# “THE AIR WE BREATHE”:

# NINETEENTH-CENTURY AMERICANS AND THE SEARCH FOR FRESH AIR

by

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ABSTRACT OF THE DISSERTATION

"The Air We Breathe": Nineteenth-Century Americans and the Search for Fresh Air

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This dissertation studies how Americans came to value and protect "fresh air" in the rapidly changing industrial cities of the nineteenth century, and explains how and why old-fashioned sensory knowledge sparked environmental campaigns. Drawing from government documents, scientific reports, personal files, political cartoons, novels, and periodicals, this cultural history of fresh air recreates the common sense of the nineteenth century, when people believed that invisible miasmas governed their bodies. To eliminate odors, chemists recommended condensers and chemical neutralizers, lawyers and politicians created new nuisance regulations, and engineers designed complicated systems of ventilation and sewerage. While specialists claimed that they could control odors, lay people pursued their own time-tested solutions: the wealthy took summer vacations, the working classes spent their evenings on tenement roofs, and women planted fragrant plants in on the borders of their homes.

With the introduction of public health boards and new industrial processes, urban odors changed dramatically, though people's perception of and reaction to these odors remained largely the same. This study tracks the changing smellscapes of New York City and Chicago, focusing on the materiality of the physical city, and it uses complaints about "bad" odors and celebrations of "good" smells to assess the role of sensory experience in late nineteenth-century environmental movements. Because people associated bad odors with illness, the olfactory history of urban

experience illustrates how Americans enlisted science, technology, law and common practices to mitigate health dangers and ultimately accept environmental risk.

Through investigating the public ramifications of personal experiences of odor, this project contributes to the histories of the senses, urban environment, public health, science, urban governance, and cleanliness. The unusual melding between the individual, subjective experience of smelling and the emerging community of scientific experts in the late-nineteenth century formed a tenuous but persuasive foundation for articulating the necessity of change and resisting unchecked industrial development.

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**TABLE OF CONTENTS**

## LIST OF ILLUSTRATIONS

## Introduction.

## What's that Smell?

## Maple Syrup and Environmental Concerns

Just before Halloween in 2005, an unusual odor wafted through the streets of New York City. Some thought it was maple syrup, others pancakes. Rather than taking comfort from such a familiar scent and seeking out nearby diners, many New Yorkers panicked due to the intensity, wide dispersal, and atypical presence of this odor in their environment. What could the smell be? Residents called the city's 311 hotline, spoke with the press, and blogged about their concerns. In a post 9/11 world replete with chemical toxins, many suspected that the smell might be some form of bioterrorism. Before learning that everyone could smell something sweet and syrupy, individuals worried they were having a stroke or "some sort of brain tumor-induced olfactory hallucination." Others mocked such fears as overreaction, chalking the smell up to "EGGO-terrorism" or a Vermont tourism campaign. Through both fear and humor, New

Yorkers tried to understand where this odd odor originated, what it was, and how it affected those living in the city.[1]

The maple syrup smell and reactions to it raise a series of questions about urban environments. What should the air smell like? What scents are normal and non-threatening? What makes an odor unusual? How do residents react to unfamiliar odors, and why do they react in that way? How do people understand their relationship to the air they breathe? Though the maple syrup smell was novel in New York in 2005, these questions had been asked before. In the nineteenth century, New Yorkers regularly sniffed the wind for knowledge about health threats in their local environment. In conversations as varied as those about city streets, filth, new industries, open windows, summer vacations, plumbing and flowers, urban residents developed and debated definitions of fresh and foul air. Their ideas about the air determined which smells were good and healthy, and which stenches might make them sick.

The chapters that follow answer these questions by investigating how urban Americans thought about fresh air and foul odors between 1840 and 1900. During these years, cities saw population growth and industrial expansion that fundamentally changed their natural environments, urban forms, and residents' expectations. Both New York City and Chicago were prominent on regional and national levels, and each has its own interesting story about the struggle for fresh air.

Nineteenth-century Americans came to value and protect "fresh air" through a variety of methods. To eliminate odors, chemists recommended condensers and chemical

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[1] The maple syrup smell became a media event in the 24-hour news cycle, with articles appearing in the local press, on television news programming, and numerous news blogs. Reader comments are especially helpful in glimpsing the varied reactions of individuals. Quotes taken from comments on: Jake Dobkin, "Maple Sugar Smell Mystery!" *Gothamist,* 28 October 2005, http://gothamist.com/2005/10/28/maple_sugar_smell_mystery.php (accessed 9 April 2012).

neutralizers, lawyers and politicians created new nuisance regulations, and engineers designed complicated systems of ventilation, plumbing and sewerage. While these specialists claimed that they could detect and control odors, lay people pursued their own time-tested solutions: the wealthy took summer vacations, the working classes spent their evenings on tenement roofs, women strategically placed fragrant plants in their windows and all classes complained about the ill effects of the malodorous atmosphere. Drawing on these many practices, I argue that olfaction was central to nineteenth-century evaluations of air quality and environmental degradation. I contend that smells had deep cultural meanings beyond aesthetic pleasure or discomfort, and deodorization campaigns were as much about alleviating the material conditions of disease as they were about middle class formation and modernity. Because people associated bad odors with illness, the olfactory history of urban experience illustrates how Americans enlisted science, technology, law and common practices to mitigate health dangers and ultimately accept environmental risk as a cost of urban living.

"Today's history comes deodorized."[2] With this statement, historian of medicine Roy Porter opened his introduction to the 1986 English translation of Alain Corbin's *The Foul and the Fragrant* (originally published in French, 1982). Corbin's book, more than any other, put odor on the historical map. Porter referred to the attention historians had given "what the past looked like" and "the distant sounds of civilized life," and their comparative neglect of history's scents. Porter suspected that historians were silent because modern hygienic sensibilities repelled scholars "from even contemplating the stench of the past." Corbin's book was hailed a breakthrough in scholarship and

[2] Roy Porter, "Foreword," in Alain Corbin, *The Foul and the Fragrant: Odor and the French Social Imagination*, trans. Miram L. Cochan (Cambridge: Harvard University Press, 1986), v.

universally applauded. Yet, over twenty-five years after *The Foul and the Fragrant* reached an English-speaking audience, Porter's comment remains as true today as when he penned it. In a recent review of the literature on smell, historian Mark S.R. Jenner noted that period odors appear for scene-setting purposes at the start of monographs and in historical novels, but rarely receive sustained scholarly attention.[3] By and large, historians have not integrated scents, odors and olfaction into their studies. This raises the obvious question of, why not? Where might a history of odors and olfaction take us?

For the history of France, Alain Corbin and David S. Barnes have offered two destinations. Corbin's book traced the ways that smells were perceived and analyzed in the eighteenth and nineteenth centuries, when there was "a collective hypersensitivity to odors of all sorts."[4] To understand this hypersensitivity, which he saw as a break with the past, Corbin sought both its causes and consequences. This line of investigation led Corbin to consider the history of science and medicine alongside the history of urban development and spatial segregation. Working in these literatures, Corbin argued that odors hadn't changed during this period; instead, doctors, chemists and reformist campaigners gave odors more attention because changes in scientific theory explained foul odors as unhealthy emanations from soil, water and bodies. Leading with scientific theory, Corbin asserted that scientists, especially hygienists and chemists with disinfecting techniques, created a revolution in smell that redefined the intolerable, created a "new calculus of olfactory pleasure" and launched a widespread deodorization campaign.[5]

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[3] Mark S.R. Jenner, "Follow Your Nose? Smell, Smelling, and Their Histories," *American Historical Review* 116, no. 2 (Apr 2011), 335-351.
[4] Corbin, 4.
[5] Corbin, 71.

This revolution not only affected public places, but also changed domestic space, social relations, and even ideas about the self. In the home, Corbin highlighted the evolution of the bathroom as a specialized space and the advent of single family, standalone homes, both of which he connected to the new sensitivity toward smell. In social relations, Corbin borrowed from anthropology to aver that "abhorrence of smells produces its own form of social power," an argument that lent political power to assertions that the urban poor, villagers and peasants smelled bad.[6] Corbin also found a heightened attention to one's body odor, which he associated with "the rise of narcissism and the retreat into private space."[7] The last contention, crafted through the now suspect practices of psychohistory, is the least convincing of an impressive range of arguments and explanations that resulted from this serious consideration of olfaction. Overall, Corbin explained that the "perceptual revolution" between 1750 and 1880, before Pasteur's work introduced germ theory, was the "precursor of our odorless environment."[8]

David S. Barnes published *The Great Stink of Paris* in 2006, picking up the history of French odors where Corbin left off and charting the reasons for shifting perceptions of odors between Paris's two olfactory crises of 1880 and 1895. In each of these summers, overpowering stenches stirred public anger and created a minor political crisis. However, while experts in 1880 alleged that the stench caused disease, claims that odors spread disease were rare in 1895. To explain this shift in public health knowledge, Barnes turned not to scientists but to practice on a local level, formulating a theory of "sanitary-bacteriological synthesis [that] brought the commonsense cultural appeal and

[6] Corbin, 5
[7] Corbin, 232.
[8] Corbin, 229.

broad applicability of old knowledge…into harmony with the specificity and scientific mastery inherent in the new knowledge of microbes."[9] In other words, the bacteriological revolution did not occur overnight, but scientists spread their new understanding of microbes by fitting it into existing practices for disease prevention. While Barnes considered scientists in this period as experts, he spent less time exploring their expert status than asking how scientists translated medical knowledge into "unprecedented authority in society as a whole, and in specific organs of public government."[10] To answer this question, Barnes moved away from Paris and studied public health workers, both doctors and government employees, who tried to spread the tenets of bacteriology among France's peasants and articulated their goals as spreading civilization and modernity.

Barnes' study focuses on public health and is much narrower than Corbin's account, but what Barnes sacrificed in breadth he more than made up for in depth. Corbin often moved through evidence in confusing ways that obscured time, location and source type in order to construct a *mentalité*; Barnes instead worked in detail and great care through a dense body of documents compiled by scientists, doctors and government employees over a very brief period. That said, Barnes' goal was not a history of sensory perception, but to use olfaction as an entry into the history of public health and how knowledge about disease etiology and prevention spread through society.

Both Barnes and Corbin situate the importance of odors in questions of hygiene and public health, which makes explorations of beliefs about disease and the origins of public health perfect starting points for investigations of olfaction's history.

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[9] David S. Barnes, *The Great Stink of Paris and the Nineteenth-Century Struggle Against Filth and Germs* (Baltimore: The Johns Hopkins University Press, 2006), 3.
[10] Barnes, 7.

Furthermore, Barnes follows Corbin in identifying a deodorizing impulse that was bound up in notions of civilization and modernity as well as ideas of health. Although Corbin considered pleasing fragrances, the preference for sweet odors, and the changing uses of perfume for the body and the home, he did not find a triumph of the fragrant over the foul. Instead, Corbin argues that all types of odors were eliminated as part of a deodorizing and civilizing process that resulted in today's "muted olfactory environment" or "odorless environment."[11] Following Barnes's and Corbin's leads also means considering the extent of these deodorizing campaigns.

Writing in 2011, Mark S.R. Jenner questioned the emphasis on deodorization with which historians have interpreted the eighteenth to twentieth centuries as "a progressive conquest of stench."[12] Jenner challenged the deodorization thesis from multiple angles. As a historian of early modern England, Jenner noted that both Corbin and Barnes dismiss or ignore the ways in which individuals and governments struggled against and tried to eradicate foul odors in the fifteenth, sixteenth and seventeenth centuries. Jenner was impatient with the deodorization thesis as a Whiggish history that emphasizes progress toward today's supposedly deodorized environment and implicitly perpetuates the "imperialist, racist, and/or Orientalist, stereotype that 'simpler societies' lived amid stench and squalor."[13] Instead of emphasizing so-called simpler societies, Jenner pointed out that the stench of excrement—the primary concern of Barnes's hygienists—was likely most intense in historical moments marked by extreme poverty and the swift shift to urban living. Following this line of thought, Corbin and Barnes have found an emphasis on deodorization not because there was a new sensitivity to odor or because of

[11] Corbin, 4, 229.
[12] Jenner, 338.
[13] Jenner, 340.

a civilizing impulse, but because both studied Paris during a period of expansion and industrialization. Jenner also noted that the deodorization thesis does not adequately address the full range of odors that exist in modern society. Deodorization, as part of the modernizing project, primarily refers to the elimination of excremental odors, rather than the elimination of all odors. The modern period, which both Barnes and Corbin equated with deodorization, included a proliferation of odors from industries, perfumes, flowers, tobacco and the movement of people into new spaces and new social configurations. Jenner's arguments against the deodorization thesis call for a consideration of how odors were perceived and used outside of the realm of public health. This in turn requires other models for how to explore the history of olfaction.

Jenner's essay appeared just as I was drafting this project and growing frustrated with the limits of Barnes and Corbin's discussions of deodorization, civilization and modernity. Like Barnes and Corbin, I had begun my research on smell in the public health records of American cities, but I had also found references to and insights about odors in domestic advice literature, novels, editorials and cartoons. The explanatory power of deodorization and the sanitary-bacteriological synthesis did not stretch to cover my thoughts on urban navigation, the uses of fragrant plants, or visualizations of smell. Following Jenner's provocative lead, I returned to the wider literature on history of the senses and tried to answer his call for "a richer, quasi-ecological, history of smell and the senses that examines simultaneously the person or people perceiving *and* the environment that they inhabited."[14]

Jenner rightly noted that there is a tension in history of the senses that has created two types of studies. Some focus on perception, while others document the materiality

[14] Jenner, 349.

apprehended by the senses. This dichotomy is clear in the literature on sound where I found many of my methods for identifying an archive and interrogating sources. Richard Cullen Rath's *How Early America Sounded* (2003) argues that historians need to take discussions of sounds literally, rather than assuming that references to sounds were metaphoric or metonymic, and this method led Rath to tell a story of shifts in perception.[15] Rath argued that sounds haven't changed; "what has shifted is how [sounds] are heard."[16] Rath reread many familiar sources from colonial America to recover the cosmologies of auditory perception that guided settlers and Native Americans in interpreting their environment and each other. Mark M. Smith has made similar points in *Listening to Nineteenth Century America* (2001) as he argued that differences between the soundscapes of North and South contributed to the Civil War and Reconstruction. In arguing for the importance of aural representations of sectional identities, Smith also built a story of perception in which the soundscape or aural environment existed and shaped how different people understood sounds. In *The Soundscape of Modernity* (2002), Emily Thompson took the opposite approach, focusing on production of new sounds and soundscapes by modern technology in early twentieth-century America, and how acoustic engineers tried to control these sounds.[17] Thompson's study offers insights into how urbanization and industrialization changed sensory phenomena, but it privileges technologies of control, expert knowledge and the materiality of sound over perception.

Jenner argued that this distinction between the cultural and the physical "is singularly inappropriate for the history of smell," and I agree with this assessment. As I

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[15] Richard Cullen Rath, *How Early America Sounded* (Ithaca: Cornell University Press, 2003).
[16] Rath, 3.
[17] Emily Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900-1922* (Cambridge: MIT Press, 2002).

borrowed methods and insights from Rath, Smith, and Thompson, I blended these approaches to create a study that is attentive to the reciprocal relationship between the material environment and perceptions thereof. Because all three authors emphasize the importance of soundscapes, they made me look for evidence of specific smellscapes in the past, and to try to understand how odors were attached to particular places. From Rath, I also adopted the need to read mentions of smell literally as well as metaphorically, so that I could understand what specific smells meant to the people describing them. Just as Rath found perception and meaning in "what people did with sound," I looked for evidence of how and for what purposes people used smells.[18] Smith taught me that smells could not be divorced from their cultural, political and economic contexts because all were entwined in people's lives. Thompson introduced a set of actors who either had control or tried to assert control over the sound, which made me question both who might have controlled odors and what smell expertise entailed. In following these methodological approaches, this project grounds ephemeral odors and reactions to them by explaining changes in the natural and built environment that created new smells, altered the intensity of familiar scents, and brought people into contact with odors previously unknown while also recovering and historicizing the efforts of urbanites to educate the senses and trust their noses.

The literature on history of the senses, while offering many promising directions for an investigation of odors, holds a problematic assumption as its starting point. The above studies of sound and smell all stem from the premise that the centrality of vision in our modern culture has created an imbalance in our scholarship that privileges sight and ignores other senses. Studies of the senses of hearing, smelling, tasting, and touching

[18] Rath, 47.

argue against ocularcentrism and assert that the 'lower' senses are of equal or greater importance. This approach has proved an effective starting point for studies of the senses, as it has pushed scholars to move beyond visual culture and investigate a wide range of sensory evidence. However, as James Cook has cautioned, rescuing and elevating the non-visual senses is historically inaccurate, because historical actors "first identified visual representation as a primary arena of ideological struggle."[19] Cook urged scholars to ask why seeing and visual culture were more important than other senses in particular historical contexts and to understand the cultural systems that privileged seeing. This timely reminder encouraged me to look for the interplay between smelling and seeing, rather than focusing on accounts of scents and smelling to the exclusion of other sensory experiences and evidence.[20]

Building from the methodologies of sensory history and considering the primary archives of Corbin and Barnes's studies of odors, I began my research in the literature on public health in the United States. I chose the 1840s as my starting point because this decade marked the beginning, on both sides of the Atlantic, of systematic surveys of the public's health and the push for sustained government provisions for the health of its citizenry. As I read these early surveys, however, it became obvious that the sanitarians were just as concerned with the environment as with health, and in fact saw the two as closely connected. In pursuing this connection, I turned to environmental history.

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[19] James Cook, "Seeing the Visual in U.S. History," *Journal of American History* 95, no. 2 (Sept 2008), 434.

[20] Anthropologist David Howes has also urged attention to the multi-directional interaction of the senses and sensory ideologies, though with less concern for understanding why people have privileged sight than an interest in replicating sensory models and recognizing that "more than one sensory model may be operating and interacting at one time." David Howes, ed., *Empire of the Senses: The Sensual Culture Reader* (Oxford: Berg, 2005), 11; Howes, *Sensual Relations: Engaging the Senses in Culture and Social Theory* (Ann Arbor: University of Michigan Press, 2003).

Environmental history, like the field of history in general, has said very little about the role of the senses. Writing in the field's premier journal, both Peter Coates and Adam Rome have exhorted environmental historians to think more and explicitly about the senses, but responding efforts have been few and far between.[21]

Three studies of the environment in the nineteenth-century United States have commented explicitly on the connection between odors, health, and environment: Conevery Bolton Valencius's *The Health of the Country* (2002), Linda Nash's *Inescapable Ecologies* (2006), and Gregg Mitman's *Breathing Space* (2007).[22] Each of these books, working at the intersection of medical and environmental histories, illustrates how closely connected ideas of health and the natural environment were in nineteenth-century minds. As Nash argued, "knowledge and ideas do not emerge from nowhere but from the interactions of human minds with specific places, materials, and things."[23] Accordingly, the senses—one of the mediums by which the human mind interacts with its surroundings—are important to these attempts to situate human bodies in their ecologies and to understand how people made knowledge from their daily experiences of the world around them.

Valencius considered olfaction the most of these three authors, devoting an entire chapter to "airs." In this chapter, Valencius clearly articulated the perceived connections between bad smells, bad airs, and bad health that derived from both humoral and

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[21] Peter Coates, "The Strange Stillness of the Past: Toward and Environmental History of Sound and Noise," *Environmental History* 10 (Oct 2005): 636-655; Adam Rome, "From the Editor," *Environmental History* 9 (Apr 2004): 203.

[22] Conevery Bolton Valencius, *The Health of the Country: How American Settlers Understood Themselves and Their Land* (New York: Basic Books, 2002); Linda Nash, *Inescapable Ecologies: A History of Environment, Disease and Knowledge* (Berkeley: University of California Press, 2006); Gregg Mitman, *Breathing Space: How Allergies Shape Our Lives and Landscapes* (New Haven: Yale University Press, 2007).

[23] Nash, *Inescapable Ecologies*, 9.

miasmatic theories, and explained why these connections have been so difficult to unravel: "Silence about *how* airs imparted the nature of surrounding terrain to the human body was indicative of the completely unremarkable nature of that transfer. Airs' action on the human frame was part of the common sense about the functioning of the world that was shaped by shared experience and expressed through shared language."[24] To understand how olfaction, the "mute sense," guided actions, one needs not only to follow Rath's lead in taking language seriously, but also interrogate the silences created by shared cultural values and knowledge.[25]

Valencius interrogated both discussions and silences about bodies and the environment to argue that her actors, the men and women among the first trans-Appalachian settlers, were steeped in the medical theories of their day when they read the landscape for its salubrity and interpreted the negative consequences of bad smells. Linda Nash took this argument further in her analysis of migrants to California's Central Valley, explaining the persistence of the perceived link between environment and health after the introduction of germ theory. Writing across the divide of germ theory but focusing on lay people rather than scientific and medical leaders, Nash offered an alternative to Barnes's sanitary-bacteriological synthesis. Nash found that local knowledge about environmental dangers continued to guide actions throughout the twentieth century, but because many of her actors were migrant workers racialized as 'other,' their knowledge of unhealthy environments was dismissed by sanitary inspectors and medical experts. Nash argued that "tension between local and translocal knowledge often emerges in the materials produced by state and local public health officials," and

[24] Valencius, *Health of the Country*, 114-115.
[25] Diane Ackerman, *A Natural History of the Senses* (New York: Vintage Books, 1991).

that the history of health and environment "does not conform to either the progressive narration of medical discovery or to the declensionist narrative of relentless scientific reductionism."[26] While Barnes encouraged me to find synthesis in modernization, Nash pushed me to look for disagreements over health and environmental knowledge. Because of *Inescapable Ecologies*, I ask whose knowledge was contained in public health documents and what alternative knowledge or silences these documents ignored.

While Mitman's actors also saw connections between their health and local environment, they reacted in different ways. Wealthier and more privileged than trans-Appalachian settlers or migrant agricultural workers, Mitman's actors saw their bodies at odds with the surrounding environment. When hay fever, asthma and allergies struck their respiratory systems, the afflicted tried to free themselves from the offending environment. As early as the 1880s, the leisure classes took "hay fever holidays" to flee the pollens of their localities. Others took an offensive against the environment, spraying pesticides, attacking weeds and cutting down trees in an effort to destroy the local pollens that caused runny noses and itchy eyes. More recently, Americans have tried to barricade themselves from their environments, hermetically sealing themselves into homes with air conditioning and filtration systems. In surveying these histories, Mitman revealed the many ways in which allergies and allergy sufferers had changed the American landscape in their futile attempts to flee the natural environment. Mitman's history of allergies and hayfever holidays is one of unintended consequences, in which sufferers transported the allergens that they hoped to flee and introduced them into new environments. Mitman's attention to the role that pollens and plants played in experiences of environments and

[26] Nash, *Inescapable Ecologies*, 10, 214.

health raised questions for me about the place of plants, pollens and fragrances in cities, and about the unintended consequences of deodorization efforts.

Each of these studies offers intriguing insights into how nineteenth-century Americans used their senses to guide their interactions with and movements through their environment. However, these histories all focus on rural environments, rather than the rapidly changing urban environments of the nineteenth-century. Nash considers waves of migration into California's agricultural Central Valley, while Valencius and Mitman focus on people who moved away from the urban East, as western settlers or elites on hay fever holiday. But if people moved in search of health, what did those without mobility do to ensure health in their own environments? What efforts were taken to make environments healthier? If no efforts were taken, why not? These questions about health and environment need to be answered for places that Americans had inhabited for a long time, as well as the new places that Americans sought out in their quest for health.

Urban environmental historians—a small group at the intersection of urban, environmental and technology history—have begun to ask these questions about built environments. The subfield of urban environmental history is surprisingly new; Harold Platt wrote about "the emergence of urban environmental history" as a recent development in 1999.[27] The first authors in this field, most notably Joel Tarr and Martin Melosi, wrote histories of urban environments that focused on problems with pollution and inadequate infrastructures.[28] As both Tarr and Melosi surveyed the growth of

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[27] Harold L. Platt, "The Emergence of Urban Environmental History," *Urban History* 26, no. 1 (1999): 89-95.

[28] Joel Tarr, *The Search for the Ultimate Sink: Urban Pollution in Historical Perspective* (Akron, OH: The University of Akron Press, 1996); Tarr, ed., *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region* (Pittsburgh: University of Pittsburgh Press, 2003); Clay McShane and Joel Tarr, *The Horse in the City: Living Machines in the Nineteenth Century* (Baltimore: The Johns Hopkins University Press, 2007); Martin Melosi, *The Sanitary City: Urban Infrastructure in America from Colonial*

American cities in the nineteenth and twentieth centuries, they isolated environmental problems (especially water pollution and waste disposal) that also were sanitary problems. Urban environmental historians have found solutions to these sanitary-environmental problems in the rise of civil engineering as a professional field and the creation of systems such as sewers and street cleaning to govern urban environments.

Despite the accomplishments of urban environmental history, Melosi argues that there are some shortcomings of the field as it has developed thus far. Primarily, Melosi urges subsequent historians to "place urban environmental issues in a broader framework than reform politics" and to move beyond the Progressive Era in asking questions about urban environments.[29] Furthermore, though Melosi's own work began in a "problems" approach to the urban environment, Melosi believes that this pollution-centric approach has handicapped urban environmental history from addressing the full range of ways in which people encountered, understood and thought about the physical city. These arguments about the shortcomings of a pollution-centered approach to environmental history dovetail with Jenner's concern about the deodorization thesis. Therefore, while I ask how olfactory history can help to elucidate the physical city, I also sought moments when people did not perceive smells as a problem. Were smells a positive aspect of the urban environment, and which smells did urban residents celebrate rather than decry? Furthermore, how did changes in the physical city change the city's odors?

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*Times to the Present* (Baltimore: The Johns Hopkins University Press, 2000); Melosi, *Effluent America: Cities, Industry, Energy, and the Environment* (Pittsburgh: University of Pittsburgh Press, 2001); Melosi, *Garbage in the Cities: Refuse, Reform and the Environment* (Pittsburgh: University of Pittsburgh Press, 2005); and Melosi, ed, *Pollution and Reform in American Cities, 1870-1930* (Austin: University of Texas Press, 1980).

[29] Melosi, *Effluent America*, 5.

Environmental histories of the air are few, and have followed the problems approach. These works overwhelmingly focus on the struggles against smoke pollution, a relatively recent development. Robert Dale Grinder began this work with his 1973 dissertation, which countered the idea that "concern over pollution is something new, something that at least post-dates the Second World War."[30] Grinder noted that such timelines relied upon technological devices that consumed smoke, rather than looking for the genesis of the idea that smoke was a problem and early attempts to abate smoke. Grinder successfully located the origins of the anti-smoke crusades in the 1890s, situating them within other attempts to reform cities during the Progressive Era and explained the subsequent turn to engineering solutions rather than legislative measures. In this way, Grinder's story was as technologically driven as the air pollution narrative he hoped to deflate. David Stradling updated Grinder's work with *Smokestacks and Progressives* (1999), but also emphasized technological solutions over legislative as he tracked how the identification of a smoke "problem" waxed and waned with economic imperatives and coal supplies.[31]

Other scholars have taken a cultural approach to the problem of air pollution, asking when, why and for whom smoke became a problem. For Pittsburgh, once one of the smokiest American cities, Angela Gugliotta has rejected the idea that smoke became a problem for all citizens, or even the entire middle-class, at a single moment. Instead, she asserted that smoke held divergent meanings for Pittsburgh's residents, who neither

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[30] Robert Dale Grinder, "The Anti Smoke Crusades: Early Attempts to Reform the Urban Environment, 1893-1918," (PhD diss., University of Missouri-Columbia, 1973), 1.
[31] David Stradling, *Smokestacks and Progressives: Environmentalists, Engineers, and Air Quality in America, 1881-1951* (Baltimore: The Johns Hopkins University Press, 1999).

passively accepted nor unanimously resisted the dark skies of their city.[32] Adam Rome has examined the language of pollution and argued that "pollution" took on a new meaning during the Progressive Era as middle-class reformers used a word with powerful moral connotations as a descriptor for matter out of place.[33] Yet these scholars of air pollution have said very little, if anything, about the role of olfaction and odors in perceptions of air quality. This led me to wonder if and how reformers connected stenches with smoke. My interest was especially piqued by the Citizen's Association of Chicago, whose anti-smoke efforts have been documented by Christine Meisner Rosen (1995).[34] As I looked into the records of this group, I found that a Committee on Stench predated the Committee on Smoke that Rosen examined. Since the Committee on Stench disappeared as the Committee on Smoke became very active in urban governance,

The questions and approaches of urban environmental history and the literature on air pollution sent me back to public health by way of the history of nuisance law and urban regulation. The emphasis on urban systems and infrastructures led me to wonder how smells interacted with these systems. Did individuals use their sense of smell to navigate urban systems as they did new rural environments? Did cities try to construct fresh air infrastructures alongside those for supplying fresh water and removing garbage? Furthermore, since Valencius and Nash identified air problems that predated the anti-smoke crusades, I wondered if the problems of miasmas and stenches were connected to definitions of air pollution. Did city governments try to regulate stenches with engineers

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[32] Angela Gugliotta, "How, When, and for Whom was Smoke a Problem in Pittsburgh?" in *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region*, edited by Joel A. Tarr (Pittsburgh: University of Pittsburgh Press, 2003), 110-125; Gugliotta, "'Hell with the Lid Taken Off': Cultural History of Air Pollution-Pittsburgh," (PhD diss., University of Notre Dame, 2004).

[33] Adam Rome, "Coming to Terms with Pollution: The Language of Environmental Reform, 1865-1915." *Journal of Environmental History* 1, no. 3 (July 1996): 6-28.

[34] Christine Meisner Rosen, "Businessmen Against Pollution in Late Nineteenth Century Chicago," *Business History Review* 69:3 (Autumn 1995), 351-397.

and ordinances as they did smoke? What might histories of regulation tell us that histories of abatement technologies don't?

Histories of nuisance law have begun to answer these questions by examining stench nuisance cases of the nineteenth century. Both Andrew Hurley and Christine Meisner Rosen have surveyed the outcomes of these cases, which were decided far more often for the stench-producing defendants than for the plaintiff who complained. Rosen has argued that, although stenches were "the most common reason why city dwellers took legal action against businesses," the judges who decided these cases had great difficulty in applying existent definitions of nuisance and damage to the effects of new industries.[35] Working within a common law system of legal precedents, the courts lacked the ability to regulate unprecedented levels and types of pollution. Hurley found that business owners exploited power structures and the municipal division of authority to thwart environmental reform and create "ecological wastelands" which became de facto industrial zones once pollution began to take its toll.[36] In each of these cases, nuisance law was ineffective against industrial stenches and thus new industries were able to claim urban areas for their own uninterrupted and unregulated use.

In contrast to the long-held view that common law and nuisance law were weak and largely powerless against the progress of business, industry and wealth in the nineteenth century, legal historian William Novak has argued that, "Nineteenth-century nuisance law was neither trivial nor timid….Declaring an activity or establishment a

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[35] Christine Meisner Rosen, "Noisome, Noxious, and Offensive Vapors, Fumes and Stenches in American Towns and Cities, 1840-1865," *Historical Geography* 25 (1997): 51; Rosen, "'Knowing' Industrial Pollution: Nuisance Law and the Power of Tradition in a time of Rapid Economic Change, 1840-1864," *Environmental History* 8, no. 4: 565-597.

[36] Andrew Hurley, "Creating Ecological Wastelands: Oil Pollution in New York City, 1870-1900," *Journal of Urban History* 20, no. 3 (May 1994): 340-364.

nuisance in the nineteenth century unleashed the full power and authority of the state."[37] For Novak, much of the confusion about nuisance law stems from the shifting definition of nuisance. The current vernacular defines nuisance as something causing inconvenience or annoyance. This characterization misleads casual readers, unfamiliar with the nuances of nineteenth-century legal codes, into thinking that odors and other nuisances were trivial. Following Novak's logic means that even when nuisance cases were decided in favor of the defendant, the willingness of the plaintiff to invoke the language of nuisance reveals a powerful sense that something was amiss in the status quo and that the common good was under wrongful attack. Novak also directed historians to look beyond nuisance litigation and consider police power as governmental regulation that was based upon definitions of nuisance and the public good.

Legal scholar Noga Morag-Levine built upon Novak's arguments with her *Chasing the Wind: Regulating Air Pollution in the Common Law State* (2003).[38] Morag-Levine, writing in response to the burden of proof for air quality complaints in California, sought the historical origins of such a complicated legal and regulatory system through a comparison of the development of air regulation regimes in Great Britain, Germany and the United States. Like Novak, Morag-Levine located a problem in shifting vernacular definitions of key terms. Under the Clean Air Act, the Environmental Protection Agency [EPA] classified localized pollution, both chemical and nonchemical, as "odors" because sensory perception of each occurs primarily via the nose. Morag-Levine argued that this classification, merged with contemporary connotation of odors as nonthreatening, has

[37] William Novak, *The People's Welfare: Law and Regulation in Nineteenth-Century America* (Chapel Hill: The University of North Carolina Press, 1996), 62.
[38] Noga Morag-Levine, *Chasing the Wind: Regulating Air Pollution in the Common Law State* (Princeton: Princeton University Press, 2003).

"provided a useful rhetorical device for those who sought to question the need for greater [industrial pollution] controls."[39] EPA's classification and the nonthreatening connotation of odors combine to dismiss complaints about environmental smells, denying local knowledge of the connection between pollution and illness. As with the "minor annoyance" meaning of nuisance, applying the "trifling inconvenience" definition of odors to nineteenth century is both anachronistic and misleading. Though I reviewed few court cases in my research on olfaction, I learned from Novak and Morag-Levine to listen carefully when actors invoked the language of nuisance outside of courtrooms.

Morag-Levine's arguments also redirected my approach to public health from a curiosity about miasma theory and health threats to a consideration of public health bureaucracies as regulatory agencies for local environments. Morag-Levine found that as people continued to think about odors as nuisances that required abatement, but found little relief from the courts, they pursued alternative means of regulation. The most obvious form in the United States was the creation of health departments who had the power to enforce nuisance law. Through writing and enforcing nuisance regulations, public health officials and lawmakers defined bad and unhealthy smells. This insight led me to ask if and why health officials categorized smells differently from other urban residents, and how differences in definition were resolved. Was there an arbiter between public health and the public on the subject of smells?

The search for the public's categorization of odors and an arbiter between public health officials and the public became increasingly important to me as I reviewed the literature on the origins of organized public health in the United States. The main thrust

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[39]Noga Morag-Levine, *Chasing the Wind: Regulating Air Pollution in the Common Law State* (Princeton: Princeton University Press, 2003), 129.

of the historical literature on public health, since George Rosen's seminal study in 1958, has been to explain the "social character of disease" and document the historical trajectory of preventive measures.[40] A large part of this literature has been written to explain and implicitly support the agenda of the modern state and modern medicine in caring for the health and welfare of the citizenry. In supporting modern public health, this literature has touted the successes of past public health initiatives and deemphasized early failures or ideas about etiology now thought to be incorrect, such as miasma theory. Rather than take seriously the warnings against stenches of early public health advocates such as Edwin Chadwick, who famously declared that 'all smell is disease,' medical historians have emphasized sanitarians' concerns with conditions of overcrowding and filth, the conditions in which microbes multiplied and spread. Once public health accepted germ theory, odors became an incidental part of the story rather than significant health threats to be managed.

In the American context, the works of John Duffy, Barbara Gutman Rosencrantz, and Charles Rosenberg have traced stories of sanitary reform that grew into bureaucracies peopled by professional men: physicians, scientists and politicians.[41] Together, these authors have cemented 1866, the year in which New York City chartered the first standing Board of Health, as a turning point in public health—a moment of

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[40] Feliz Marti-Ibanez, "Foreword" to George M. Rosen, *A History of Public Health* (New York: MD Publications, Inc., 1958), 16.

[41] John Duffy, *The Sanitarians: A History of American Public Health* (Urbana: University of Illinois Press, 1990); Duffy, *A History of Public Health in New York City, 1625-1866* (New York: Russell Sage Foundation, 1968); Duffy, *A History of Public Health in New York City, 1866-1966* (New York: Russell Sage Foundation, 1974); Charles Rosenberg, *The Cholera Years: The United States in 1832, 1849, and 1866* (Chicago: The University of Chicago Press, 1987); Barbara Gutman Rosenkrantz, *Public Health and the State: Changing Views in Massachusetts, 1842-1936* (Cambridge, MA: Harvard University Press, 1972).

institutionalization that created professional sanitarians who dedicated their labors to improving health, eradicating disease, and improving mortality rates.

1866 is a moment ripe for celebration because the creation of permanent health boards marked an expansion of government's role in providing for its citizens. As Rosenberg argues, New York City's government not only conquered cholera in 1866, but also adapted to the increasingly complex social and economic organization of its time with "a corresponding expansion in the tasks of public administration."[42] Duffy breaks his two-volume history of new York City's public health in 1866 for precisely this reason, though his account of ordinances passed and political debates changes little in 1866—a continuity that begs the question of how much power public health officials acquired with institutionalization. Rosencrantz finds much to applaud in the early years of institutionalization, when statewide coordination of officials enabled the thorough investigations of housing, water supplies, slaughterhouses and alcohol use that underpinned preventive efforts. Given the early successes of the Massachusetts Board, Rosencrantz agrees with Rosenberg and Duffy that professionalization and bureaucratization of medicine were positive steps in the march toward improved health. However, Rosencrantz argues this progress did not last long because of a turning point central to medical history: Pasteur and Koch's discovery of bacteria and introduction of germ theory circa 1880. Rosencrantz argues that public health's shift to germ theory, a shift that took officials' attention from homes to laboratories, included turning away from the boards' initial focus, the social conditions that underlay illness. In emphasizing germs over living conditions and social arrangements, public health authorities

[42] Charles Rosenberg, *The Cholera Years: The United States in 1832, 1849, and 1866* (Chicago: The University of Chicago Press, 1987), 232.

emphasized cures rather than prevention and thus lost the forward momentum that institutionalization had originally created.

This history of nineteenth-century public health raised as many questions as it answered. While I learned how institutionalization and professionalization of public health imbued nuisance law with renewed regulatory powers and enforcement, I still wondered how early sanitarians thought about fresh air and urban odors. In the years before 1880, how did health officials react to odors and odor concerns? Did public health officials create ordinances for ventilation and encourage public parks because of odor concerns? Did newly deputized public health officials change the ideas and attitudes toward odors among lay people, like those of Valencius's and Nash's histories? Did Barnes's sanitary-bacteriological synthesis take place in the United States after 1880 as well as in France? Or did Nash's arguments about the continued belief in connections between bodily and environmental health after germ theory apply to the city as well as to rural areas? While the literature on public health did not answer these questions, it nevertheless convinced me of the need to consider the process of institutionalization when discussing public health and to ask how professionalization shaped the response to odors.

These questions about the relationship between institutionalized public health, as a branch of urban governance, and the lay public sent me to the literature on expertise and professionalization. I continued to search for an arbiter of disagreements over smells, or failing that, hoped to find the basis for one's authority in defining odors as good or bad. In the archives, chemist and chemist claimed expertise over odors and many operated within newly formed health boards, leading me to ask how the particular

history of chemistry's professionalization shaped understandings of odors, though the same archives made me skeptical of Corbin's assertion that science led a revolution in olfactory perception.

The literature on expertise is voluminous, and has its origins in intellectual history and history of science, though some of the most influential recent works have come from a reconsideration of expertise in the field of science studies. Early studies of expertise in intellectual history and the history of science focused on the nineteenth-century creation and proliferation of professional organizations. Studying the social sciences, intellectual historian Thomas L. Haskell argued that professionalization was "a three-part process by which a community of inquirers is established, distinguishes itself from other groups and from the society at large, and enhances communication among its members, organizing and disciplining them, and heightening their credibility in the eyes of the public."[43] Historians of science Nathan Reingold and George Daniels, writing before Haskell, also focused nineteenth-century institution and association building as a way of separating properly educated and trained expert practitioners from amateurs.[44] The social process of separating amateurs from experts emerges in these writings as a central concern, both for historians of professionalization as well as for the historical actors who created professional associations. As Reingold explained, distinguishing experts from amateurs takes on particular importance in the American context because such separation fits uneasily with a belief in democracy and rejection of social elites.

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[43] Thomas Haskell, *The Emergence of Professional Social Science: The American Social Science Association and the Nineteenth-Century Crisis of Authority* (Urbana: University of Illinois Press, 1977), 19.
[44] George Daniels, "The Process of Professionalization in American Science: The Emergent Period, 1820-1860," *Isis*, 58, 2 (Summer 1867): 150-166; Nathan Reingold, "Definitions and Speculations: The Professionalization of Science in America in the Nineteenth Century," in Alexandra Oleson and Sanborn C. Brown, eds, *The Pursuit of Knowledge in the Early American Republic* (Baltimore: The Johns Hopkins University Press, 1976), 33-69.

Though these historians have focused primarily on the actions of the scientists and professionals who founded associations and institutions and then policed their boundaries, they have also noted the importance of public recognition of expertise to the process of professionalization. As Daniels explained, "the general acceptance of these claims [of the moral value of science and of science's immediate practicality] was crucial in establishing the social role of the scientist in mid-nineteenth century America."[45] Yet these histories also demonstrate that public acceptance of the expert or professional was often uneven or unattained. The creation of a professional association did not in and of itself generate expert status. Even when lay people considered individuals to be experts on a particular subject, such as chemistry, they did not always trust an individual chemist's expert opinion. Thus the public's understanding of and relation to experts emerges as one of the most interesting questions to explore in the history of expertise, and its answers vary greatly from case to case. Considering the professionalization of chemistry alongside the institutionalization of public health within urban government, these works pushed me to consider the overlap and slippages between expertise, authority and power in nineteenth century cities.

Sociology and science studies have probed the public's relation to experts when investigating the "public understanding of science" or PUS. Influential works in these fields built upon Michael Polanyi's conception of "tacit knowledge," a knowledge gained through practice and observation that only rarely could be put into words.[46] Polanyi explained tacit knowledge as "we know but we cannot tell," meaning that humans gain knowledge through lived experience but, because lived experience is not formal training,

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[45] Daniels, 163.
[46] Michael Polanyi, "Tacit Knowing," in Polanyi, *The Tacit Dimension* (Garden City, NY: Doubleday, 1966), 3-25.

humans with tacit knowledge often lack the concepts and vocabulary to explain how they know what they know. Sociologists and science studies scholars posit that such tacit knowledge is a form of expertise, thereby challenging the nineteenth-century notion of expertise existing chiefly in relation to one's education, training and affiliations. Sociologist Brian Wynne expanded upon Polanyi's arguments in his detailed case study of the interactions between radiation experts and sheep farmers dealing with the nuclear fallout from Chernobyl in Great Britain.[47] Wynne used his case study to argue that in 1980s Britain, and probably in many other times and places, experts were no better informed than the lay people whom they tried to influence. Instead, the two groups were differently informed, as both gained knowledge about the subject from their lived histories—experts through formal education and farmers through experience. Despite the differences in their source of knowledge, each group could evaluate the changes taking place in their environment and make decisions with similar effectiveness. Studies similar to Wynne's rejected the idea that only professionals had expertise or could be experts, and instead posited a diffusion of knowledges that could and should be recognized as expertise.

Sheila Jasanoff, Harry Collins and Richard Evans have tried to build new definitions of expertise from these arguments about tacit knowledge. Jasanoff, in *Designs on Nature*, argued that distinct "civic epistemologies" exist in different cultures, times and places, and that scholars should direct their attention to these civic epistemologies in attempting to understand the role of experts in a society. Jasanoff defined civic epistemology as "the institutionalized practices by which members of a

[47] Brian Wynne, "Misunderstood Misunderstandings: Social Identities and Public Uptake of Science," in Alan Irwin and Brian Wynne, eds., *Misunderstanding Science?: The Public Reconstruction of Science and Technology* (Cambridge: Cambridge University Press, 1996), 19-46.

given society test and deploy knowledge claims used as a basis for making collective choices," and further elaborated that civic epistemology itself is tacit, "articulated through practice rather than in formal rules."[48] This approach focuses on the public far more than on the experts who were the subject of historians' studies, and helps to elucidate the basis upon which the public decides which experts to trust. Collins and Evans, uncomfortable with the diffusion of expertise allowed by the approaches of Wynne and others, urged that scholars should return their attention to the experts themselves rather than advocating for democracy in "technical decision-making," a category that encompasses state and institutional decisions that affect everyday lives.[49]

Though Wynne, Jasanoff, Collins and Evans formulated their ideas about expertise through cases from the post-World War II period, the period when big science rose to prominent positions in society and modern state structures, I found many of their ideas about tacit knowledge and public trust useful to nineteenth-century conflicts over odors. When nineteenth-century Americans discussed odors and charted olfactory geographies, they were sharing their tacit knowledge of health and environment. Recognizing these pronouncements as a form of expertise meant that I had to consider what was at stake when public health officials asserted a different interpretation of smells in the environment. Aspects of Jasanoff's civic epistemologies influenced me to look for the practices and methods by which people evaluated differing knowledge claims about smells. This became particularly important—and difficult—because my cases of olfactory conflict came from the period in which scientists and public health officials

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[48] Sheila Jasanoff, *Designs on Nature: Science and Democracy in Europe and the United States* (Princeton: Princeton University Press, 2005), 255.

[49] H.M. Collins and Richard Evans, "The Third Wave of Science Studies: Studies of Expertise and Experience," *Social Studies of Science*, 32, no. 2 (Apr 2002), 235-296; Collins and Evans, *Rethinking Expertise* (Chicago: University of Chicago Press, 2007).

were trying to establish themselves as authorities within society. In the encounter with newly defined professions, there was no institutionalized practice for evaluating truth claims akin to that Jasanoff studied in the recent history of evaluating claims about genetic modifications. Because the professions, the experts and the authorities were new categories, I argue that people were creating rather than using civic epistemologies as Jasanoff explained the concept.

Nevertheless, there clearly were power differentials between scientists, public health officials, and the lay public, and thus I kept Collins and Evans insistence upon considering scientists as experts in mind. As I wrestled with these many interpretations of expertise and tried to understand how the public did or did not see scientists as experts on olfactory knowledge in the nineteenth century, historian of science Paul Lucier published an important article that brought new clarity—and new confusion—to my evaluation of expertise. As Lucier considered this same historiography, he realized that historians and sociologists had strayed far from the original meanings of "professional" and "scientist" in the nineteenth century.[50] Lucier argued that scholars too often refer to "professional scientists," rather than recognizing that "professional" and "scientist" were coined to refer to distinct positions within society with different goals; professionals sought to advance both industry and capitalism, while scientists thought of themselves as promoters of "purer" science and established university departments. Professionals and scientists, in Lucier's reading of Gilded Age America, were opposite poles along the spectrum of practitioners of science. According to Lucier's distinction, public health officials were professionals while university professors were scientists.

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[50] Paul Lucier, "The Professional and the Scientist in Nineteenth-Century America," *Isis*, 100, no. 4 (Dec 2009), 699-732.

Though Lucier's definitions came from debates in the scientific community in the second half of the nineteenth century, they did not apply to the chemists who commented on olfaction from simultaneous positions in public health bureaucracies and universities. While the poles of professional and scientist might have been clear in explanation, they were not distinct in practice. Men such as Charles Frederick Chandler, chemist, Columbia University professor, and President of the Metropolitan Board of Health, moved seamlessly between the "purer" science of university professor and profit-garnering applications of science in industry and government. This speaks to the peculiar history of the professionalization of chemistry relative to the natural sciences. Far more than other scientific disciplines, chemistry was the science of industry, from the earliest years of the German dye industry through contemporary production of synthetic chemicals and household cleaners. Men who studied chemistry often did so because of its practical applications and potential for profit through industrial consulting, pharmacies, or government work.

Americans turned to chemists for answers about smells because they knew chemistry as "a science that positively revels in nauseous odors," and because chemists held prominent positions in public health boards.[51] Writing a state of the field essay about history of chemistry in 1985, historian John Servos identified civic chemistry, or the role of chemists in local and state government, as an area ripe for study.[52] Few, however, have taken up his call for investigation, especially within the United States.[53]

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[51] "Greek Fire," *Chicago Tribune* 1 Sept 1862, pg. 3.
[52] John W. Servos, "History of Chemistry," *Osiris* 2, no. 1 (1985): 132-146.
[53] Jeffrey L. Sturchio was writing on civic chemistry at the time of Servos' article, but Sturchio's work on Charles F. Chandler in New York City remains unpublished. Sturchio, "Civic Chemistry in Metropolitan New York, 1870-1910: The Chandler Circle," paper presented at the 17th Middle Atlantic Regional Meeting of the American Chemical Society, White Haven, Pennsylvania, 8 Apr. 1983. Christopher Hamlin has written on this issue in France and Britain, but concluded that chemists did not take an active role in

Chemists saw both personal profit and civic duty in using their analytical skills to address olfactory concerns and explain where offensive odors originated. As I tried to unravel the complicated issues of expertise, professionalization, authority and power over smells and health, I also found myself exploring civic chemistry and the ways in which chemistry was part of the broader American culture.

Furthermore, because city government was the arbiter to whom concerned citizens turned in their complaints against odors and the changing urban environment, I bring the relationship between science and government into the discussion of expertise and authority in the nineteenth century. Government employment was not merely an alternative route to professional status and pure science, but was as complicated and possibly corrupting as commercial involvement. The authority of the government, much like that of professionals and scientists, also depended upon the trust or legitimation of the public in the nineteenth century. I argue that once public health became a regular feature of the government's responsibilities, city mayors and aldermen needed to be responsive to odor complaints and wanted quick solutions to environmental issues and health threats as much as citizens did. Scientists, as part of the government but also responsible to city boards, had limited authority. When they could not demonstrate the utility of their knowledge by offering a quick solution, scientists risked losing their newly won governmental positions and the authority that came with them. Yet that authority was already compromised when the scientists employed by government lacked the power to enforce the regulations they recommended. Because there was no clear line between professional position, authority and power, detailed case studies like this one are still

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municipal governance of these countries. Hamlin, "The City as a Chemical System? The Chemist as Urban Environmental Professional in France and Britain, 1780-1880," *Journal of Urban History* 33 (2007): 703.

important for the history of science, expertise, professionalization and urban governance. Historians of science, relying on the professionalization model to explain nineteenth century American science and locate expertise in specialized knowledge, have been inattentive to the reciprocal relationship of science and lay knowledge in determining expertise. Nineteenth-century scientists' recognition of and reckoning with tacit knowledge shows that expertise, like science, has never been pure.

While the issues of expertise and authority came into sharper focus and necessitated a full consideration of public health professionalization as well as legal regulation and environmental change, questions about germ theory's impact on olfactory perception remained. David Barnes had argued that public health officials in France spread the tenets of germ theory and thus deflated long held cultural fears that stenches caused illness. Linda Nash claimed that environmental understandings of illness continued at the level of lay practice long after medical men and health officials endorsed the tenets of germ theory in California. Barbara Gutman Rosenkrantz claimed that the introduction of germ theory marked the end of public health's attention to the social conditions of disease and therefore undid much of public health's early successes in reforming the city. But if public health officials were not widely accepted as experts, how did their adoption of germ theory affect the everyday practices of people who lived and breathed in the city?

I found some answers to this question in Nancy Tomes's *Gospel of Germs* (1998), a history of public attitudes toward disease causation that traced how education campaigns brought the tenets of germ theory into American homes and housewives' minds. Tomes's approach to public health and attitudes shifted the focus from the largely

male cast of scientists, doctors and public health officials to the women who, as the primary caregivers and housekeepers, understood and implemented the lessons of sanitary science to prevent illnesses in their families. Tomes was forthright in her challenge to "the implicitly gendered division of knowledge that regards as significant what Pasteur did in the laboratory but dismisses as inconsequential what a public health nurse or housewife did with his insights."[54] Tomes's approach to the questions of public health and germ theory gave me a framework in which to understand women's attitudes towards odors and health. Just as public health officials patrolled the air of the city, women policed the air of their jurisdiction, the home. Despite their different roles in the public sphere, men and women shared the goal of improved health and both made important strides in that direction.

Public health officials, chemists and lawmakers had specific tools for addressing complaints and eradicating odors from cities: new legislation, corps of inspectors, technological devices and fines. Women, as caretakers of the home, had cleanliness. Tomes found connections between public health officials, germ theory and cleanliness in "the practical lessons that advocates of the germ theory derived from the laboratory," lessons that did not change traditional wisdom about dirt and stenches but "underlined the urgency of the sanitarians' warnings that utmost care needed to be taken to evade the domestic sources of disease."[55] Thus Tomes contended that, "tracking the rise of domestic sanitary science," a field that medical historians had ignored in their histories of

[54] Nancy Tomes, *The Gospel of Germs: Men, Women and the Microbe in American Life* (Cambridge, MA: Harvard University Press, 1998), 16.
[55] *Ibid*, 47.

the institutionalization of public health, "illuminates how concerns about infectious disease transformed the customs of everyday life."[56]

As I turned my attention to domestic sanitary science and women's domestic advice literature, I found frequent discussions of odors, fragrances, deodorization and fresh air. These discussions sometimes referred to the opinions of medical and scientific authorities, but far more often referenced the practices of previous generations of women. I also found that, though points of discussion changed with the introduction of new household technologies and coincidental odors, the pattern of discussion did not change substantially with the introduction of germ theory. As I read many of the same volumes that Tomes had considered in her study, it was not clear who was teaching whom the importance and practices of cleanliness.

Though Tomes connected domestic manuals and advice on cleanliness to health concerns, much of the literature on cleanliness frames its questions in the history of manners and development of bourgeois gentility. Scholars who have written histories of cleanliness make two obligatory nods in their introductory comments, noting that the thoughts of anthropologist Mary Douglas and sociologist Norbert Elias have framed their investigations and, inevitably, their conclusions.

In *Purity and Danger* (1966), Mary Douglas laid out her theory of how the culture construction of taboo created notions of dirty and clean. Douglas argued that nothing is inherently dirty or disgusting, not even human excrement: "There is no such thing as dirt; no single item is dirty apart from a particular system of classification in which it does not

[56] *Ibid*, 69.

fit."[57] This explanation that "dirt" is the result of the human impulse toward classification and order, that "dirt" is matter out of place, sent scholars searching for historical changes in acceptable levels of dirtiness or cleanliness as a way of unraveling the cultural underpinnings and values of societies in different times and places. Definitions of dirt can reveal the cultural anxieties and structures of social order in a particular period. For example, some scholars argued that denunciations of African Americans as dirty and repulsive served to uphold the racial order of the United States by teaching white children to avoid and fear contact with a culturally constructed other.[58]

Douglas's ideas about the cultural constructions of dirt stemming from classificatory systems pushed me to think about how differing definitions of odors as good or bad, clean or dirty might reveal divergent values in evaluating the urban environment. For instance, in the conflict between lay citizens and public health officials over city stenches, was there more at stake than expertise, authority and health? Why did different groups perceive the same material odors in different ways? Douglas's ideas reinforced my hesitation about the deodorization thesis and pushed me instead to recognize different perceptual revolutions and the consequences of each.

Douglas's emphasis on dirt as matter out of place also led me think about the boundaries that odors crossed, and how smells out of place raised different questions than those odors whose sources were readily apparent and well known. Just as the familiar smell of maple syrup raised concerns when it blanketed large sections of New York City, how did the perception of familiar smells change when these odors were encountered far

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[57] Mary Douglas, *Purity and Danger: An Analysis of Concept of Pollution and Taboo* (London: Routledge, 2002), xvii.
[58] See Mark M. Smith, *How Race is Made: Slavery, Segregation, and the Senses* (Chapel Hill: The University of North Carolina Press, 2006), esp. ch. 6.

from their source? And by what criteria did people evaluate new scents in the urban environment and in the home? These questions pushed me not only to consider the multiple meanings of cleanliness, but also to situate people and their smell complaints in urban geographies of homes, parks and a wide variety of industries. I thus began to ask not only how these different places smelled, but how they were supposed to smell and what effect olfactory expectations had on perception and categorization of odors.

In *The Civilizing Process* (1939), Norbert Elias argued that thresholds of disgust, shame and repugnance increased in course of the development of manners to define and separate social classes. I did not turn to Elias's work myself, but recognized the impact of his ideas on histories of cleanliness. Because of *The Civilizing Process*, scholars construe ideals for how cities, homes and bodies should look and smell as particular to certain social groups and classes rather than normative. Thus olfactory perceptions, when bound up with olfactory expectations, differed within shared cultures by class and social standing.

That said, the bulk of literature on bodily cleanliness, household technology, and labor has focused on the upper and middle classes of the United States, largely because these people had the means to invest in domestic manuals and technologies that promised better cleanliness more easily obtained. For instance, in *All the Modern Conveniences* (2000), Maureen Ogle explained how plumbing technology developed through the experiments of upper-class households and the middle-class culture of convenience and reform.[59] Similarly, Ruth Schwartz Cohen's history of the domestic technologies that created *More Work for Mother* studies objects such as the Franklin stove and microwave

[59] Maureen Ogle, *All the Modern Conveniences: American Household Plumbing, 1840-1900* (Baltimore: The Johns Hopkins University Press, 2000).

that were first introduced with a high price point.[60] Cohen argued that technologies such as these differentiated classes both through their presence in the home and through the different patterns of household labor they enabled. Suellen Hoy has argued that Americans became obsessed with cleanliness as a way to distinguish the middle class from poor and countrified Americans.[61]

The literature on cleanliness and household labor emphasizes the fact that cleanliness, both in perception and in reality, is deeply rooted in class ideas. Yet these books and Kathleen Brown's *Foul Bodies* speak mostly to visual cues of cleanliness. Indeed, Brown goes to great lengths to explain how the use of white linen, visible at collars and cuffs on the clothing of early Americans, visually cued bodily cleanliness, regardless of how one smelled.[62] This led me to ask if cleanliness had an aroma. Given Tomes's attention to sanitary science and domesticity—both of which included prescriptions for odor management as well as visual cleanliness—how did women connect smells and sights with dirt and health dangers in their household practices? Did these practices differ between classes?

In bringing the literature on domestic cleanliness into conversation with histories of environmental perception, public health and urban regulation, I also asked how homes fit into urban environments. Were the same norms and standards for cleanliness and health dangers applied both inside and out? How did the demands of middle-class domesticity fit into the industrial city? I found following odors and odor concerns a

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[60] Ruth Schwartz Cohen, *More Work for Mother: The Ironies of Household Technology from the Open Heart to the Microwave* (Basic Books, 1985)
[61] Suellen Hoy, *Chasing Dirt: The American Pursuit of Cleanliness* (New York: Oxford University Press, 1995).
[62] Kathleen Brown, *Foul Bodies: Cleanliness in Early America* (New Haven: Yale University Press, 2011), ch. 4.

fruitful access to these questions because of the outcry that ensued when industrial odors passed through windows and doors, into the homes and bedrooms of urban dwellers. In understanding these moments of outcry, which were tied both to health concerns and the ideal of the middle-class home as a refuge from the city, I argue that women engaged in specific fragrant practices to protect the air of their homes, and they adapted these practices to new technologies such as plumbing that changed the boundaries of their homes. With their domestic practices, women tried to control the air they breathed as much as did the public health officials, scientists and lawmakers who are the focus of other historiographies. In order to understand the history of nineteenth-century odors and olfaction, I had to bring together the insights of the histories of the senses, environments both rural and urban, pollution, technology, legal regulation, public health, and cleanliness, rather than consider these subfields separately. As a result, each chapter brings together two or more historiographies as it explores a particular aspect of smells and smelling in nineteenth-century America.

Chapter one examines the people's relation to and navigation of the physical city through the sense of smell. Citizens noted the locations of foul smells, which they believed threatened health, and avoided those areas of the city in their daily movements; carefully navigating the city was an alternative to filing nuisance cases. Through the emphasis on olfactory navigation, this chapter brings together nineteenth-century medical geography with lived experience, raising questions about tacit knowledge similar to those asked by Joy Parr in *Sensing Changes* (2010).[63] In her exploration of olfaction and risk assessment near a Great Lakes nuclear plant, Parr achieved one of the most thorough

[63] Joy Parr, *Sensing Changes: Technologies, Environments, and the Everyday, 1953-2003* (Vancouver: UBC Press, 2010).

analyses of how individuals from different backgrounds and with different lived experiences decide between and/or combine tacit knowledge and formal education to interpret newly perceived threats in their environment.[64] This chapter similarly examines how urban residents obtained and used tacit knowledge to evaluate health threats in their rapidly changing urban environment. Sanitarians with formal education about the connection between living conditions and disease also mapped the city's odors as they argued for public health boards and preventive health measures that would eliminate foul odors from the city. Definitions of fresh air and the nascent public health movement encouraged efforts to actively change the city's olfactory geography through the creation of fresh air infrastructure. In considering the variety of ways that people interacted with odors and navigated the city, this chapter argues that the creation of public health boards created an "official" olfactory geography that excluded a wealth of others' knowledge of the city.

Chapter two picks up the expertise conflict that the institutionalization of public health created, paying particular attention to the role of chemists and chemistry in two moments of olfactory crisis: Chicago in 1862 and New York City in 1878. These olfactory crises grew out of each city's inability to create the imagined fresh air infrastructure. In each city, as new industries polluted the local waterways and foul odors drifted across neighborhood boundaries and into people's homes, citizens turned to their local governments with demands for fresh air. These similar conflicts over industry and odor played out differently in Chicago and New York City, revealing the importance of

[64] Parr, *Sensing Changes*, ch. 5; Parr, "Smells Like?: Sources of Uncertainty in the History of the Great Lakes Environment," *Environmental History* 11 (Apr 2006), 269-299.

local government and of coalitions among numerous actors in establishing the cultural authority of expertise.

The third chapter focuses on domestic practice to explore how people, especially women, navigated the paradoxes of urban domestic life. Prescriptive literature, such as Catharine Beecher's advice manuals and domestic health tracts, supports well-known arguments about the emerging emphasis upon cleanliness and germ control among women. I revisit this literature, and pair it with contemporary advice about raising aromatic gardens and remodeling houses for better ventilation, to argue that women worked deliberately to control the smells inside their homes for health and for comfort. Using their knowledge about odors and harnessing architectural and medical literature, women claimed an authority over air that they used to extend their control over the air into public campaigns for municipal housekeeping and smoke abatement.

The final chapter examines the connections between concerns about industrial stenches and the rise of the anti-smoke crusades at the end of the nineteenth century. Rather than viewing the anti-smoke crusades as the origin of a conception of air pollution, this chapter argues that the definition of air pollution as smoke was a shift in the perception of air quality. Through a close analysis of how the graphic press illustrated stenches and created an iconography for odor, one can see the shifting terms of the definition of pollution. This shift, which largely took place in the pages of middle class magazines before dominating the public, political debate of the anti-smoke crusades, had lasting effects not only for the definition of air pollution, but also for the meanings of odors in urban life. When smoke became the definition of air pollution, the aspect of the atmosphere on which middle class reformers focused their attentions, the

meanings of odors changed. Smells did not disappear, but the ways in which they have been written out of nuisance law and environmental reform have made them hard to find.

In answer to the question of where a history of smells takes us, there is no single destination. A history of olfaction takes us many of the places that historians have already been and, most importantly, it takes us closer to the elusive lived experiences of the nineteenth century. The strength of sensory history is that it brings seemingly diverse fields together and explains how people experienced them as connected and entwined. Pursuing a history of urban odors means pursuing histories of environment, public health, legal regulation, municipal governance, expertise and authority, science, cleanliness, manners, and technology all at once. The result is not a narrative of how smells and smelling changed, but complex story of how people apprehended, understood, adapted to and tried to change the world they inhabited. Though odors were ephemeral, their effects on human lives and urban environments were tangible and enduring.

# Chapter 1.

## "The Uses and Abuses of Air":

## Mapping Urban Air Quality, 1840-1900

When he took his doctor's advice and moved twenty miles up the Hudson River from New York City, "OLFACTORIOUS" expected that the country air would improve his health.[1] But the daily trip from the city business to his country home required him to pass through a nasal purgatory of foul odors. In a letter to *The New York Times*, Olfactorious mapped his miseries in detail. There was the slip at the end of Clarkson Street, where the wastes of a city sewer main "fester[ed] and putref[ied]…, causing an effluvium sufficient of itself to start the yellow fever." There was the Milk Factory on Tenth Avenue, which gave off its "peculiar, penetrating, stump-tail odor." There were the Gas Works, which spewed noxious gases into the atmosphere, and just past the Gas Works, a Melting Establishment "fill[ed] the air with an odor exactly like roast mutton, *only more so*." Usual nuisances of dust, cinders and noise aggravated the assault on the nose. The businessman consoled himself with the belief that "no one will dispute that I

[1] OLFACTORIOUS, "Pursuit of Fresh Air Under Difficulties," *New York Times* 12 Jul 1858, pg. 2.

deserve all the fresh breezes that I get after passing through the frightful variety of bad smells on the way."

Olfactorious was not the only mid-nineteenth-century city dweller to picture his life as a landscape of smells. Odors helped Olfactorious and his neighbors understand and evaluate their environments.[2] For many, the contrast between fresh breezes and foul odors meant the difference between good health and disease. Connections between smell and health appeared both as popular lay knowledge, passed down for generations, and as the subject of the new sanitarian movement that emerged on both sides of the Atlantic in the 1840s and 1850s.[3] As rapid industrialization changed the way the air smelled, concentrating familiar odors and introducing new stenches, people like Olfactorious feared falling ill. He could escape to a country retreat, but laborers and their families, living in poorly maintained, overcrowded tenement buildings and surrounded by human, animal, and urban filth could not.

Individuals responded to malodorous atmospheres in a variety of ways, most of which were designed to evade unhealthy odors. In their daily movements through the city, people created mental maps of stenches to avoid the worst smells. Professional sanitarians responded to smells with systematic surveys of the city that documented the locations of unhealthy living conditions. Both groups created what we might call

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[2] Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley: University of California Press, 2006); Dell Upton, *Another City: Urban Life and Urban Spaces in the New American Republic* (New Haven: Yale University Press, 2008); Conevery Bolton Valencius, *The Health of the Country: How American Settlers Understood Themselves and Their Land* (New York: Basic Books, 2002).

[3] John Duffy, *The Sanitarians: A History of American Public Health* (Urbana: University of Illinois Press, 1990); Christopher Hamlin, *Public Health and Social Justice in the Age of Chadwick, 1800-1854* (Cambridge: Cambridge University Press, 1998); Anthony S. Wohl, *Endangered Lives: Public Health in Victorian Britain* (Cambridge, MA: Harvard University Press, 1983).

smellscapes, olfactory geographies of their urban environments.[4] The informal sensory geographies of individuals and the methodical surveys of sanitarians mapped the air in narrative form, identifying the addresses where people encountered healthy or infectious air.[5] Graphic maps, which plotted the location of odors and their sources, were less common. Although graphic maps circulated less and spoke more to political needs than daily experience, they were an important tool for sanitarians who tried to visualize the existence and movement of unhealthy odors. Nineteenth-century urbanites hoped smell maps would protect their health by giving them a better sense of the air they breathed, but they were only able to map what they knew about the air. As definitions of fresh air and its opposites changed, so too did the features of olfactory maps and the targets of sanitary reform.

Historians of the sanitary movement have discussed the nineteenth-century concern with water and sewage, documenting the development of urban infrastructure to ensure safe handling of both.[6] Scholars have also studied the growing emphasis on physical cleanliness, both for individuals and city environs, as a health concern that led to

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[4] Geographer J. Douglas Porteous uses the term "smellscape" to refer to the "landscape of smell." In discussing olfactory geographies, Jim Drobnick coined the similar term "toposmia" to denote "a field of inquiry…which investigates the spatial location of odors and their relation to particular notions of place." See J. Douglas Porteous, *Landscapes of the Mind: Worlds of Sense and Metaphor* (Toronto: University of Toronto Press, 1990): 21-45; Jim Drobnick, ed., *The Smell Culture Reader* (Oxford: Berg, 2006): 85, 89; Drobnick, "Toposmia: Art, Scent and Interrogations of Spatiality," *Angelaki* 7(1): 31-46; and Paul Rodaway, *Sensuous Geographies: Body, Sense and Place* (London: Routledge, 1994): 61-81.

[5] On the interplay between narrative and graphic maps in the sanitarian movement of London, see Pamela K. Gilbert, "Medical Mapping: The Thames, the Body and *Our Mutual Friend*," in William A. Cohen and Ryan Johnson, eds., *Filth: Dirt, Disgust, and Modern Life* (Minneapolis: University of Minnesota Press, 2005): 78-102.

[6] John Duffy, *The Sanitarians*; Martin V. Melosi, *The Sanitary City: Environmental Services in Urban America from Colonial Times to the Present,* abridged edition, (Pittsburgh: University of Pittsburgh Press, 2008); Harold Platt, *Shock Cities: The Environmental Transformation and Reform of Manchester and Chicago* (Chicago: University of Chicago Press, 2001); Joel A. Tarr, *The Search for the Ultimate Sink: Urban Pollution in Historical Perspective* (Akron: University of Akron Press, 1996).

the employment of street sweepers and sanitation departments.[7] However, few historians have considered the same sanitarians' concerns about the ill effects of odors and efforts to improve air quality prior to the anti-smoke crusades of the 1890s.[8] Scholars who have thought about the role of stenches in nineteenth-century cities have done so primarily through the legal category of nuisance, pursuing questions about the use of common law as a precursor to zoning.[9] In *Chasing the Wind*, legal scholar Noga Morag-Levine argues that the regulation of nuisances, especially invisible odors, was hampered in the United States by the requirements of proof of legal injury "to a significant number of people or to the public at large" and of "perpetual mobilization" of the public against nuisances.[10] These two requirements of the nuisance law regime, while drawing on the experiences of individuals, undermined the ability of individuals to use the courts to stop the spread of industries and their pollutants. Thus the evidentiary and mobilization demands of nuisance law encouraged alternative ways of coping with or fighting against urban odors,

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[7] Katherine Ashenburg, *The Dirt on Clean: An Unsanitized History* (New York: North Point Press, 2007); Daniel Eli Burnstein, *Next to Godliness: Confronting Dirt and Despair in Progressive Era New York City* (Urbana: University of Illinois Press, 2006); Suellen Hoy, *Chasing Dirt: The American Pursuit of Cleanliness* (New York: Oxford University Press, 1995); Nancy Tomes, *Gospel of Germs: Men, Women, and the Microbe in American Life* (Cambridge, MA: Harvard University Press, 1998).

[8] One notable exception is the discussion of odors in Clay McShane and Joel A. Tarr, *The Horse in the City: Living Machines in the Nineteenth Century* (Baltimore: The Johns Hopkins University Press, 2007). On the anti-smoke crusades, see Platt, *Shock Cities*; David Stradling, *Smokestacks and Progressives: Environmentalists, Engineers, and Air Quality in America, 1881-1951* (Baltimore: The Johns Hopkins University Press, 1999); and Frank Uekotter, *The Age of Smoke: Environmental Policy in Germany and the United States, 1880-1970,* trans. Thomas Dunlap (Pittsburgh: University of Pittsburgh Press, 2009).

[9] See, for example, Andrew Hurley, "Busby's Stink Boat and the Regulation of Nuisance Trades, 1865-1918," in *Common Fields: An Environmental History of St. Louis*, ed. Andrew Hurley (St. Louis: Missouri Historical Society Press, 1997), 145-162; Noga Morag-Levine, *Chasing the Wind: Regulating Air Pollution in the Common Law State* (Princeton: Princeton University Press, 2003); Christine Meisner Rosen, "Noisome, Noxious, and Offensive Vapors, Fumes and Stenches in American Towns and Cities, 1840-1865," *Historical Geography* 25 (1997): 49-82; Rosen, "'Knowing' Industrial Pollution: Nuisance Law and the Power of Tradition in a Time of Rapid Economic Change, 1840-1864," *Environmental History* 8:4, 565-597; William Novak, *The People's Welfare: Law and Regulation in Nineteenth-Century America* (Chapel Hill: The University of North Carolina Press, 1996), 60-62, 217-233; and Stanley K. Schultz, *Constructing Urban Culture: American Cities and City Planning, 1800-1920* (Philadelphia: Temple University Press, 1989), 42-47, 111-149.

[10] Morag-Levine, esp. ch. 4-6. In relation to the current definition of odors as "trifling inconveniences," Morag-Levine argues that such language is a problematic dilution of the traditional definition of nuisance odors, rather than a reflection of odors' effect on health and property.

and society developed meanings for smells beyond and outside of the legal category of nuisance. This chapter uses sanitary surveys, editorials, city guides and popular periodicals to explore the many ways in which urban dwellers understood and reacted to smells both pleasing and disturbing in their daily lives. While some with means to pursue legal action turned to the courts for relief from pestilential odors, most city dwellers learned to navigate the city in search of fresh air and good health.

Olfactorious lived in a city full of smells, many of which he could name, locate, and preferred to avoid. Sanitarians, operating under miasmatic theory that taught them bad airs caused illness, were also very attentive to odors and the air as they tried to create healthier cities. This chapter begins with prominent sanitarian John Hoskins Griscom's definition of fresh air, and the ways in which he mapped fresh air deficiencies across the city. Other definitions and alternative maps follow, illustrating the enduring importance of "fresh air" to a wide variety of people as they adapted to changing city environs. Although commentators did not always mean the same thing by "fresh air," they did notice and record the air's qualities and physical effects on the body. Olfactory maps document the central role that odors and the air played for evaluations of landscape health both in everyday life and in movements to reform living conditions. When city boards of health emerged after the Civil War, these branches of city government had the power to define and regulate urban air, a power that created "official" olfactory maps and changed citizen outcry against foul odors by raising the question of whose nose really knew dangerous stenches from healthy fresh air.

No one thought about New York City's air more than Dr. John Hoskins Griscom, a "dedicated social reformer" and active member of medical societies who urged reforms

in tenements, prisons, schools, and aboard ships.[11] In his lifetime, Griscom laid the groundwork for public health services in New York City, though his only official office was that of City Inspector (chief health officer) in 1842 and 1843.[12] During his brief term, which ended with the election of a new administration, Griscom counted caskets, calculated mortality rates and decided that something must be done about the poor health of New York City's residents.[13]

In Griscom's lifetime, New York City had grown tremendously, from a mere 60,000 inhabitants in 1800 to over 300,000 in 1840. The city would have grown even more if so many of its new inhabitants hadn't died; mortality rates in these decades ranged from twenty-four to over fifty per thousand. This meant that the caskets that Griscom counted piled up in the thousands. Alarmingly, total deaths in 1841 and 1842, rather than declining, approached the peak death numbers of the 1832 cholera year. [14] The dead were quickly replaced by new arrivals, many of whom would themselves sicken. It was obvious to Griscom that New York City was not a healthy place.

Inspired by Edwin Chadwick's survey of London and Alexandre Parent-Duchâtelet's work in Paris, Griscom entered the sanitary movement by completing his own survey of living conditions in New York. Griscom observed the ravages of endemic respiratory diseases, led overwhelmingly by consumption and scrofula, among those

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[11] Duffy, *The Sanitarians*, 95-97.

[12] For the fullest account of Griscom's life and work, see Duncan Robert Jamieson, "Towards a Cleaner New York: John H. Griscom and New York's Health, 1830-1870," PhD thesis, University of Michigan, 1972.

[13] Griscom was an early practitioner and advocate of vital statistics, then unevenly practiced in the United States, throughout his career. See James H. Cassedy, *American Medicine and Statistical Thinking, 1800-1860* (Cambridge, MA: Harvard University Press, 1984), 178-229.

[14] Gretchen A. Condran has argued that endemic diseases, especially tuberculosis, were consistently deadlier in urban environments than epidemic occurrences of diseases such as cholera and yellow fever. Condran, "Changing Patterns of Epidemic Disease in New York City," in David Rosner, ed., *Hives of Sickness: Public Health and Epidemics in New York City* (New Brunswick: Rutgers University Press, 1995), 27-41.

"liv[ing] out their brief lives in tainted and unwholesome atmospheres."[15] He concluded that lack of fresh air was the chief cause of ill health. This idea directed his efforts for public health throughout his career.

Griscom believed that fresh air was a life-giving force, calling it a "powerful stimulant," a "nutrient substance," and explaining that, "Air, when pure, gives a freshness and vigor, a tone to the nervous and muscular parts of the system, productive of the *highest degree* of mental and physical enjoyment."[16] The absence of fresh air made people ill, despondent, and prone to vices that replaced "the stimulus given by nature."[17] Intemperance and tobacco particularly worried Griscom, who came from a Quaker family, and he thought both were directly traceable to the absence of fresh air.[18] Thus, improving the city's air quality would raise levels of both general health and morality.

Like urban boosters who sang the city's virtues and physicians who shared his belief in environmental causes of disease, Griscom thought New York City's natural topography was very healthful: "In geographical position, in climatic placement, and in geological structure, no site perhaps could be selected for all the purposes of a great city, of a more salubrious character, than Manhattan Island."[19] A celebration of Manhattan's

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[15] Quote from John H. Griscom, *The Sanitary Condition of the Laboring People of New York* (New York: Harper & Brothers, 1845), 4. Griscom named both consumption and scrofula as the worrisome respiratory diseases, and the city mortality reports reflect his concerns. Between 1835 and 1839, deaths attributed to consumption and inflammation of the lungs averaged 1,390 and 549 yearly. Both averages rose between 1840 and 1844 to 1,407 and 592. For figures, see Appendices 1 and 6 in John Duffy, *A History of Public Health in New York City, 1625-1866* (New York: Russell Sage Foundation, 1968), 576, 583.

[16] Griscom, *The Sanitary Condition,* 49.

[17] Ibid; Association for Improving the Condition of the Poor, *First Report of a Committee on the Sanitary Condition of the Laboring Classes in the City of New York, with Remedial Suggestions* (New York: John F. Trow, 1853), 4.

[18] Charles Rosenberg and Carroll Smith-Rosenberg argue that Griscom's motivations for improving public health originated in the Quaker religious tradition and his upbringing in a family dedicated to service and piety. Charles E. Rosenberg, *No Other Gods: On Science and American Social Thought*, revised and expanded ed. (Baltimore: The Johns Hopkins University Press, 1997), 109-116.

[19] Griscom, *The Sanitary Condition*, 42. For an overview of medical geography in the nineteenth century, see Frank A. Barrett, *Disease and Geography: The History of an Idea* (Toronto: Geographical Monographs,

natural salubrity, imparted by the downward slope that provided drainage and the rivers that continuously flushed its shores, remained constant throughout sanitary reports of the 1850s, sixties and seventies.[20] In 1878, amateur sanitarian Thomas B. Musgrave asserted that the city was "one of the most highly favored spots on earth for pure air," because its daily breezes were "purified and cooled" by crossing the surrounding rivers before entering city streets and homes.[21] In an area with such natural advantages for health, high death rates and frequent illnesses could only be the result of manmade dangers.

Griscom turned to these manmade dangers in his survey of the built environment, of "the condition in which people live, the position and arrangement of their working and lodging rooms." [22] Griscom visited residences across the city in search of patterns in living conditions that correlated with patterns in illness. Appalled by the conditions he found, Griscom invited his audience to join him on this journey and share his experiences so that they could, "appreciate in its full force the mournful and disgusting condition, in which many thousand of the subjects of our government pass their lives."[23] He took his readers into the crowded tenements and down into the offensive cellars, where foul air and blinding darkness nearly overcame the inspector. He brought his audience into the tiny sleeping rooms where "the effluviae of the bodies and breaths of the persons sleeping in it" created an intolerable smell and an "atmosphere productive of the most offensive and malignant diseases."[24] For those who might doubt him, such as the City Council

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2000), 175-372; and Nicolaas A. Rupke, ed., *Medical Geography in Historical Perspective,* Supplement 20 to *Medical History*, (London: The Wellcome Trust Centre for the History of Medicine, 2000).
[20] Association for Improving the Condition of the Poor, *First Report*, 4; Thomas B. Musgrave, *Report of the Citizens' Committee upon the Nuisances of New York City: The Air We Breathe* (New York: S. Hamilton's Son, 1878), 1-2.
[21] Musgrave, 1-2.
[22] Griscom, *The Sanitary Condition*, 3.
[23] *Ibid*., 9.
[24] *Ibid*., 8.

members who rejected his recommendations for a Health Police in 1842, Griscom insisted that they "must descend" to the cellars and "must feel the blast of foul air as it meets your face upon opening the door."[25] Griscom emphasized the importance of experience as knowledge as he recorded the intimate and place-bound experience of breathing foul air, and bolstered his opinion with assertions of common knowledge about the differences between city and country air: "Every city resident who takes a stroll in the country, can testify to the difference between the atmospheres of the two situations:--the contrast of our out-door (to say nothing of in-door) atmosphere, loaded with the animal and vegetable exhalations of our streets, yards, sinks, and cellars—and the air of the mountains, rivers, and grassy plains, needs no epicurean lungs to detect it."[26] Members of the City Council were deceiving themselves in not following Griscom's recommendations. Even if they hadn't visited cellar apartments, they knew that city air was unhealthy. They breathed it themselves. One did not need specialized knowledge or noses to detect the inferiority of urban air.

In Griscom's survey, unhealthy air was a highly localized phenomenon that mapped vertically, rather than horizontally across the city. Instead of discussing areas redolent with various stenches, as Olfactorious and others would later do, Griscom focused on the foul air of cramped spaces: cellar apartments, bedrooms and narrow alleyways. In these small spaces, respiration quickly exhausted the air of its freshness and purity, leaving behind dangerous "vitiated air" full of poisonous carbonic acid and bodily effluvia. The danger of vitiated air was acute in cellar apartments, where residents often shut out fresh air in their attempts to regulate room temperature. Vitiated air

[25] *Ibid*., 8.
[26] *Ibid*, 12.

remained even when windows and doors were open, since free circulation of air was highly unlikely in rooms located at the base of buildings and facing narrow alleyways. Though rooms above ground were also at risk for vitiated air, especially when overcrowded and unventilated, basements were far more dangerous breathing spaces.

Griscom was not alone in his fears of vitiated air; discussions of this dangerous by-product of respiration appeared in the pages of *Popular Science*, *The Water Cure Journal* and *The Sanitarian*, as well as in the widely read works of Catharine Beecher, Andrew Jackson Downing, Ellen Swallow Richards, and ventilation experts John Shaw Billings and David Boswell Reid.[27] Adopting the chemical theories of Joseph Black, Joseph Priestley and Antoine Lavoisier, Griscom and his peers believed that respiration purified the blood as it flowed across the lungs, changing the color of this vital liquid from "dark purple to a scarlet hue."[28] Each inhalation provided the blood with oxygen, originally called "vital air," and every exhalation cast out aqueous vapor and "carbonic acid gas," a compound of oxygen with carbon and the impurity that made blood dark. Griscom and his peers believed that carbonic acid gas, better known in the twentieth century as carbon dioxide, was the chief poison and main hazard in vitiated air.[29]

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[27] Catharine Beecher, *Letters to the People on Health and Happiness*, (New York: Harper & Brothers, 1855); Beecher, *Miss Beecher's Housekeeper and Healthkeeper* (New York: Harper & Brothers, 1873); Andrew Jackson Downing, ed., *The Horticulturalist, and Journal of Rural Art and Rural Taste*; Ellen H. Richards and Alpheus G. Woodman, *Air, Water and Food from a Sanitary Standpoint* (New York: John Wiley & Sons, 1900); Richards, *Sanitation in Daily Life* (Boston: Whitcomb & Barrows, 1910); John S. Billings, *Ventilation and Heating*, (New York: The Engineering Record, 1893); David Boswell Reid, *Illustrations of the Theory and Practice of Ventilation: With Remarks on Warming, Exclusive Lighting, and the Communication of Sound,* (London: Longman, Brown, Green, & Longmans, 1844); Reid, *Ventilation in American Dwellings,* (New York: Wiley & Halsted, 1858).

[28]Griscom, *Uses and Abuses of Air*, 25-29, quote pg. 28. A more detailed explanation of the perceived relationship between respiration and blood color during this period can be found in J.G. McKendrick, "The Gases of the Blood," *The Lancet,* 18 Aug 1888, pgs. 299-304.

[29] The chemical definition of carbonic acid underwent many changes during the nineteenth century. Edinburgh chemist George Wilson's 1850 textbook defined carbonic acid as $CO_2$, or carbon dioxide, noting that it was "a colourless, invisible gas, having a peculiar sharp, but not sour odour and taste," and "poison"

In the open air, carbonic acid posed little threat, for it readily dispersed away from the body, and there was a liberal supply of oxygen for safe inhalation. In rooms with no ventilation, however, carbonic acid would build up quickly and threaten human life. Everyone's nightmare case was the "Black Hole of Calcutta." In June 1756, Siraj ud-Daulah, the Nawab of Bengal, allegedly imprisoned one-hundred-forty-six English soldiers and allies for the night.[30] In the morning, only twenty-three emerged, the rest having expired in the hot, cramped cell as they beseeched their guards for water and fought for space near the window. Experts on respiration and ventilation attributed these deaths to "the large volume of carbonic acid gas emitted from their lungs."[31] The dungeon room was small, designed to hold two or three men, and had only a few vents for air. When Griscom recounted the incident, he calculated the dungeon's capacity at "not more than four or five thousand cubic feet of air," far less than the "three hundred cubic feet" required for each man's respiration.[32] According to these calculations, the dead men suffocated on their own respired air, which their bodies had filled with deadly carbonic acid. Griscom reported that the health of those who lived until morning was also impaired. Many suffered from a typhus-like fever, probably caused by breathing "a highly concentrated dose of the ammoniacal effluvia arising from the putrifying [sic] exhalations" of their comrades' lifeless bodies. The Black Hole of Calcutta was an

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to breathe. George Wilson, M.D. F.R.S.E., *Chemistry* (Edinburgh: William and Robert Chambers, 1850), 128-133.

[30] These figures come from the original assertion of John Zephaniah Howell, a survivor of the incident who published a narrative of the event. Scholars have questioned Howell's figures, but not the veracity of the event, which was widely known and frequently cited by ventilation proponents and advertisements in the 1800s, as well as in justifications of the British imperial project. See, "The Black Hole of Calcutta," *History Today* 56 (June 2006): 60-61; and Amalendu De, "A Note on the Black Hole Tragedy," *Quarterly Review of Historical Studies* 10, no. 4 (1970): 187-192. Griscom transcribed the nawab as "Surajah Dowlah" in *Uses and Abuses of Air*.

[31] Griscom, *Uses and Abuses of Air*, 82.

[32] *Ibid.*, 82.

obvious lesson in the importance of having a ready supply of fresh air, and became a common referent for advertisements of ventilation systems.

Though putrefying bodies were not a regular feature of cellar apartments or bedrooms, high concentrations of carbonic acid—vitiated air—could be found wherever men and women "separated for his own exclusive use, a small portion of the great atmospheric ocean," by building a house with solid walls and an impervious roof.[33] Griscom's campaign against vitiated air encompassed not only the cellar apartments that most worried him, but also the poorly ventilated homes of New York's upper classes and the overcrowded spaces of churches, lecture halls, courtrooms and theaters. Griscom recounted a meeting "of an important charitable institution assembled in the house of one its members, a professional gentleman, residing at the corner of two of the most fashionable streets."[34] The builder of this stylish home had done his job well, fitting windows and doors almost exactly to their frames and thus preventing the circulation of air between inside and out. Two stoves warmed the meeting rooms on this frigid December evening. Despite the education and breeding of the illustrious gentlemen within—numbering among them judges, physicians, merchants and editors—they did not realize the danger of meeting in airtight rooms heated by stoves until it was almost too late. When the chair complained of the closeness of the room and tried to open a window, his peers cried out and warned him against "catching cold." He persisted, only to have his committee members complain variously of great heat and intense cold, as deficient oxygen affected their bodies differently. Griscom concluded, "Doubtless a good system of ventilation would have obviated the whole difficulty, and avoided evils

[33] *Ibid.*, 55-56.
[34] *Ibid.*, 56. Given Griscom's involvements, this likely was the Association for Improving the Condition of the Poor.

for which neither the beautiful paintings, the costly furniture, nor the downy carpets, could compensate."[35] Griscom's sanitary report was not solely for the laboring classes, but also a warning that wealth did not always buy health.

Sanitarians thought that, in daily life, people too often neglected the importance of fresh air, especially if they labored behind closed doors. When children went to schoolhouses or workers went to factories, they entered poorly ventilated buildings and breathed depleted air. In his 1837 prize-winning essay, "On the Influence of Trades, Professions, and Occupations in the United States, in the Production of Disease," Dr. Benjamin McCready repeatedly singled out the absence of ventilation as a contributing factor to the ill-health of workers and the chief health risk for sedentary workers: "The necessity of pure air and of a perfect ventilation of dwellings and workshops, has already been so often insisted on, and indeed so generally acknowledged, that it may be thought supererogatory to mention it again; yet the importance of the subject is so great that I could not avoid recurring to it."[36] Inadequate ventilation weakened tailors, shoemakers, gold beaters, carvers and gilders. Painters and printers suffered further through their employment of noxious chemicals. Even the clergy, despite being the "most favorably situated" of professional men, shortened their lives through their labor.[37] In commenting on the clergy's common malady, the inflammation of the larynx, McCready opined, "Lecturing too in crowded and ill-ventilated rooms must be attended with consequences deleterious to health, and the same want of sufficient ventilation, with the exertion and

[35] Griscom, *Uses and Abuses of Air*, 58.
[36] Benjamin W. McCready, MD, "On the Influence of Trades, Professions, and Occupations in the United States, in the Production of Disease," (New York: Arno Press, 1972), 118.
[37] *Ibid.,* 92.

excitement attendant upon protracted meetings, renders them still more injurious."[38] No one was safe from vitiated air.

Griscom followed McCready's reasoning, arguing that sailors and farmers, though they might count themselves among the lucky who spent their days in the open air, both suffered when they retired for the night. The sailor, going below deck to rest in the forecastle, spent his sleeping hours "inhaling an atmosphere as impure as that above is pure."[39] Likewise, Griscom characterized the farmer's sleeping chambers as small, cramped and rarely ventilated, so that slumber reversed the positive effects of the day's inhalations. "[T]he seeds of disease may be sown during the brief hours of sleep, which the purer and healthier circumstances of the day may never eradicate."[40] For health and comfort, people needed ventilation. They needed fresh air.

While Griscom worried about the wellbeing of all classes in a variety of locations and employments, he focused in his sanitary report on the most desperate case—cellar apartments and the laboring classes within them. Life within damp, airless basements marked its residents, imparting to them not only the pallor of illness but also a noticeable "musty smell" that they carried with them throughout the city.[41] Dispensary physicians immediately knew a cellar dweller by that smell, which informed them of their patient's low class and social standing. Just as the musty odor told the physician the likely source of the malady, vitiated basement air, it also informed the doctor that the cure was unlikely. If a patient lived in a cellar apartment, he or she probably could not afford a room on the upper floors that offered windows and fresh breezes.

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[38] *Ibid.,* 96.
[39] Griscom, *Uses and Abuses of Air*, 51.
[40] *Ibid.,* 52.
[41] Griscom, *The Sanitary Condition*, 10.

Poor ventilation was not the only cause of breathing problems in the city. Fresh air remained a positive good, but vitiated air was only one of many nefarious inhalations. Many commentators, especially those unfamiliar with the biology and chemistry of respiration, overlooked ventilation as they mapped city smells and attendant illnesses. In 1850, the *Saturday Evening Post* reminded its readers that, "Beneficial odors are sweet and fragrant; hurtful vapors are offensive and unpleasant."[42] Responding to recent actions by Philadelphia's Board of Health, the *Post* argued for a new olfactory geography: "Therefore every manufactory, employment, &c., from which a bad smell proceeds, is injurious to health and should be located in a place where the public will not be affected by it."[43] The *Post* was firm in its stance that all stench-producing trades must be relocated, not just the butchers whose facilities had been found wanting.

In Chicago, satirical author Franc B. Wilkie conjured "The Court-House Ghost" as "the incarnation of stench" and used this character as a guide to the city's many stinks.[44] Wilkie imagined interviewing Chicago's stenches to learn their whereabouts. In response to Wilkie's questions, the Ghost revealed that he was "partial to amusements" and often went to Colonel Wood's Museum.[45] Wilkie had never seen him there, but had caught whiffs of the Ghost among the anatomy exhibits. The Ghost next mentioned his preference for McVicker's Theater, especially on crowded nights, though he disliked the Opera-House for being "too large and airy, and I become lost in the vastness."[46] Ventilation was the Ghost's foe, but this "son of old rancidity" feared not in churches.[47]

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[42] "Nuisances," *Saturday Evening Post* 29 June 1850, pg. 2.
[43] *Ibid.*
[44] Franc B. Wilkie, *Walks About Chicago,* (Chicago: Belford, Clarke & Co., 1882): 27-32.
[45] *Ibid.*, 29.
[46] *Ibid.*, 29.
[47] *Ibid.*, 30.

Instead, the Ghost said, "I infer that I am much liked from the fact that nearly all the churches are built with special reference to my convenience. They [religious people] are so fearful, apparently, that I will not stay with them, that they are careful to allow no avenue of escape."[48]

Just at Chicago's architecture made the Ghost comfortable, so too did its industry. The Ghost especially enjoyed "inhal[ing] the inspiriting odor" of the Chicago River, which often held more offal than water between its banks.[49] The Ghost also spoke of visiting a twin brother who lived in nearby Bridgeport, the home of the slaughterhouses. In his spare time, the Ghost flitted about the entire city, riding the horse-cars, touring Archer Road, following scavengers to the city's limits, visiting the Armory, attending morning sessions of police court, and always returning to his home in the basement of the court-house. Wilkie asked his fetid friend where he was headed that evening when the Ghost disappeared as suddenly as he had come, leaving the writer alone in the cold night air, sniffing cautiously at the wind.

Wilkie's Ghost embodied not only stench, but also the difficulties of tracking smells in a busy city. Odors abounded; the Oneida Community's *Circular* spoke humorously in 1854 of a man with "a remarkable set of olfactories" who could identify sixty-nine distinct smells in one urban spot.[50] Just as the Ghost was everywhere in Chicago, so too were a variety of scents whose presence were both predictable and irregular. Wherever one went in a city, there would be aromas of one sort or another, but a sudden shift of the wind could change the air entirely. Rather than staying in one place, stenches came and went as suddenly as the Court-House Ghost.

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[48] *Ibid.*, 30.
[49] *Ibid.*, 31.
[50] "The Nose in the City," *Circular* 25 Jul 1854, pg. 399.

The sudden comings and going of smells vexed those who tried to locate them on a map or pinpoint their sources in the city. Residents of Cambridge, a Boston suburb, tried to find the source of the "smell of dead hogs and melting lard mixed" that disturbed their slumber, but were thwarted by shifting winds. As resident Samuel Slocumb testified before the State Board of Health, "Well, in going down Fourth Street, when we got near Broad Street, we seemed to pass out of the current of the smell. We walked up on Gore Street, and after we had walked up there a piece we came again into the current."[51] Lawyers recited Slocumb's words back to him, insinuating that Slocumb did not follow the odor directly to its source: "If I understand you, you say that you commenced to go towards Mr. Squire's [pork packing business] in the smell. As you proceeded you passed out of the current." Slocumb could draw the route he travelled on a map, but not the path of the offending smell.

Adding to Slocomb's difficulty was the fact that odors often overlapped, so that few could distinguish individual smells in the nasal cocktail of city air. *Circular* published a long list of odors that permeated city air: "the gas smell (leaking from some pipe), the gutter smell (which a good rain helps to sweeten), the dock smell, and the wharf smell." The stink of fish, oysters, and liquor comingled with the cloying perfumes released by sugar, molasses, tar, and turpentine. "[F]umes of kitchen and restaurant, the condensed smell of groceries, apothecary shops, &c." further aggravated the nose, so that respite could be found only in select places: walking past a stall of fragrant flowers, standing near a fruit stand heaped with oranges and pineapples, or most reliably beyond

[51] *John M. Tyler et al, Petitioners, vs. John P. Squire et al, Respondents, The Official Record of the State Board of Health of Massachusetts; Together with a Phonographic Report of the Evidence and Arguments at the Hearing, by George C. Burpee and W.O. Robson*, (Cambridge, MA: Welch, Bigelow, and Company, 1874), 22.

the city limits, inhaling the self-purifying billows of sea breezes from aboard a ferry. Even in these places where the breeze was sweet, "the odor of segars and perfumery" from the masses was noticeable. The *Circular* argued that it was impossible to control urban odors, but time would dull the nasal pain: "we gradually get city noses which don't smell only when we please." The *Home Journal* agreed wholeheartedly, asserting after a summer visit, "The *Nose*-Nothings are a happy majority of the residents of New-York."[52]

As outsiders to the city, the *Home Journal*'s writers did not have the accomplished city nose celebrated by the *Circular.* Instead of parsing the city's odors themselves, they wished for a "chemical analysis of the SMELL OF NEW-YORK *in summer time*."[53] Laymen thought of chemistry as, "a science which positively revels in nauseous odors," and routinely called upon its practitioners to identify a stench.[54] The same chemists who measured drugs at the apothecary and testified in poisoning cases could name the gaseous components of a smell and explain the effects of these gases on the body. Griscom used chemistry to elucidate the origins and dangers of vitiated air for his readers, and other chemists considered the questions of smell. In Edinburgh, professor and agricultural chemist James Finlay Weir Johnston dedicated five chapters of his popular two-volume *The Chemistry of Common Life* to odors, breaking them down in the categories of enjoyment and displeasure.[55] Plants held within them volatile oils, fragrant essences, camphors, balsams, volatile ethers and odoriferous resins that could be extracted for a variety of household uses, but also might cause hay fever when in high

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[52] "Lesser Gossip," *Home Journal* 15 Jul 1854, pg. 2.
[53] Emphasis in original. *Ibid.*
[54] "Greek Fire," *Chicago Tribune*, 1 September 1862, pg. 3.
[55] James F. Johnston, *The Chemistry of Common Life* (New York: D. Appleton and Company, 1856), II:179-269. This title went through numerous reprinting between 1853 and 1898, and was translated into German, Danish, Swedish and Chinese.

concentrations.[56] In his discussion of "the smells we dislike," Johnston noted that most fragrance preferences were borne of familiarity and habit, but there were also "certain smells which almost everyone dislikes."[57] While nature produced many of the universally unpleasant smells, such as the sulphuretted hydrogen of volcanoes and the fragrance of an agitated skunk, far more were created by "chemical art."[58] Johnston promised that chemists, "could, by familiar chemical processes, add stenches almost inconceivably disgusting to those which have hitherto been prepared"[59] Nevertheless, Johnston's chemical future remained bright, as he anticipated that chemical research would provide both new and cheaper perfumes as well as methods for the prevention and removal of "evil-smelling substances" such as those that aroused the passions of the *Home Journal*.[60]

The authors first scented the putridity at Thirty-first Street, where "passengers on the Hudson River Railroad arrive at a stench and there take an omnibus," and the rancidity lasted until they left the city.[61] Though the visitors originally thought that Thirty-first Street's stench might come from some nearby slaughter-houses, they abandoned this assumption of a local source when they encountered "a slimy perpetuation of the same stagnant putridity" in the gutters of Broadway. They worried that it was "most *unhealthful* to walk a mile alongside this slimy gutter of Broadway," and sounded the alarm: "There is CHOLERA in that smell."[62] *Home Journal* proposed

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[56] *Ibid.*, II: 196. On beliefs about hay fever's origins in the nineteenth and early twentieth century, see Gregg Mitman, "Hay Fever Holiday: Health, Leisure, and Place in Gilded-Age America," *Bulletin of the History of Medicine* 77 (2003): 600-635.
[57] Johnston, *The Chemistry of Common Life*, II: 218.
[58] *Ibid.*, II: 239.
[59] *Ibid.*, II: 239.
[60] *Ibid.*, II: 249.
[61] "Lesser Gossip," *Home Journal* 15 Jul 1854, pg. 2.
[62] Emphases in original. *Ibid.*

that a chemical analysis of the city's smell would be a "valuable addition to the public knowledge," and it would unite the city's geography by bringing together the Board of Health "in their session on one side of the gutter," and a chemistry professor of Columbia College "on the other side of" Broadway.[63] Even an afternoon in Manhattan was long enough for New York's powerful stenches to impress health concerns and an olfactory geography upon the visitor.

These olfactory concerns were social as well as spatial. When Griscom mapped cellar apartments, he obviously was locating poverty. Later sanitary surveys, even when they documented stench-producing trades and accumulations of filth rather than vitiated air, also mapped wealth and social inequalities. Just as odors could define places in the city, they also marked the place of people within the city. Absorbed by clothes, skin and hair, odors traveled with people as they moved through urban spaces. Smells, both good and bad, were an unspoken and invisible sensory signal of a person's neighborhood, occupation, and social status. At the dispensary, Griscom and his fellow physicians could identify a basement dweller by "a musty smell, which a damp cellar only can impart."[64] In Chicago, when satirical author Franc Wilkie conjured The Court-House Ghost as "the incarnation of stench," his initial reaction to this smelly specter was the suspicion that the ghost was actually a bone boiler who had absorbed the odors of his trade along the South Branch.[65] The ghost's fetor instantly triggered a recognition that was both spatial and social.

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[63] *Ibid*.
[64] Griscom, *Sanitary Condition,* 10.
[65] Wilkie, 28.

As markers of places and employment, odors often mapped onto class and ethnic prejudices, reinforcing social divisions in urban society.[66] The musty odor of the cellar resident indicated poverty, and the aroma of the ghost defined a class of workers. Yet the perfume of respectability did not automatically determine one's worth relative to the great unwashed, especially when pleasant smells contradicted assumptions of racial inferiority. This was starkly clear to the writers of *The Independent* in 1853 when they decried "The Power of Caste" that had evicted Reverend James WC Pennington from a crowded omnibus for the color of his skin.[67] *The Independent* objected to Pennington's exclusion when more offensive people were allowed to remain:

> The kitchen-maid, returning from market, with her greasy basket of mutton, may crowd herself into an already full stage. The loafer, with clothes emitting the smell of bad segars, and flesh oozing at every pore with the fumes of vile gin, may take his seat beside the perfumed damsel from 'above Bleecker,' and nothing shall be said. But Dr. Pennington, a gentlemen [sic] of education, a Christian clergyman, and Moderator of the Third Presbytery of New York, may not exercise the common privilege allowed even to the worst members of society.[68]

*The Independent* defined the "worst members of society" by the odors that seeped from their packages or their bodies. The kitchen-maid herself might have been acceptable, but her "greasy basket of mutton" caused offense. The loafer was even more disgusting and exuded a combination of stenches to remind his perfumed seatmate of his lower place in the social odor. With only her perfume, the 'damsel' reminded everyone that she was a

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[66] Mark M. Smith, *How Race is Made: Slavery, Segregation and the Senses* (Chapel Hill: University of North Carolina Press, 2006); Connie Y. Chiang, *Shaping the Shoreline: Fisheries and Tourism on the Monterey Coast* (Seattle: University of Washington Press, 2008).

[67] "The Power of Caste," *The Independent* 17 Feb 1853, pg. 26.

[68] *Ibid.* Pennington was born a slave, but escaped to the North, attended classes at Yale Divinity School, and established himself as a leader in religious and abolitionist circles. He published a slave narrative, *The Fugitive Blacksmith*, in 1849, but only brief studies of his life have been published. See, James P. Walsh, "James W.C. Pennington," *Connecticut's Heritage Gateway,* http://www.ctheritage.org/encyclopedia/ct1818_1865/pennington.htm (accessed March 16, 2011); David 0. White, "The Fugitive Blacksmith of Hartford: James W.C. Pennington," *Connecticut Historical Society Bulletin*, 49 (Winter 1984), 5-30.

member of a higher class. Though emitting the redolence of the lower class from their parcels and themselves, the kitchen-maid and loafer could claim a place in the omnibus which the distinguished Dr. Pennington, who had all the social markers of respectability but white skin, could not. Odors, like all other signs of social standing, were imperfect and often variable, subject to interpretation. Though the writers of *The Independent* found stenches more objectionable than skin color, the omnibus's conductor and passengers obviously disagreed.

Pennington's eviction was a question of what people were willing to endure. In this instance, the passengers of the omnibus found stenches more amenable than the presence of a black man. At other times, people found stenches impossible to endure but, like Olfactorious, they had little choice. Various commentators agreed that, when forced to breathe air so foul, the remedy would be as personal and intimate as the spaces that worried Griscom. *Home Journal*'s writers longed for "an ointment to rub around the edges of the nostrils…[that] might be both fragrant and disinfecting."[69] *Circular* thought that one could improve the atmosphere of his home through the careful cultivation of sweet-pea and mignonnette.[70]

Not all plants improved city air, as anyone who had met the ailanthus tree well knew. The ailanthus, a native of East Asia, had been cultivated in American cities because it grew rapidly and promised to provide cooling shade and ornament. It repelled insects and was hardy enough to survive the city smoke and dust that killed other trees.[71] Yet these benefits paled when compared to the "nauseous," "enervating," "unwholesome

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[69] "Lesser Gossip," *Home Journal* 15 Jul 1854, pg. 2.
[70] "The Nose in the City."
[71] M. B. B., "Scentless Ailanthus Trees," *Ohio Farmer* 22 Aug 1857, pg. 134; Peter Coates, *American Perceptions of Immigrant and Invasive Species: Strangers on the Land* (Berkeley: University of California Press, 2006), 119.

and sickly" odor of the tree in bloom.[72] Every July, for the short period when the tree blossomed and its "pollen scattered in every direction," people feared that its "sickening and detestable perfume" caused illness.[73] This shade tree added risk of injury to the insult of the already pestilential-smelling streets: "The ordinary odor of our streets is sufficiently nauseating; but the worst scent which an incompetent City Inspector has given us is refreshing, compared with the unwholesome and sickly odor of the Ailanthus."[74] A single ailanthus demanded closed windows in the summer heat, and a cluster of them sent families out of the city in search of respite.[75] This was another intensely local experience of air, odor and illness that guided the movement of New Yorkers through and out of their city.

Because he was editor of *Horticulturalist* and a leading authority on fashion and plants, Andrew Jackson Downing's cry "Down with the Ailanthus!" received considerable attention. Downing's friends were driven from their homes in upper Manhattan "by the Ailanthus malaria every season," and Downing described the annual scourge as air filled "with something that looks like curry-powder, and smells like the plague."[76] Chemists weighed in on the subject. In New York, James R. Chilton declared that ailanthus trees were not poisonous in 1855.[77] Chilton was a prominent chemist in New York City, where he owned an apothecary, offered his services as an analytical

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[72] "A Blossoming Nuisance," *New York Times* 30 Jun 1859.
[73] Ed. O. F., "Remarks.," *Ohio Farmer* 18 Jul 1857, pg. 113; "A Blossoming Nuisance."
[74] "A Blossoming Nuisance."
[75] For escape from the ailanthus, see: Andrew Jackson Downing, "Shade Trees in Cities," *Horticulturalist and Journal of Rural Art and Rural Taste* 1 Aug 1852, pgs. 345-349; "The Ailanthus," *Valley Farmer* Jul 1853, pg. 249; "A Visit to Town," *Home Journal* 22 Apr 1854, pg 2; "A Blossoming Nuisance."
[76] Downing, "Shade Trees," 346. As a horticulturalist, Downing objected to the ailanthus both for its smell and its invasive root structure as a sucker.
[77] "Editorial Inkdrops," *Flag of Our Union* 25 Aug 1855.

chemist for hire, and frequently testified as a chemical expert in poisoning trials.[78] Anyone who read newspapers was familiar with Chilton's name and, given the frequency with which advertisements for everything from Central African Guano and Anderson's Honey-Dew Tobacco to Lyon's Magnetic Powder and JH Tompson's Instantaneous Liquid Hair Dye cited Chilton's approval as evidence of the product's efficacy, people probably trusted his chemical evaluations.[79] Yet Chilton's conclusions about the ailanthus received far less press than those of French chemist M. Hetet.

At the School of Medicine of Toulon, Professor Hetet and his assistants sought medicinal effects from the ailanthus glandulosa. They found a volatile oil in the tree's bark that induced vertigo, cold sweats and vomiting during evaporation, or nausea and prostration when chewed. Hetet pulverized the bark and fed the greenish yellow powder to dogs, obtaining his desired result, the expulsion of taenia or tapeworms. In *American Journal of Pharmacy*, editors recounted Hetet's successes using the ailanthus in human cases of taenia, though they warned of the dangers involved in preparing the bark.[80] *New York Times* also reported on Hetet's experiments, but its column included no mention of tapeworm. Instead, the *Times* emphasized the dangers of the bark's volatile oil as evidence that the tree was poisonous: "its bark contains a volatile oil, which is so deleterious in its effects, that the assistants, who had the evaporation of the extract under

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[78] All of these activities were common ways to earn a living by doing science in the nineteenth century. Paul Lucier, *Scientists and Swindlers: Consulting on Coal and Oil in America, 1820-1890* (Baltimore: The Johns Hopkins University Press, 2008).

[79] In the literature on advertising, very little has been written about the role of scientific testimony in the antebellum period. After the Civil War, patent medicines dominate discussions of scientific testimony in advertising, and thus much that has been written is critical of "expert" opinion. See William H. Helfand, *Quack, Quack, Quack: The Sellers of Nostrums in Prints, Posters, Ephemera & Books* (New York: The Studley Press, 2002), esp. 35-39, 47; T.J. Jackson Lears, *Fables of Abundance: A Cultural History of Advertising in America* (New York; Basic Books, 1995); John C. Burnham, *How Superstition Won and Science Lost: Popularizing Science and Health in the United States* (New Brunswick, NJ: Rutgers University Press, 1987), esp. 76-79; James Harvey Young, *The Toadstool Millionaires: A Social History of Patent Medicines in America Before Federal Regulation* (Princeton: Princeton University Press, 1961).

[80] "Gleanings from the French Journals," *American Journal of Pharmacy* 229-230.

their care, would be seized with vertigo and vomiting whenever they came in contact with the vapors."[81] The editors of *New York Times*, as well as those of *Friends' Intelligencer* and *Ohio Farmer*, ignored the medical benefits revealed by Hetet's experiments, concluding instead that the bark's volatile oil evaporated naturally in warm summer months, killing insects and sickening people in the tree's vicinity.[82] The press preferred Hetet's conclusions to those of Chilton not because they trusted the French chemist more than New York's own, but because Hetet's experiments upheld what experience had taught them. The ailanthus smelled bad and it made people ill. In short, this shade tree poisoned the air.

Downing relied less on chemistry than on his nose and his racial prejudices as he patriotically urged native shade trees such as maples, elms, ashes, tulip and magnolia in place of the "petted Chinaman or Tartar" ailanthus. Unlike the ailanthus, which "*smells* horribly, both in leaf and flower," American maples were "clean, sweet, cool, and umbrageous," and thus ideally suited as urban shade trees.[83] Downing went on to celebrate the actions of "Herods who wield the besom of sylvan destruction" for their annihilation of ailanthus trees "in more towns than one south of Mason and Dixon's line."[84] Downing certainly would have praised the municipal ordinances against the ailanthus in New Haven (1855) and Georgetown (1859), and joined the *New York Times* in its stance that "these poison-emitting trees…should be removed by a Corporation ordinance."[85]

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[81] "The Poison Ailanthus," *New York Times* (30 Jun 1859), pg. 1.
[82] *Ibid*; "The Ailanthus," *Friends' Intelligencer* (16 Jul 1859), pg. 288; "The Poisonous Ailanthus," *Ohio Farmer* (1 Oct 1859), pg. 315.
[83] Downing, "Shade Trees," 346, 348.
[84] *Ibid.,* 345. On Downing's patriotism, see Coates, *American Perceptions*, 120.
[85] "Our Upas Trees," *New York Daily Times* 2 Jul 1855, pg. 4.

Downing employed his patriotism in support of airborne health more widely, though he did not find American bodies as celebratory as American trees. In comparison to the robust and healthy Europeans he had seen everywhere on the continent, Downing thought his fellow Americans were "pale and sickly."[86] Like Griscom, Downing believed that Americans' ill health was the result of breathing foul domestic air. Downing had no occasion to frequent the dispensary or cellar apartments, but he saw the same dangers of vitiated air in the unventilated rooms of both city and countryside, kept warm by stoves. Downing declared that stoves were "the favorite poison of America" because the hot iron released arsenic and sulphur vapors.[87] To protect the warmth of their rooms, Americans shut their windows and sealed their doors, effectively containing and concentrating the poisonous vapors with their own respired air and bodily effluvia. Americans preferred "the continual atmosphere of close stoves" to deep breaths of "that blessed air, bestowed by kind Providence as an elixir of life," and their health suffered for it.[88]

This preference perplexed Downing, and he sought to remedy its ill effects through an insistence upon ventilated rooms, for which he offered architectural plans, and through changes to the larger urban environment. As early as 1848, Downing advocated public parks and gardens as "salubrious and wholesome breathing places" where the city's residents would "exercise in the pure open air."[89] Looking back on his travels, Downing realized that European cities had many public parks where citizens from all social levels partook of fresh air and exercise. He concluded that these spaces were the

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[86] Andrew Jackson Downing, "The Favorite Poison of America," in George William Curtis, ed., *Rural Essays* (New York: De Capo Press, 1974): 281.
[87] *Ibid.*
[88] *Ibid*, 285, 279.
[89] Andrew Jackson Downing, "A Talk About Public Parks and Gardens," in George William Curtis, ed., *Rural Essays* (New York: De Capo Press, 1974), 142-143.

key to Europeans' advantages in health. When Mayor Kingsland proposed People's Park in 1851, Downing supported the plan for "a breathing zone, and healthful place for exercise" where visitors would experience "the perfume and freshness of nature."[90] Though Downing undoubtedly saw the plan for a large urban park as another marker of Americans' improving "popular taste," his emphasis on the health and respiratory benefits of the park was consistent with his concerns for domestic air.[91] If unhealthy air affected bodies in small domestic and work spaces, unbounded fresh air could do the reverse in a capacious space that brought the benefits of the countryside into the city.

Griscom, though he supported city parks, did not share Downing's ardor for Mayor Kingsland's plan. In *The New York Times*, Griscom argued that the creation of a large park was the wrong way to improve the sanitary condition of the city, because giving residents an hour in a park and twenty-three in vitiated air "is like administering one grain of antidote for a pound of poison."[92] No matter how large or grand, a park could not offset the "stifling vapors, and…poisonous gases" of cellar apartments and overflowing tenements.[93] Bringing fresh air indoors would improve the public's health far more than could changes to the outdoor environment because, in Griscom's assessment, fresh air problems were localized in domiciles rather than widespread through the city's atmosphere.

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[90] Andrew Jackson Downing, "The New-York Park," in George William Curtis, ed., *Rural Essays* (New York: De Capo Press, 1974), 147, 149, 150. Though Downing was an ardent and vocal advocate of a large urban park, he was not the originator of the idea. For an account of the origins of Central Park as a public space and its many meanings, see Roy Rosenzweig and Elizabeth Blackmar, *The Park and the People: A History of Central Park* (Ithaca: Cornell University Press, 1992), 15-36.
[91] Andrew Jackson Downing, "Public Cemeteries and Public Gardens," in George William Curtis, ed., *Rural Essays* (New York: De Capo Press, 1974), 154.
[92] J.H. G., "Public Parks vs. Public Health," *New York Daily Times* 30 Jun 1853, pg. 3.
[93] *Ibid*.

Furthermore, Griscom argued that the benefits of a "reservoir of pure air, as a means of ventilating its neighborhood" would extend fewer than a thousand feet from the park's edge.[94] Griscom proposed the dispersal of small fifty or one-hundred acre parks across the city as better for urban ventilation, but his preference was that the time, space and money invested in the idea of a grand park go instead to the construction of well-ventilated dwellings. If New Yorkers wanted respite from the city's odors, Griscom contended, they would continue to seek fresh air and recreation on the many local ferries and "prefer the rivers for their purity of air and quietness of repose" over any inland park.[95]

For all the talk of breezes purified by river water and reservoirs of air, the perception remained that fresh air was found outside the city rather than within it. New Yorkers thought the same about the availability of fresh water prior to the completion of the Croton Aqueduct and Reservoir in 1842. Whenever he talked about the air, Griscom began by commenting on the infrastructure that carried fresh water into city homes, and the incredible expenditure of fifteen million dollars that it had entailed. When New Yorkers had gone to such lengths to protect and improve their drinking water, constructing a complex system to carry this vital liquid from forty-one miles away, Griscom found it curious that New Yorkers made no provisions to introduce air, the "life-giving, ethereal, and invisible fluid," into city homes and buildings.[96] He began his public lectures and publications with this point, and emphasized it in private letters as

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[94] *Ibid.*
[95] *Ibid.*
[96] Griscom, *Uses and Abuses*, 5.

well.[97] Later in the century, others would echo these sentiments on the economics of fresh air. In 1890, Boston's landscape architect Charles Eliot advocated city parks with the logic, "just as you can no longer afford not to tax yourselves, let us say for pure water, so you can no longer afford not to tax yourselves for pure air and open spaces."[98]

Connections between water and air abounded, both in discourse and in the environment itself. Griscom thought New Yorkers would go to their rivers for fresh air, and observers of the city's geography insisted that air arrived at the city purified and cooled after passing over the Hudson or East River. In Chicago, the city's river exhaled stenches that made the Court-House Ghost feel right at home, but Lake Michigan supplied the city's fresh water. In Boston, high tides covered mud flats throughout the city and its suburbs, but receding water exposed the mud and anything trapped in it to the open air, releasing noxious and offensive stenches into the wind.

Engineers were taking control of water by midcentury, building canals and water systems, moving rivers underground, constructing sewers, and pumping water in and out of individual houses. These technological developments changed not only the water they channeled, but also the air. Miasmas disappeared when drainage improved, but sewers concentrated odors with waste water, and indoor plumbing created a fearful new specter in dangerous sewer gas. Olfactorious avoided the sewer outfall at Clarkson Street, and other residents similarly changed their routes through the city. When the *Chicago Tribune* published a series of articles on the city's health in 1873, reporters mapped gaps

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[97] Dr. Griscom, "Lectures for the People," *New York Times* 21 Jan 1852; James H. Cassedy, "The Roots of American Sanitary Reform 1843-47: Seven Letters from John H. Griscom to Lemuel Shattuck," *Journal of the History of Medicine and Allied Sciences* 30 (1975), 144.

[98] Charles William Eliot, *Charles Eliot, Landscape Architect* (Boston: Houghton Mifflin Company, 1902), 339.

in the sewerage system rather than cellar apartments or topographical features.[99] The new technology of sewers had alleviated some of the city's drainage and waste problems, but aggravated others. Incomplete sewerage left intact the overflowing cesspools, flooded lots and streets of stagnant water of the city's poorer neighborhoods, condemning families to foul air and ill health. The *Tribune* feared the Northward march of cholera, already striking in Memphis and New Orleans, and argued the deaths due to "filthy, odorous, and pest-breeding streets" were "wholesale slaughter."[100] To improve the air and thwart epidemic, the reporters demanded better and more complete infrastructures.

The pipes, pumps and sewers that made up the sanitary city's water system might diminish odors, but they could not carry fresh air into the city.[101] Griscom, Downing and countless others attributed the qualities of water to air, talking about oxygen as a vital fluid and imagining city parks as reservoirs of fresh air. Contrary to the metaphors, these two staples of health did not behave the same way. Air, unlike water, could not be bounded. Public health advocates and early urban planners urged some structureless infrastructure, pushing buildings out of the way to enable the movement of air through cities. The Massachusetts Sanitary Commission, in its 1850 sanitary survey, recommended the preservation of open spaces and the laying out of wide streets to enable the circulation of air.[102] Horace Bushnell agreed, arguing in "City Plans," that streets should be "laid diagonally in relation to the breeze," so that "the current would press into

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[99] "The City's Health," *Chicago Tribune* 18-22 Jun 1873.
[100] "The City's Health," *Chicago Tribune* 20 Jun 1873, pg. 2.
[101] One outlier on this point was the British sanitarian Benjamin Ward Richardson, who envisioned a technological system for the distribution of ozone as a purifying agent for the air and other materials. See Peter Thornsheim, *Inventing Pollution: Coal, Smoke and Culture in Britain since 1800* (Athens, OH: Ohio University Press, 2006), 24.
[102] *Report of a General Plan for the Promotion of Public and Personal Health, Devised, Prepared and Recommended by the Commissioners Appointed Under a Resolve of the Legislature of Massachusetts Relating to a Sanitary Survey of the State* (Boston: Dutton & Wentworth, 1850), 166.

all the streets and into and through all the houses open to its passage, making eddies and whirls at every crossing, and fanning, as it were, by its breath, the whole city."[103] The wide boulevards and spacious parks of the City Beautiful movement were advocated at midcentury not for aesthetics, but for fresh air and public health.[104]

Griscom took a different approach, striving for more immediate improvement of the air and public health than overhauling the existent city or planning a new one. For the enclosed spaces of homes, schools, prisons and hospitals, Griscom emphasized the technological solution of ventilation systems. When he turned to the problem of fresh air in the city as a whole, Griscom advocated bureaucratic networks rather than physical infrastructure. Sanitary Police and health ordinances would improve air quality not by pumping in fresh air, but by systematically removing the causes of foul air and stenches. In regulating the air and removing nuisances, health boards acted as quasi-judicial authorities who defined nuisances and policed their existence.[105]

The Metropolitan Health Bill, enacted in February 1866, created a permanent institution for public health issues, including fresh air and stench nuisances, in the Metropolitan Board of Health. This development was the result of a long fight, in which Griscom had been a leading member, and the most thorough and detailed sanitary survey of the city to date. The *Report of the Council of Hygiene and Public Health of the Citizens' Association of New York Upon the Sanitary Condition of the City* took narrative mapping of New York City to a new level of detail and precision. The Citizens'

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[103] Horace Bushnell, *Work and Play; Or Literary Varieties* (New York: Charles Scribner, 1864), 321.
[104] For connections between the midcentury sanitary movement and Progressive Era city planning, see Jon A. Peterson, *The Birth of City Planning in the United States, 1840-1917* (Baltimore: The Johns Hopkins University Press, 2003), esp. 29-39.
[105] On the regulatory powers of health officials as a nineteenth-century extension of nuisance law from judicial to executive power, see Novak, ch. 6; and Morag-Levine, ch. 4.

Association broke the city into thirty-one sections and enlisted physicians as "competent experts" to investigate every aspect of their assigned district through "house-to-house visitation."[106] In their individual reports, the inspecting physicians documented sanitary conditions of single blocks and buildings. They specified the addresses of the "most offensive odors" and of buildings whose ventilating facilities failed to admit enough fresh air for the inhabitants.

What emerged from these thirty-one detailed reports was a catalogue of sanitarians' concerns, from natural topography to the built environment and from soil drainage to aerial currents. The minute mapping of these concerns onto specific building addresses and street blocks defined the geography of fresh air and foul odors. Though building ventilation remained important, the local experience of air now included odors and emanations of entire blocks, squares and neighborhoods. Ventilated buildings offered few advantages when the air of the neighborhood contained "the most nauseous odors," "noxious gases," and "insalubrious emanations."[107] Consequently, inspectors turned their attention to the accumulation of filth—including garbage, manure, sewage, and animal carcasses—not so much for its material presence and unsightliness, but because these nuisances "contaminate[d] the atmosphere of the locality."[108] The physicians cited certain businesses as infecting the atmosphere and, when located in populous areas, classed these with filth as nuisances "injurious to public health and to individual welfare."[109] Inspectors thus focused on the proximity of slaughterhouses, hide

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[106] The Council of Hygiene and Public Health specified twenty-nine sanitary districts, but two of these were so large or unhealthy as to require further division in two for inspection. *Report of the Council of Hygiene and Public Health of the Citizens' Association of New York Upon the Sanitary Condition of the City* (New York: D. Appleton and Company, 1865), xxii, xxvii.
[107] *Ibid.*, 8, 34.
[108] *Ibid.*, 8.
[109] *Ibid.*, xciii.

and fat depots, bone-boiling and fat-melting establishments, gas manufacturers, and manure-yards to residential areas and crowded tenements. It was not the mere existence of these industries within the city that made them dangerous; it was their effect upon the air that residents and visitors breathed.[110]

Chemists also took part in the sanitary survey, arguing that, "Hygiene must rest on the basis of chemical investigation."[111] Professors John W. Draper of New York University and R. Ogden Doremus of Bellevue Hospital reported on the hygienic applications of chemistry to the water, air, food, and soil of the city. The chemists advocated water analysis to test for impurities in the Croton water and local wells, and the use of charcoal in sewer ventilators to absorb noxious gases. They concluded that the dangers of rotting and adulterated food were omnipresent, but adequately addressed by "modern methods of analysis and examination."[112] Soil was best managed by street-cleaning and sewerage. Air, like water and food, required analysis to determine its quality and the sources of impurities it carried. Though recent advances in gas analysis enabled the chemists to "offer legal evidences of sources of contamination by clearly identifying them," a systematic examination of the city's air would be "the most difficult and expensive of the inquiries thus recommended."[113] Chemistry could provide invaluable knowledge on the sanitary condition of the city and methods for improvement, but such knowledge came at a higher price than common sense solutions already available to sanitary reformers.

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[110] Of the fifteen nuisances enumerated in the report, only one had no connotation of bad odors, "the unreasonable overcrowding of the city railway cars." However, given the concerns about poor ventilation in overcrowded rooms, this ill likely merited classification as a nuisance because it created unhealthy breathing conditions and vitiated air.
[111] *Ibid.*, xcix.
[112] *Ibid.*, cii.
[113] *Ibid.*, ci-cii.

As with the ailanthus, whose fragrance people found nauseating, feared and then expelled, reformers targeted filth and offensive trades for elimination from the city. The Metropolitan Board of Health, with its power to enact and enforce health regulations, was responsible for improving the air. In its first report, this new Board—which shared members and beliefs with the Citizens' Association—explained that "filth and its concomitants" were the cause of New York City's high death rate: "Hot weather and filth, which, combined, originate the thousand of odors which vitiate the atmosphere, destroy these delicate beings."[114] To "secur[e] pure air and general cleanliness," the Board of Health began regular inspections and regulation of all odor-producing, and odor-eliminating, practices in the city. The Board established a system of permits for slaughtering, emptying cesspools and stables, carting entrails and offal through the streets, rendering fat and producing fertilizers, disposing of garbage, and so on.[115] Following the nuisance law tradition of separation, the permits restricted the geography of the offensive trades and attempted to move stench-producers and their nauseating fumes away from the most populous areas of the city. For example, the Board pushed slaughterhouses north of 40th Street in 1868, and then restricted them from the core of the city between Second and Tenth Avenues in 1870.[116]

These restrictions changed as the city rapidly grew and commercial spaces overtook residential neighborhoods.[117] In essence, the Board of Health tried to reorient the geography of fresh air and odors in Manhattan, and they met with some success.

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[114] *Annual Report of the Metropolitan Board of Health, 1866* (New York: C.S. Westcott & Co.'s Union Printing-House, 1867), 10-11.
[115] *Ibid.*, 33+.
[116] John Duffy, *History of Public Health in New York City, 1866-1966* (New York: Russell Sage Foundation, 1974), 33, 129-130.
[117] For the rapid growth and spatial changes of Manhattan, see David M. Scobey, *Empire City: The Making and Meaning of the New York City Landscape* (Philadelphia: Temple University Press, 2002).

These changes are evident in the panoramic maps of New York at midcentury (Figures 1.1 and 1.2). In a direct comparison of lithographs from 1856 and 1876, the distribution of smokestacks, the visual marker of industry and jobs, shifts to the edges of Manhattan and across the Hudson and East Rivers on the opposing shores of New Jersey and Brooklyn.[118] The owners of many stench-producing trades, rather than wrestle with the rapidly changing city and its sanitary needs, bought land and established their factories beyond the reach of the Metropolitan Board of Health. If it weren't for the wind, which stirred the air and odors of the entire region, this might have been a suitable change in line with the goals of the Board of Health and sanitary reformers.

In the 1870s, as oil refining and fertilizer manufacturing flourished along Brooklyn's Newtown Creek, which emptied into the East River across from midtown, Manhattan's residents complained about "vile smells" and "noisome gases."[119] These afflicted residents shared Olfactorious's earlier concerns about odors, attributing "severe headache and dizziness,…extreme nervous prostration and derangement of the stomach" to the stenches.[120] However, these urbanites did not endure a nasal purgatory while traversing Brooklyn; instead, the odors from Newtown Creek's industries crossed the East River on every easterly wind and made their homes an olfactory hell.

Citizens turned to the Metropolitan Board of Health that had created this new geography of odors, but met with defeat. The Metropolitan Board had no authority over the businesses of Brooklyn, so frustrated citizens petitioned the state government for relief. In successive sessions in Albany, the legislative docket included bills to extend the

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[118] *Ibid.*, 62-70; John W. Reps, *Bird's Eye Views: Historic Lithographs of North American Cities* (New York: Princeton Architectural Press, 1998), 31-32.
[119] "Attempt to Abate a Nuisance," *New York Times* 1 Apr 1876, pg. 10.
[120] *Ibid*.

powers of a city's board of health beyond the city's boundaries when industries outside those boundaries were affecting health within the city.[121] Despite the support that these bills received from the Metropolitan Board of Health and concerned citizens in the city, none of them were passed into law. Instead, each was referred to the Assembly Committee on Public Health, "a committee which can be bought," in the words of Horace Greeley's *New-York Daily Tribune*.[122] The bills floundered in committee, as Brooklyn's Board of Health and business owners lobbied against an extension of Manhattan's powers. Brooklyn's leaders had no desire to be subsumed into the growing metropolis.

A Citizens' Committee upon the Nuisances of New York City formed to address the question of odors in the city, but its investigation and results differed greatly from the Citizens' Association's earlier report. Instead of trained physicians, banker and stockbroker Thomas B. Musgrave led a group of concerned citizens to investigate "the stench factories of New York City."[123] In their report, this committee asserted the common belief that, "A wise Providence has made healthful odors pleasant to the senses and malarial ones disagreeable," then went on to claim that many disagreeable odors originated within Manhattan rather than across the East River.[124] Musgrave documented the addresses of slaughterhouses, fertilizer factories and fat renderers within the city's bounds, and claimed that each of these "generate[d] pernicious odors sufficient, with a westerly wind, to envelope the city from North river to Madison avenue, and to sicken

[121] Such bills were introduced in 1875, 1876, 1877, and 1878. The State Board of Health, created in 1878, immediately addressed the content of these bills with its creation of a Committee on Effluvium Nuisances to collect testimony and inspect industries in both Manhattan and Brooklyn.
[122] *New-York Daily Tribune,* 16 Nov 1876, pg. 4.
[123] Musgrave, *Report of Citizens' Committee*, 1.
[124] *Ibid*.

thousands of our people."[125] Though offensive trades had been relegated to the margins of Manhattan, their odors were not so easily contained.

Musgrave saw possibility in the bureaucratic network of a health board, regulations and inspectors; "*Law* has thus supplemented *Nature* in providing perfect safeguards for health."[126] Yet the odors that nightly disturbed Musgrave and his fellow citizens proved that neither law nor nature was working effectively. Musgrave had options. He might have questioned the efficacy of the law on a matter of nature, or pushed for an extension of the Board's powers to further supplement nature. He could have condemned the stench-producing industries and agitated for their closure. Musgrave might have taken himself out of harm's way by buying a new home and moving out of the afflicted Murray Hill neighborhood. If he didn't want to move, he could have vacationed at his Bar Harbor villa during the warmest months. Instead of all these things, Musgrave maintained his faith in the current law and charged that corruption had overtaken the Board of Health: "*What this city needs is not more laws, but efficient executive officers and better administration of the laws we have.*"[127] The Citizens' Committee alleged that the Board was negligent because it used the system of permits to allow offensive trades to produce stenches within the city rather than to remove the sources of dangerous odors from the city. Musgrave created his own map of Manhattan, on which he located slaughterhouses, renderers, gas works, and manure yards, and then noted that "*All are protected by the permits of the Board of Health*."[128] Brooklyn did not appear on this map, for there were plenty of stench factories within Manhattan, under the

[125] *Ibid.*, 6.
[126] *Ibid.*, 2. Emphasis in original.
[127] *Ibid.*, 11.
[128] *Ibid.,* 6.

jurisdiction of the Board of Health. Musgrave concluded that, until these local nuisances were removed from Manhattan, they posed a bigger threat than whatever industries might be in Brooklyn.

While Musgrave continued to think that smells were something he could pinpoint on a map, the Metropolitan Board of Health wrestled with a much larger body of air. Since the Board had restricted offensive trades to the margins of the city, the prevalence of stenches in the heart of Manhattan meant that odors were not strictly local, but diffused widely from their sources. The Board of Health's olfactory map encompassed Manhattan and its neighbors, noting both the location of offensive trades and the winds that united Manhattan and Brooklyn (Figure 1.3). Water divided these two islands in a geographic boundary had long ago become a political one. Air obeyed nature rather than law, flowing freely between Manhattan and Brooklyn and distributing stenches without regard for local regulations or political borders.

"The Smells of Hunter's Point," as the newspapers dubbed the aroma that nightly entered Manhattan's homes, both challenged and reinforced earlier beliefs about and maps of the city's air. Fresh air remained desirable and stenches dangerous, but no longer could sanitarians believe that the effects of air upon health were intensely local, or even bounded by the block or neighborhood. Odors did not reside at a particular address that might be avoided, but traveled miles on the wind to invade homes far from their source. The battle against filth and the offensive trades, which had guided so many sanitarians and public health officials continued at the local level, but also became a regional struggle between health and industry that increasingly invited, created and required municipal institutions and state regulation.

The creation of bureaucratic regulation, for which Griscom had so long fought, also changed the relative value of olfactory maps. When Olfactorious and Griscom were mapping the city's air in the 1840s and 1850s, their maps differed but were equally valid. Each man was sharing his experience of the same things—location, air, and health—but interpreting his experience in different ways. Though Griscom focused on vitiated air and Olfactorious documented odors, their differing interpretations of the city's air were both acceptable because bodily experience conferred knowledge. People used these maps as they used chemists—not as absolute authorities on the air, but as guides to the city and corroborating evidence for their own conclusions. Once the Metropolitan Board of Health had regulatory oversight of the air, its olfactory map was the sole authority. Dissenting maps that located the sources of odors within Manhattan, like that of Thomas Musgrave, might be true to personal experience but had to fight for legitimacy against the official map of the Board of Health. These fights took place in courtrooms and before state legislatures, and their conclusions had important ramifications for power in the city and scientific authority. The Metropolitan Board of Health, as the regulatory embodiment of nuisance law, controlled the definition of fresh air and foul odors. Yet other experiences, definitions, and maps of air quality circulated, spreading knowledge about urban air and spaces that, while personal and unofficial, guided individual decisions about navigating through and living in the city.

Figure 1.1. C. Parsons, *City of New York* (New York: N. Currier, 1856). Image courtesy of Library of Congress.

Figure 1.2. Parsons & Atwater, *New York & Brooklyn* (New York: Currier & Ives, 1876). Image courtesy of Library of Congress.

Note the location of smoke, indicative of factories, in each of these maps. Before the Metropolitan Board of Health, factories were located on the margins of Manhattan. After the Board of Health began regulating the offensive trades, the factories moved across the shores of the Hudson and East Rivers, where they were beyond the Board's jurisdiction.


Figure 1.3. "Map Showing Location of Odor Producing Industries of New York and Brooklyn and the District Claiming to be Affected Thereby," Date Unknown, File: New York City Board of Health—Notes, Box 52, "Charles F. Chandler Papers," Columbia University, New York.

This map shows the location of offensive trades (here called "odor producing industries") and the "district affected by odors." Most complaints about the stenches originated in this district. New York's Board of Health used this map to show how stenches travelled from the offensive trades of Newtown Creek, though further from the "district affected" than some of Manhattan's businesses.

# Chapter 2.

## The Smell Detectives:

## Chemists and the Public Nose in the Industrial City

In May 1878, New York City District Attorney Benjamin Phelps charged chemist Charles Frederick Chandler, president of the Board of Health, with a misdemeanor offense. The district attorney, building a case from Thomas Musgrave's allegations in "The Air We Breathe," indicted the board for "unlawfully, willfully and contemptuously neglect[ing] and refus[ing]…to abate and suppress" the stench nuisance of fertilizer manufacturing in Manhattan.[1] Phelps turned the Board of Health's regulations on their head; when the Board defined failure to abate a nuisance as a misdemeanor, its members did not anticipate that they would face such charges themselves.

Chandler responded in the press, in the courtroom, and before his professional peers by explaining that the odors in question did not come from Manhattan's businesses, but from offensive trades across the East River in Kings and Queens Counties. Those

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[1] Benjamin K. Phelps, District Attorney, "The People vs. Charles F. Chandler, Edward G. Janeway, S. Oakley Vanderpoel, William F. Smith—Misdemeanor." in Box 16, "Charles F. Chandler Papers," Columbia University Rare Books and Manuscripts, New York.

businesses were beyond the city Board's jurisdiction. Chandler's Board could not control the breezes that carried foul odors onto Manhattan's streets and into New York homes. Before the indictment, Chandler had invited any jury member to conduct "a personal examination of all places in the city from which offensive odors may emanate." [2] He promised the Board's full cooperation. But when the indictment came down, Chandler complained, "citizens are very poor smell detectives. They are annoyed by a stench and in most instances ascribe it to some industry near them and believe it to be perpetual."[3] Only a professional chemist, properly trained, could follow a stench to its source. Only a chemist could parse the air's contents, decipher wind patterns and detect the distant sources of a nasty smell.

New York's courts tried both the Board of Health and the utility of the chemistry that underpinned it. As concerns with the definition and control of urban stenches made their ways into the courtroom and city council questioned the usefulness of sanitary science, Chandler knew he was under attack. Recorder Hackett, a judge who admitted personal experience of the "vile odors," told the Grand Jury that issued the indictment, "Science is very useful always, but sometimes it happens that its microscope becomes more technical than legal or beneficial."[4] The *New York Tribune* said, "One need not be a Dr. Chandler to know that air which smells badly is unfit for breathing."[5] While Chandler denounced poor smell detectives, others derided his chemical expertise and

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[2] Charles Frederick Chandler, President of Board of Health to Francis H. Amidon, Foreman of Grand Jury, Court of General Sessions, printed in "The Health Board Asks Full Inquiry," *New York Tribune* 7 May 1878, pg. 8.
[3] "The Hunter's Point Stenches: Work of the Special Committee of the State Board of Health—Prof Chandler on the Evil," clipping in Box 52, Folder 12, "Charles F. Chandler Papers," Columbia University Rare Books and Manuscripts, New York.
[4] Qtd. in "The Recorder on Nuisances," *New York Tribune* 7 May 1878, pg. 2.
[5] "The Up-Town Fragrance," *New York Tribune* 30 Apr 1878, pg. 4.

professional position; to men like Hackett, Chandler was no more an authority on stench than the average New Yorker. Yet neither Hackett nor Chandler could offer convincing evidence of who better understood the air. In this version of the nineteenth-century conflict between lay experience and expert knowledge, invisible and ephemeral odors posed a unique challenge.[6]

This chapter explores two olfactory crises, in Chicago in 1862 and New York City in 1878, to explore how the cultural authority of expertise was negotiated and established in the nineteenth century. Despite widespread agreement in both cities that stenches threatened health, attempts to mediate this threat and eliminate odors pitted sensory knowledge against chemical evaluation. The senses provided invaluable, but also unreliable evidence. Expertise, as it related to odors, was built through coalitions between professional or trained scientists, doctors, politicians and the lay public in the arena of urban governance. Historian Christopher Hamlin, in surveying European cities and the prevalent nineteenth-century view of cities as chemical systems, has asked why chemists were "unable to secure the high moral ground of abstract authority over the city."[7] The debates over olfactory and chemical knowledge in Chicago and New York show that chemists did vie for urban authority, but their success often hinged on questions of urban politics and public opinion rather than on the strength of their science.

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[6] Robert Wiebe, *The Search for Order, 1870-1920* (Westport, CT: Greenwood Publishers, 1974); Thomas Haskell, *The Emergence of Professional Social Science: The American Social Science Association and the Nineteenth-Century Crisis of Authority* (Baltimore: The Johns Hopkins University Press, 1977); Alexandra Oleson and John Voss, eds., *The Organization of Knowledge in Modern America, 1860-1920* (Baltimore: The Johns Hopkins University Press, 1979); Thomas Haskell, ed., *The Authority of Experts: Studies in History and Theory* (Bloomington, IN: Indiana University Press, 1984); Sheila Jasanoff, ed., *States of Knowledge: The Co-Production of Science and Social Order* (London: Routledge, 2004); Harry Collins and Robert Evans, *Rethinking Expertise* (Chicago: University of Chicago Press, 2007).

[7] Christopher Hamlin, "The City as a Chemical System? The Chemist as Urban Environmental Professional in France and Britain, 1780-1880," *Journal of Urban History* 33 (2007): 703.

The comparison between Chicago and New York City's experiences reinforces one of environmental history's central points: the local matters. Despite broad similarities between the two cities' olfactory crises, the problem and its solutions were significantly different. To bring these similarities and differences into focus, this chapter begins with an overview of the local geography and environment of each city, followed by discussions of industrial and governmental development. Different odors emerged in each locality, and the definition of the stench problem in each city was specific to the local context of geography, industry and political structure. Both cities turned to a chemist in an attempt to understand and eradicate odors, and each chemist faced challenges from public opinion and the press. However, the nature of those challenges and the chemists' responses varied with both the local urban culture and with the personal ambitions of the chemist. These variations had lasting impacts for the odors, local environment, and municipal governance.

In 1833, Chicago was a muddy fur-trading village of 350 in the swampy area where the Chicago River emptied into Lake Michigan. By 1860, Chicago was a booming city of 109,000 residents, pulled out of the muck by the confluence of rail lines and water passages that united the Atlantic and Pacific seaboards through the heart of the city. The Civil War contributed heavily to this boom both in population, which would triple during the decade, and in commerce. When Union ships blockaded New Orleans, they bottled up all Mississippi River trade, including that of Chicago's rival, Saint Louis. Chicago emerged nearly overnight as the foremost city of the American West. Chicago businessmen profited by drawing on the city's vast hinterland. Farmers who had sent their wares to market in Saint Louis now sent produce to Chicago to supply wartime

demand for food and supplies. Cars of beef, pork, corn, lumber, steel, and medicines left the city daily, destined for the cities and soldiers of the Union.[8]

Just as the explosive growth of industry and population benefitted the city, it also strained Chicago's limits. Smoke filled the sky, refuse clogged the river, and muck dominated the mostly unpaved and ungraded city streets.[9] Some of these were problems of engineering, to which Chicago's able Board of Public Works turned its attention, time and resources. Engineers raised street levels above that of the lake and lifted houses from the swamp. Sidewalks, street paving, and sewers followed slowly but surely, as property owners could afford the city assessments for improvements along their lots.[10] Consequently, poorer areas would not reap these benefits for decades, but progress toward the modern urban form had begun.[11]

Chicago's industries grew up along the banks of the Chicago River, which flowed through the heart of the city [Figure 2.1]. The North, South and Main Branches of the river created internal boundaries between the city's Northern, Southern and Western districts, even as these arteries united people and industries in each of these areas in economic and political networks. The Chicago River was the center of the city, but its water did not turn paddle wheels to power factories, as did the rushing waters of New

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[8] Bessie Louis Pierce, *From Town to City 1848-1871*, vol. 2, *A History of Chicago, 1848-1871* (New York: Alfred A. Knopf, 1940); William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W.W. Norton & Co., 1991); Dominick Pacyga, *Chicago: A Biography* (Chicago: The University of Chicago Press, 2009).

[9] Cronon; Harold L. Platt, *Shock Cities: The Environmental Transformation and Reform of Manchester and Chicago* (Chicago: University of Chicago Press, 2005).

[10] Robin L. Einhorn, *Property Rules: Political Economy in Chicago, 1833-1872* (Chicago: The University of Chicago Press, 1991).

[11] Jon A. Peterson, "The Impact of Sanitary Reform upon American Urban Planning, 1840-1890," *Journal of Social History* 13:1, 83-103; Martin Melosi, *The Sanitary City: Environmental Services in Urban America from Colonial Times to the Present*, abridged edition (Pittsburgh: University of Pittsburgh Press, 2008); Joel A. Tarr, *The Search for the Ultimate Sink: Urban Pollution in Historical Perspective* (Akron, OH: The University of Akron Press, 1996).

England's rivers. [12] Instead, this slow and sluggish river provided water for use in production, transportation and, most importantly, waste disposal. Tanneries, breweries, livestock pens and slaughterhouses crowded the banks of Chicago's river branches and dumped tannic acid, fermented grain, animal wastes and carrion into the water. The nascent sewerage system, designed by Public Works engineer Ellis Chesbrough in 1855, also emptied human wastes into the river. Thus Chicago's growth transformed the Chicago River into a channel of filth that ran through the heart of the city.

New York City, like Chicago, experienced rapid growth in population and industry during the middle years of the nineteenth century. Between 1830 and 1860, the city's population quadrupled from 202,000 to over 800,000. The population continued to grow, reaching over one million by the time of Chandler's trial. Also like Chicago, New York City's geography was defined by local waterways. The Hudson and East Rivers that ran alongside Manhattan Island formed the political boundaries of New York City, dividing its residents both physically and legally from the state of New Jersey to the west and the counties of Kings and Queens to the east. Newtown Creek, which emptied into the East River, created the political and geographic boundary between Kings and Queens counties. Thus the waterways, rather than forming the center of the city, formed its edges and were the city's liminal spaces.

Though the rivers were New York City's liminal spaces, they were as important to the industrial activity of the city as was Chicago's river. In the 1840s and 1850s, workmen filled in tidal marshes along the rivers and built block after block of waterfront

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[12] Cf. Theodore Steinberg, *Nature Incorporated: Industrialization and the Waters of New England* (New York: Cambridge University Press, 1991); John T. Cumbler, *Reasonable Use: The People, the Environment, and the State, New England, 1790-1930* (Oxford: Oxford University Press, 2001).

docks and warehouses in Kings and Queens counties. These facilities competed with New York City's deteriorating waterfront, drawing new investment and industries across the East River. Rising land costs on Manhattan Island and the regulations of the Metropolitan Board of Health, founded in 1866 as a permanent fixture of New York City's municipal governance, contributed push factors to the redistribution of industries across the East River from New York City.[13] For example, Mayor Ely Smith Jr. wrote Charles Frederick Chandler in 1876, citing his tannery's loss of $20,000 due to earlier health regulations. He asked for assurances that the Board "wouldn't drive businesses" from the spot where he planned to reopen his tannery.[14] Other business owners avoided the health board altogether, moving across the East River to the friendlier suburban governance of Kings and Queens Counties.[15] When owners of the "offensive trades," so named because of their odiferous output, sought freedom from tightening nuisance regulations of the Metropolitan Board of Health, they found their ideal along Newtown Creek: relatively lax health boards, water access for trade, and proximity to a dense population that could provide labor.

The offensive trades anchored miles of interdependent factories that spewed stench, smoke and sludge along Newtown Creek [Figure 2.2]. Chemical factories produced rotten egg smelling sulfuric acid for use in oil refining. Oil refineries mixed

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[13] Accounts of the mid-nineteenth century growth of New York City and the surrounding region, with varying attention to environmental impacts, can be found in David Stradling, *The Nature of New York: An Environmental History of New York State* (Ithaca: Cornell University Press, 2010), esp. 106-137; David Scobey, *Empire City: The Making and Meaning of New York City Landscape* (Philadelphia: Temple University Press, 2007), esp. 55-88; and Edwin G. Burrows and Mike Wallace, *Gotham: A History of New York City to 1898* (New York: Oxford University Press, 1999), esp. 649-673 and 917-950.

[14] Smith Ely to W.H. Wickham, 24 March 1876, Box 51, Folder 2, Series II.3, Chandler Papers, Columbia University Rare Books and Manuscripts, New York.

[15] Andrew Hurley, "Creating Ecological Wastelands: Oil Pollution in New York City, 1870-1900," *Journal of Urban History* 20:3 (May 1994), 344; Burrows and Wallace, *Gotham*, 938; Vincent F. Seyfried, *300 Years of Long Island City, 1630-1930* (Flushing, NY: Queens Historical Society, 1984), 83-99.

sulfuric acid with petroleum, agitating the mixture with an air-jet to oxidize the oil and remove impurities. When this process was completed, workers drew off "sludge acid," a compound of spent acid and contaminants, and sold this waste product to nearby fertilizer manufacturers. According to one Columbia chemist, sludge acid was "black and foul-smelling, and becomes intensely so when brought into contact with any substance with which it may combine chemically."[16] Sludge acid chemically reacted with most materials, including the waters of Newtown Creek into which refiners dumped unsold quantities.

Sludge acid was just one of many urban and industrial wastes flowing in New York City's waterways, but its stench drew considerable attention. Though New York's rivers had considerably more water and a stronger current than the Chicago River, Atlantic tides often restricted the abilities of the rivers to flush wastes away from the city. The banks of Newtown Creek became coated with sludge acid, and each turn of the tide released "the sickening, disgusting, filthy stench" anew.[17] Similarly, when the Chicago River wasn't strong enough to propel wastes out of the city, boat propellers churned a liquid mass of decomposition, releasing foul odors into the city atmosphere. In both places, the stenches that emanated from waterways elicited strong reactions and health concerns, though few worried about the water itself.

Neither Chicago nor New York's residents drank from their local rivers. In both cities, engineers had gone to great lengths in constructing technologies that freed city residents from drinking polluted river water. Chicago's engineers protected the city from

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[16] Professor Elwyn Waller as paraphrased in "East and West Side Nuisances," *New York Times* 18 May 1878, pg. 2. Waller, an instructor at the Columbia School of Mines and chemist to the Metropolitan Board of Health, had written on odor, disinfectants and disease in *The American Chemist*, which Chandler edited. See Waller, "Disinfectants and Disinfection," *The American Chemist* 6:1 (July 1875): 2-11.
[17] "Those Smells Again," *New York Times* 11 Jun 1877, pg. 4.

its river by pumping fresh water for drinking, cooking, and bathing from Lake Michigan. Residents noticed the deplorable state of the river only when the hot sun quickened the rot, and river released the stink of decomposition. New York City's residents, whose drinking water arrived from the Croton Reservoir over forty miles north of the city, also enjoyed physical separation from the highly polluted waters of Newtown Creek.

In Chicago, seasons gave the river's odors a predictable yearly cycle. Spring freshets flushed winter wastes from the river and the stench from the city. [18] But through the summer months, the stench returned as industries and individuals dumped their waste into the river or along its banks. The heat of August and September brought odors to their peak and sent city dwellers in search of respite on day trips or country vacations. Fall brought cooler days and the first frost slowed decomposition. When winter covered the river in ice, the odors were all but gone and everyone breathed more easily. Whatever floated below the ice would be contained, unable to release its effluvia until spring, but then the freshets would flush it away and the city air would remain pure a little longer.

Though the environmental cycle worked most years, it broke down in 1862. The usual spring floods, upon which citizens relied for their health and olfactory comfort, were not strong enough to flush the accumulated wastes from the Chicago River. Temperatures and precipitation that winter were average; Chicagoans themselves caused the freshets' failure by overburdening the water's carrying capacity.[19] According to *The Chicago Tribune*, "There have been, since October last, poured into the river the blood and entrails of more than *eighty thousand head of fat cattle* and of *four hundred thousand*

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[18] For freshets as a welcome natural cleanser of the river, see Platt, *Shock Cities*, 80; or "The Water Question," *Chicago Tribune* 21 Feb 1862, pg. 2.
[19] Henry Allen Hazen, *The Climate of Chicago* (Washington, DC: Weather Bureau, 1893): 38, 57.

*hogs*, besides the sewage and the winter's refuse of a hundred and twenty thousand well fed people."[20] With their expanding population and new factories, Chicagoans were dumping more offal, manure, swill slops, and sewage into their river than its weak current could carry out of the city.

Odors were not new in Chicago, a city named for the smell of onions or wild garlic. Yet the pervasiveness of stinks did not render them innocuous. Like the weather, stenches generated a daily hum of conversation, and spurred officials to action in times of distress. [21] For instance, during the cholera year 1854, Chicago's Common Council authorized health officers to remove nuisances such as a slaughterhouse on the grounds that "the stench coming from the offal carcasses thrown out upon the premises" jeopardized the health of 250 laborers building railroad carriages at the nearby American Car Company.[22] Cholera did not pose an immediate threat in 1862, but the river exhaled a "perfume so intense" as to frighten the populace into thinking that disease was imminent and demanding redress.[23]

Like the Great Stinks of London and of Paris, Chicago's 1862 stench problem was an amplification of familiar odors—in this case, those of the decomposition of animal carcasses, fermented grains, and excrement—exacerbated by the incongruity between human technology and environmental conditions.[24] New Yorkers, in contrast, worried far

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[20] Emphasis in original. "The Water Question Again" *Chicago Tribune* 5 Mar 1862, pg. 2.
[21] According to Christine Meisner Rosen, this increased intensity in odor was type event that would cause the "disruption of a psycho-social environmental equilibrium" that had allowed Chicagoans to endure similar odors previously. See Rosen, "Noisome, Noxious, and Offensive Vapors, Fumes and Stenches in American Towns and Cities, 1840-1865," *Historical Geography* 25 (1997), 49-82.
[22] Chicago City Council Proceedings Files [hereafter CP] 1853/54:0548; 1853/54:0551, Illinois Regional Archive Depository, Northeastern Illinois University, Chicago, IL.
[23] "The Water Question," *Chicago Tribune* 26 Jul 1862, pg. 4.
[24] David S. Barnes, "Confronting Sensory Crisis in the Great Stinks of London and Paris," in William A. Cohen and Ryan Johnson, eds., *Filth: Dirt, Disgust and Modern Life* (Minneapolis: University of Minnesota Press, 2005): 103-129; Barnes, *The Great Stink of Paris and the Nineteenth-Century Struggle*

more about new odors coming from chemical industries than the familiar scents of garbage, manure, and animal carcasses in the city streets. Oil refining, which produced the problematic sludge acid, was just one of a nexus of chemical industries that spewed stench into the winds above Newtown Creek.

Fertilizer manufacturers spread sludge acid over carcasses and left them in the sun to rot. Sludge sped decomposition, which released pungent and irritating fumes, particularly as days grew warmer. Easterly winds carried the distinctive odors of sludge acid and animal putrefaction across the East River to Manhattan. Gas works added to the nasal cocktail. City lights burned natural gas purified by a dry-lime process that produced sulphureted hydrogen and sulphide of ammonium. According to Brooklyn's Board of Health, these were both "very offensive gases" that diffused over a wide distance.[25]

Newtown Creek also attracted a number of less offensive businesses. Woodworkers, steam boiler manufacturers, vinegar distillers, ink makers and stone works benefited from improvements made for the oil industry, such as the dredging of the waterway.[26] Since any odors from these trades remained local, the innocuous businesses were largely invisible to Manhattan's residents; mapmakers felt no need to note the presence of these industries in their depictions of Newtown Creek. Manhattan's residents only worried about the stench producers whose stink infiltrated Manhattan's homes.

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*against Filth and Germs* (Baltimore: The Johns Hopkins University Press, 2006); Stephen Halliday, *The Great Stink of London: Sir Joseph Bazalgette and the Cleansing of the Victorian Capital* (Gloucestershire: Sutton Publishing Limited, 1999); Thomas F. Glick, "Science, Technology and the Urban Environment: The Great Stink of 1858" in Lester J. Bilsky, ed., *Historical Ecology: Essays on Environment and Social Change* (Port Washington, NY: Kennikat Press, 1980).

[25] S.N. Fisk, MD, "The Industries Upon Newtown Creek and their Alleged Offensiveness," in Box 50, Folder 7, Series II.3 Chandler Papers, Columbia University Rare Books and Manuscripts, New York.

[26] Hurley, "Creating Ecological Wastelands," 347.

Easterly breezes carried the expelled odors across the East River and into the heart of midtown.

Complaints about air currents appeared regularly in the New York City press during the 1870s—so regularly that an 1877 letter to the editor was titled, "Those Smells Again."[27] The editors assumed that the title needed no further explanation to attract readers' attention to PEDRO's concern: "How much longer are the people up town going to breathe the sickening, disgusting filthy stench which settles down on the City nearly every evening from Hunter's Point, and take no steps to protect themselves from such a pestilence?"[28] As many had done before him and would continue to do long after, the author associated odors with disease and sought immediate relief, though he feared it would be long in coming. In the words of another, who wrote to the *Times* after spending a night "gasping in intolerable distress" from the stenches that blew through his open windows, "Are we never to find relief?"[29]

Though Chicago's smells were different, odor perception took a similar tone. Residents noticed the stench early in 1862, and anticipated "a fearful increase in our bills of mortality."[30] In graphic detail, newspapers explained that "the floods of blood and filth and the hundreds of tons of other matter from the slaughter-houses, the glue factories, the packing-houses, etc., of which the outskirts of the city are full;…the wash and slops of the distilleries and other manufacturing establishments, and…the sewers which underlie the streets," made the river a channel of "putrescent or semi-putrescent matter." Instead of relief, *Tribune* editors anticipated that air and water quality would

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[27] "Those Smells Again," *New York Times* 11 Jun 1877, pg. 4.
[28] Ibid.
[29] X., "Where Does it Come From?" *New York Times* 26 May 1875, pg. 6.
[30] "The Water Question," *Chicago Tribune* 21 Feb 1862, pg. 2.

deteriorate further. Consequently, this article demanded new systems to flush the river, though residents would pay with higher taxes.

During an early March thaw, an investigative *Chicago Tribune* reporter traveled along the "fragrant Lethe," describing variations in the "fetid odor," perceptible by even "the obtusest of noses" wherever the ice cracked.[31] Picking his way along the frozen shore, he foretold doom at the first real thaw: "…when the ice breaks up, and the warm spring sun acts upon the mass of impurities floating through the city, the effect upon both comfort and health must be severe." A reader responded to this warning with the chilling news that already "the oder is enough to create a typhus fever."[32] Chicago's government did nothing.

In 1862, Chicagoans' complaints about nuisances, whether appearing as printed editorials or petitions submitted to the Common Council, did not automatically require a response. The preventive health measures of sanitary science had received attention from the city's medical community, but not from city leaders. Sanitarians such as American Medical Association founder Nathan Smith Davis would not have the government's ear until 1865.[33] In order for public health concerns to become a political issue and incite city leaders to action, an outside threat was required. 1862 was not a cholera year, so fear of epidemic was not a motivating factor. Fear of economic bust was always a salient concern, however, and a single petition from the Board of Trade commanded the Common Council's attention.

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[31] "The Water Question Again," *The Chicago Tribune* 5 Mar 1862, pg. 2;
[32] "Abominable Water," *The Chicago Tribune* 12 Mar 1862, pg. 4.
[33] Platt, *Shock Cities*, 146-148; Thomas Neville Bonner, *Medicine in Chicago, 1850-1950: A Chapter in the Social and Scientific Development of a City*, 2nd ed. (Urbana: University of Illinois Press, 1991), 6-8 and 19-32.

In contrast, New York City's residents had a ready audience for their stench complaints in 1878. The Civil War experiences of the Sanitary Commission with camp hospitals and infectious diseases had raised the sanitary ideal and cleanliness from its pre-war obscurity to a matter of public and national concern.[34] New York City was the home of the Sanitary Commission's founders, and was one of the first American cities to establish a permanent and effective Board of Health in 1866.[35] From its inception, the Board of Health pursued odor regulation as one of its initiatives, continuously restricting the locations and practices of the offensive trades. In addition to mandating the relocation of slaughterhouses, the Board demanded that Scavengers, the people who emptied cesspools, collected offal, and cleaned stables, do their work at night, use disinfectants, and immediately move offensive material out of "the built-up portions" of the city.[36] The Board designed a system of permits that governed both scavengers and the offensive trades, and created Sanitary Inspectors to enforce these regulations and police permit violations. Whereas Chicago's government had little incentive to heed complaints, members of the Metropolitan Board of Health were keenly aware of every negative comment. Board President Charles Frederick Chandler monitored the press, clipping articles that addressed odors and criticized the Board of Health. Chandler worried about his place in city government and the future of public health when citizens turned against his Board, like the 1878 letter-writer who renamed Chandler's group,

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[34] Suellen Hoy, *Chasing Dirt: The American Pursuit of Cleanliness* (New York: Oxford University Press, 1995): 27-62; John Duffy, *The Sanitarians: A History of American Public Health* (Chicago: University of Illinois Press, 1990): 110-156.
[35] On effectiveness, see Duffy, *The Sanitarians*, 120-1. On the founding of the Sanitary Commission, see William Quentin Maxwell, *Lincoln's Fifth Wheel: The Political History of the United States Sanitary Commission* (New York: Longmans, Green, & Co., 1956): 1-30.
[36] *Manual of the Metropolitan Board of Health and the Metropolitan Board of Excise* (New York: D. Appleton & Co., 1869): 83.

"Board of Death," and denounced this "negligent, pretending and worthless Board," because "the most nauseous, foul, stinking and pestilential odors still permeate the atmosphere of this over taxed city!"[37] As members of the main branch of the city government, Chicago's aldermen had no such fears, and thus did not react until they received an economically significant complaint.

At the end of June 1862, Chicago's Board of Trade met in its rooms overlooking the river and demanded "immediate relief from the sickening and putrefying waters of [Chicago] river, as without such relief business of all kinds will be driven from it and sickness and death surround us on every hand throughout the city." [38] Hardy warehousemen were already wearing nose-guards, and Board of Trade members worried that the nauseating river odors would drive workers and sailors from the river, halting the city's economy. Chicago's Common Council responded immediately to the businessmen's concerns, proving that who complained was more important than that about which they complained.[39] In the name of improved health and commerce, the Council directed the Board of Public Works to take immediate action and remove "impure and unwholesome water" from the river.

Engineers from the Board of Public Works explained that they were aware of the widespread fears that "the present state of the water" would be detrimental to health and expressed frustration that the attitude persisted: "the public are not cognizant of the

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[37] Letter reprinted in *Ohio Medical and Surgical Journal*, Aug 1878. Clipping in "Correspondence—1868-83," Box 51, Folder 1, "Charles F. Chandler Papers," Columbia University Rare Books and Manuscripts, New York.
[38] CP 1862/63:63
[39] A similar political situation developed around smoke in Pittsburgh. See Angela Gugliotta, "How, When and for Whom was Smoke a Problem in Pittsburgh?" in Joel Tarr, ed., *Devastation and Renewal: An Environmental History of Pittsburgh and its Region* (Pittsburgh: University of Pittsburgh Press, 2003): 110-125.

means now employed to remedy the evil complained of."[40] The engineers had tried to replicate the effect of the spring floods by activating the pumps at Bridgeport to reverse the flow of the South Branch and force the accumulated wastes into the Illinois and Michigan Canal.[41] They had achieved moderate success, until a "heavy rain…filled the river faster than it could be displaced by the pumps and therefore rendered further pumping useless."[42] Despite this setback, the engineers remained convinced that their mechanical solution could flush the offensive material from the South Branch and Main Branch.

The North Branch was beyond the reach of the Bridgeport pumps, and the engineers were unable to improve its stagnant waters. Ellis Chesbrough, the engineer who had installed Chicago's sewerage system and would later gain immortality by altering the river to flow perpetually backwards, had drawn up plans for a canal or tunnel to the lake that might affect the North Branch, but the scheme was rudimentary at best.[43] The North Branch required more time, attention and money, as did the rest of the river. At ten dollars an hour, pumping was a pricey venture that competed with sewers, sidewalks, and dredging—all "improvements"—for allocations.

When the Common Council sought alternatives to the frustrated engineers and their limited capabilities, they turned to a chemist with different methods for evaluating the river. German immigrant Frederick Mahla, doubtlessly aware of the river's odors and seeing a possibility for profit, likely offered his services of chemical water analysis to the

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[40] CP 1862/63:63.
[41] Ibid. See also, Hill, *The Chicago River,* 105-109.
[42] Ibid.
[43] CP 1865/66:62S; Hill, *The Chicago River,* 99-101, 107.

Council.[44] At the moment when the Common Council hired Mahla to do a "scientific chemical analysis of the river," the chemist was an outsider of sorts to urban politics.[45] Mahla was professor of toxicology, organic and inorganic chemistry at Lynd Medical College (now Northwestern University), and co-owner of Chappell & Mahla, a company that manufactured and sold household chemicals. Government records reveal no previous involvement of Frederick Mahla in administration, and Mahla sought no further involvement with Chicago's government, even turning down a position on the Board of Education in 1876.[46] It is more likely that, at this early point in his career, Mahla's motivations were to augment his income from teaching and selling household chemicals, and to gain publicity for his business. Chemists, like other men with scientific training in the nineteenth century, actively sought a variety of employments that paid them for their expertise, especially early in their careers.[47]

Regardless of Mahla's motivations, the instructions he received were clear: he should make a chemical analysis of the water and "deliver…a full and detailed report of the causes producing the present state of the water, at the earliest possible moment."[48] Unfortunately for Chicago's residents, that moment would not come until September. In the meantime, the water question lingered, the odors intensified and public outrage

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[44] Chemists in Europe had carved out a niche for themselves by applying their science to mineral and potable water analysis. In this role, chemists acting as arbiters of quality, an important and profitable position in the marketplace—even when the chemical analysis did not provide the answers sought about the healthfulness of water. Christopher Hamlin, *A Science of Impurity: Water Analysis in Nineteenth Century Britain* (Berkeley: University of California Press, 1990).
[45] CP 1862/63:75
[46] "City Notes," *The Chicago Daily Tribune* 9 Sept 1876.
[47] Paul Lucier, *Scientists and Swindlers: Consulting on Coal and Oil in America, 1820-1890* (Baltimore: Johns Hopkins University Press, 2008).
[48] Ibid. In Europe, governments regularly hired chemists as consultants on water quality during this period. See Christopher Hamlin, *A Science of Impurity: Water Analysis in Nineteenth-Century Britain* (Berkeley: University of California Press, 1990); Glick, "Science, Technology and the Urban Environment"; Halliday, *The Great Stink of London*.

continued. "Spare us!" editors clamored, citing the intense perfume that "permeates our buildings and mingles its nastiness with the air we breathe."[49] Residents decried the lost "sanctity of our sleeping apartments," and the many nights when nausea kept them awake.[50] While the river's effect on drinking water, pumped in from Lake Michigan, ebbed with changing winds and rainfall, its effect on the air steadily worsened.

When aldermen, engineers and sundry reporters joined the chemist to form a "smelling committee" in August, Mahla was about to embark on his tenth and final trip to sample river water. Aboard the tug JS Rumsey, while the city officials and reporters about him stared down at the "filthy compound" of river water churned by the propeller and held lemons, cigars, and scented handkerchiefs to their noses for relief, Mahla dipped into the river every few moments and mixed the water with a small amount of sulphuric acid.[51] He noted the consequent discoloration of strips of paper "moistened with a solution of sugar of lead." Curious reporters watched over the chemist's shoulder as his tests visually verified their olfactory experience. On Monday, they told their readers about those blackened papers, evidence that "sulphuretted hydrogen gas,…the essential element of all stench," was present.[52]

No reporters went with Mahla to his State Street laboratory, where he conducted his chemical analysis and concluded that ammonia was "the most prominent and important amongst [the odorous bodies]," though "sulphuretted and phosphoretted Hydrogen, light carbonetted Hyrogen (marsh gas) and scores of other [gases]" were also in the water. Neither did the reporters interview Mahla about his thoughts as to the

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[49] "Spare Us," *Chicago Tribune* 2 July 1862; "The Water Question," *Chicago Tribune* 26 July 1862.
[50] "The Water Question," *Chicago Tribune* 26 Jul 1862.
[51] "The City," *Chicago Tribune* 26 Aug 1862.
[52] "The City," *The Chicago Tribune* 26 August 1862; "The Chicago River," *Chicago Times* 25 Aug 1862.

sources of these gases and their effect upon citizens' health. The reporters were only interested in Mahla's chemical knowledge when it replicated what they already believed they knew. At the Clark Street Bridge starting point, the reporters trusted Mahla's test entirely, noting that the "water was of a dirty yellowish color, but the paper showed little or no change, indicating that the water at this point is relatively pure." When the tug reached the North Branch, reporters produced their nasal protections and offered a thick visual description: "an eddy of huge dimensions, holding in its black embrace the oceans of filth coming down…unmeasured depths of refuse from slop-shops, tanneries, distilleries and stables, sending forth its malarious odors and poisoning the breezes as they sweep over the city." After a lengthy account of their sensory miseries, the reporters briefly noted the change in the lead-papers, which blackened almost immediately upon contact.[53]

Further up the North Branch, reporters could identify odor producers without the aid of the chemists' tests, and Mahla dropped out of their account altogether. In his place, tanneries, where men washed "huge piles of green hides in the river," a "scow laden with slops from Crosby's distilleries," and stables filled with cows and hogs demanded attention.[54] At the tanneries, workers used river water to wash away any flesh or fat the butcher had missed, then transferred the hides to vats of water and lime. Other men scraped hair and bristles from hides already limed, only to pickle them in tannic acid boiled from the bark of hemlock and oak trees. When workers washed putrefying hides, boiled bark, stirred pickling vats, and again washed ooze from the finished leather in the river, they released multiple stinks and simultaneously fed the large regional market for

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[53] "The City"
[54] Ibid.

heavy leather.[55] Chicago's distilleries also did a booming trade, converting 33,000 bushels of corn into 100,000 gallons of whiskey in 1862 alone.[56] Distilleries collected the spent corn, otherwise known as "swill slops," to fatten cows and pigs for milk production and slaughtering. The slops themselves reeked of fermentation, and animal digestive tracts did not improve the odor. Uneaten slops, urine and manure ran into the river from the cramped livestock pens, often through ditches that had been dug for this purpose.[57]

Each shoreline business, from tanneries to distilleries to crowded cattle pens, had its own distinctive stench to add to the foul atmosphere, much like the nexus of offensive trades that would later spring up along New York's Newtown Creek. When reporters looked over the reeking establishments, they imbued cattle with their own desires for fresh air and freedom: "and so they remain there in their filthy stalls, covered with flies and dirt, without even a sniff of fresh air, wistfully gazing, as it seemed to us, from their scanty windows out onto the boundless acres."[58] Should anyone question their conclusions, the reporters ended by invoking the authority of personal experience, "the stench and filth may be appreciated by sight and smell, certainly not by description." First-hand sensory experience conveyed a different kind of authority than that of scientific tests. For the reporters, the significance of the smelling committee was not

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[55] David Blanke, "Leather and Tanning," in James R. Grossman et al. eds., *The Encyclopedia of Chicago* (Chicago: University of Chicago Press, 2004), 465; Isaac D. Guyer, *History of Chicago: Its Commercial and Manufacturing Interests and Industry* (Chicago: Church, Goodman and Cushing, 1862), 81-83; Peter C. Welsh, "A Craft that Resisted Change: American Tanning Practices Prior to 1850," *Technology and Culture* 4 (1963), 297-317.
[56] Guyer, *History of Chicago*, 164.
[57] CP 1862/63 0166A 10/06.
[58] "The City."

chemical analyses, but that, "the Council have seen and smelt the North Branch. Now, what will they do with it?"[59]

Chicago's Common Council placed the chemist at the heart of the smelling committee, but newspaper reporters recast the group's composition according to municipal power, emphasizing the experience of the aldermen over the scientific tests of the chemist. The aldermen were the only people with the power or authority to change the situation. Though reporters used the chemist's tests to validate their senses, they saw Mahla mainly as a curiosity, especially when his reaction to the odors directly contrasted their own misery: "The chemist alone was in ecstasies. Wrapped up in his science, what cared he for stench, so long as the stinking fluid wrought so beautiful a change [on the leadpapers],…"[60] Mahla's blackened strips of paper were significant to chemistry, but far more significant for Chicago was the olfactory experience of elected officials, who had finally smelled for themselves the noxious river exhalations at their sources and thus had the evidence necessary to make odors a political issue. In the politics of regulation, an important first step was convincing the politicians that something required regulating.

After the smelling committee's voyage, the Common Council sought the quickest remedy possible and acted on the basis of their own experience. Before Mahla could submit his report, the Common Council had decided to pursue a number of methods for reducing the odors. On occasion the Board of Public Works continued to activate the Bridgeport pumps, and the mayor began contract negotiations with the owners of the Illinois and Michigan Canal to establish pumping as a regular practice. The Mayor also deputized three aldermen as "health officers," since the city had no official Board of

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[59] "The City."
[60] "The City."

Health. The aldermen visited businesses along both branches of the river, surveying places where "Swill Slop together with all the filth of the Barnes [sic] pour[ed] a Constant stream of Liquid Poison into the River."[61] These Aldermen recommended that all businesses standardize sanitary conditions. Proprietors should build reservoirs, dams and dykes, close drains, haul manure out to the prairie, and feed all swill and slops to animals. The Mayor's ad-hoc committee on health reported a "courteous and gentlemanly" reception, and "cheerfull response" from each proprietor. [62] Having initiated all these measures, the aldermen perhaps no longer felt that they needed a perfect understanding of the river's stench-producing contents; when Mahla tried to present his findings to the city leaders on September 8, too few attended the Council meeting to establish quorum and the meeting was adjourned.[63]

Mahla finally submitted his report on September 22. He described the sources of water-borne odors, as requested, and pointed out locations where he had found the highest concentrations of ammonia. Presumably businesses nearby were responsible for the river's stench. Yet Mahla realized that the political need for quick results limited the utility of his report. He had begun his water analysis in June, months before the annual period of slaughter began and the river became foulest. Though he could see "large quantities of refuse matter in certain places nearby [the slaughter-houses], where they undergo putrefaction," Mahla's samples of the South Branch's river water contained relatively low amounts of ammonia.[64] Recent rain, wind, and the Bridgeport pumping scheme made his report too mild. As every Chicagoan knew, June was not the smelliest

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[61] CP 1862/63 0166A 10/06; CP 1862/63 0237A 12/01
[62] CP 1862/63 0166A 10/06; CP 1862/63 0237A 12/01
[63] "Common Council," *Chicago Times* 9 Sept 1862.
[64] CP 1862/63 0144A 09/22.

month. Were Mahla to return in September or October, he would have dramatically different results for the Common Council.

In an attempt to overcome the limits of his water analysis, Mahla included observations of decaying matter on land. In a first draft, Mahla demanded that the Mayor issue proclamations to all trades along the river, regardless of their proximity to high ammonia concentrations in the river. Then, perhaps thinking his comments too brash, Mahla pasted over this sections with a gentle "remark, that not all the odorous effluvia are sent forth by the Chicago river."[65] He urged that the City Council consider Bridgeport's stench, which originated on land rather than in water, as equally noxious as the river's effluvia.

The Common Council ignored Mahla's recommendations and passed an ordinance concerning nuisances that restricted offensive trades to operation in cold months, and prohibited dumping in the river.[66] This ordinance specified that no waste could be dumped nor nuisances maintained within four miles of the city limits, but it did not direct businesses to relocate. By removing waterborne odors, the Common Council expected sanitary conditions to improve and for complaints about the odors to subside.

In Chicago, public opinion cared much more for immediate solutions than careful investigate of causes. While the chemist labored over his reactions and calculations, others such as the deputized aldermen and reporters believed they could smell and see for themselves what the problem was. Consequently, many lay people thought that employing chemists was a stalling tactic and demanded immediate action. To them, Mahla's report did not go far enough; the chemist had tested the water but his

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[65] Ibid.
[66] CP 1862/63:245A.

recommendations were too mild. In December 1862, when the odors of slaughtering permeated the city as Mahla had predicted, the *Chicago Tribune*'s editors longed for "cast iron nostrils" and proclaimed:

> We have had smelling committees enough, chemists enough, and theories enough. It does not need voyages up the river, nor chemists, nor learned theories to tell the people that the river is a mass of filth. The public nose is just as sure an index. Let us have some practical, thorough, common sense action. It is no time for trifling.[67]

If the public nose was a "sure index," its measurements in 1862 and 1863 indicate that Common Council's ordinance against dumping in the river, while not a perfect solution, did have an effect. By the following spring, complaints about odor were coming from different sections of the city. While the 1862 panic mostly affected those in downtown Chicago, 1863's complaints and petitions originated in the southern neighborhoods of the city, where southwesterly breezes carried the stench from the section of prairie that had become a dumping ground. Residents of the fourth and tenth wards, both in the Southern District, began signing petitions against "this foul poisonous stench…[which is] greatly detrimental to the health to attempt to breathe it."[68] In *The Chicago Tribune*, the "Bridgeport Nuisance" replaced the "Water Question," and reporters noted the new geography of a familiar problem: "From the time you pass the Archer Road until you reach the extreme southern limits of the city, the atmosphere is filled with this poisonous stench, which, as the season advances, must induce sickness unless abated."[69] Until Bridewell prisoners could bury the mountains of "offal from slaughter houses, glue factories, packing houses, the filth collected from privies and

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[67] "The Sanitary Condition of the City," *The Chicago Tribune* 30 Dec 1862, pg. 4
[68] "The Bridgeport Nuisance," *The Chicago Tribune* 29 May 1863; "The Bridgeport Nuisance," *The Chicago Tribune* 30 May 1863.
[69] "The Bridgeport Nuisance," *The Chicago Tribune* 30 May 1863.

sewers by night scavengers, horses and dogs that have died in the city, and all manner of offensive matter," the public would have to suffer.[70]

In Chicago's olfactory crisis, when the impatient public did not want to wait for chemical analysis and neither did the Common Council, direct experience of the odors by those in power mattered far more than a clear understanding of the odors' composition and causes. Though Mahla was right that the city's odors did not emanate solely from the water and that the Common Council should regulate Bridgeport's odors, neither Chicago's leaders nor its public paid him much attention. Although chemists had specialized knowledge about the production of stenches, they did not command the confidence of larger society in the 1860s. Mahla, who seemingly had no ambition for government office and receded from the debate, did not try to gain this trust. After the Common Council ignored his recommendations and the following year's wind patterns proved the error of that decision, Mahla made no comment. There is no petition to the board, no letter to the editor, no public remonstrance. While Mahla firmly claimed scientific authority—in his report, in his lab, in his classroom and often in the courtroom—he had no interest in appropriating political authority.

When placed in a similar position in New York City, Chandler sought to extend rather than abandon his authority in the city. Chandler, a chemist, was President of New York City's Board of Health from 1873 to 1883, and had been involved with that board since its creation in 1866. Chandler was a man of political as well as scientific ambitions. By the late 1870s, when Chandler was defending Board of Health chemists against the public nose, he was a well-known member of New York City's government. Chemistry

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[70] "The Bridgeport Nuisance," *The Chicago Tribune* 22 Jun 1863; "The Bridgeport Nuisance," *The Chicago Tribune* 30 May 1863

therefore played a much more prominent role in the early environmental regulation of New York City than in that of Chicago.

Charles Frederick Chandler, born in 1836 and raised in New Bedford, Massachusetts, began his education at the Lawrence Scientific School at Harvard in 1853. American laboratories were rare, so Chandler and many of his peers completed their doctoral training in European schools like the University of Göttingen.[71] Upon returning to the United States in 1856, Chandler took the position of Janitor-Assistant in Analytical Chemistry at Union College in Schenectady.[72] In the 1850s, Union was one of the largest colleges in the United States, and boasted a collection of minerals so fine it attracted scientists from around the country. As custodian of the collection, Chandler met America's leading scientists, men such as Yale chemist Benjamin Silliman the elder and mining engineer Thomas Egleston. Connections proved useful, as Egleston invited Chandler to join him in founding a new School of Mines at Columbia College. Chandler accepted Egleston's offer and moved to New York City in 1864, bringing with him an interest in industry and applied chemistry as well as laboratory research. [73]

Shortly after arriving in New York City, Chandler began using his scientific knowledge for the public good, voluntarily offering chemical analysis on sanitary

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[71] Germany was the destination of most students seeking chemical training in the mid-1800s; Frederick Mahla also obtained his doctorate from Göttingen. See Mary Jo Nye, *Before Big Science: The Pursuit of Modern Chemistry and Physics, 1800-1940* (Cambridge, MA: Harvard University Press, 1996): 3.

[72] When Chandler arrived at Union, the only paying position available was that of janitor. The janitor doubled as a laboratory assistant, which Chandler did until his promotion to professor of chemistry upon the resignation of Professor Charles Joy. See Herman Skolnik and Kenneth M. Reese, eds., *A Century of Chemistry: The Role of Chemists and the American Chemical Society* (Washington, DC: American Chemical Society, 1976): 60-61.

[73] Marston Taylor Bogert, *Biographical Memoir of Charles Frederick Chandler, 1836-1925* (Washington, DC: National Academy of the Sciences, 1931); M. C. Whitaker, "Charles Frederick Chandler—Dean of American Chemists," *The Journal of Industrial and Engineering Chemistry* (Oct. 1922): 977; Chemical Heritage Foundation, "Charles F. Chandler," http://www.chemheritage.org/discover/chemistry-in-history/themes/public-and-environmental-health/public-health-and-safety/chandler.aspx.

questions for the newly formed Board of Health. Like Mahla, Chandler probably saw public health as a source of profit. The Board of Health, as a new institution dedicated to sanitary science, was disposed to be favorable to Chandler's chemical analysis, and Chandler soon found himself with a regular position as Chemist of the Board of Health. This began a life-long commitment to public health and sanitary questions, over the course of which Chandler would address and improve problems such as impurities in city water, adulterated milk and liquor, dangerous kerosene, poisonous cosmetics, tenement house construction, plumbing and house drainage, summer epidemics, and the care of contagious diseases.

Chandler's other ideological commitment was to establishing chemistry as a professional field in the United States. As many historians have argued, the social upheaval of the Civil War pushed Americans to create associations and institutions that established professionals' place and authority within society.[74] Specialization and the separation of trained, professional practitioners from lay-men and -women defined the professionalizing trend. Like his peers, Chandler embraced organization, both through his work to establish chemistry departments in universities and through his wider professionalizing efforts on behalf of chemistry.[75] Chandler was an institution builder. He chaired the 1874 Priestley Centennial, the first national gathering of chemists in the United States, and took up the suggestion of creating a national professional society for chemists as separate and independent from the overarching American Association for the

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[74] See, for example, Wiebe, *The Search for Order*; Haskell, *The Emergence of Professional Social Science*; Oleson and Voss, eds., *The Organization of Knowledge in Modern America, 1860-1920*; George M. Fredrickson, *The Inner Civil War: Northern Intellectuals and the Crisis of the Union* (New York: Harper & Row, 1965).

[75] For the importance of university departments to the development of chemistry and physics as academic disciplines, see Nye, *Before Big Science*, 6-20.

Advancement of Science. Chandler then publicized this idea in the pages of *American Chemist*, the journal that he had created and edited. Chandler served as president of the American Chemical Society in 1881 and 1889, and also was the organizer and first president of The Chemists' Club in New York City.

For many in New York City, Chandler's face with its distinctive mustache was the face of both health and chemistry.[76] Chandler had not only scientific authority, but also political power over the stenches. When someone questioned his expertise in one field, she challenged both professions, and this is why Chandler paid such close attention to the mounting complains about New York City's stenches in the 1870s. The complaints challenged Chandler both as a public servant and as a chemist. On the subject of odors, chemistry and health were intertwined.

Though Chandler's scientific authority might extend beyond his immediate locale, the physical boundaries of New York City strictly curtailed his political authority. Thus Chandler found himself in front of the Grand Jury in 1878, deeply knowledgeable about the production and use of sludge acid along Newtown Creek but unable to answer citizens' demands for relief from the odors. The basis of the indictment was a disagreement about the source of odors; Thomas Musgrave, the prominent citizen who investigated the city's smells on behalf of a Citizens' Association, alleged that stenches originated in Manhattan, where they were subject to the Board of Health's regulations. Musgrave's olfactory judgment led to the allegation that the Board of Health willfully neglected its duty to abate nuisances on Manhattan Island. Chandler and his fellow

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[76] Visual depictions of Chandler—both photographs and cartoons— prominently featured his mustache. See, for example, *The Daily Graphic* 1:84 (10 Jun 1873) pg 4; *The Daily Graphic* 1:85 (10 Jun 1873) pg 1; *Harper's Weekly* 8 Feb 1890, pg. 100.

chemists scoffed at this argument, alleging that the stench that disturbed slumber and stomachs was the distinctive smell of sludge acid, "one that cannot be mistaken by a chemist." [77] In making this claim, Chandler not only asserted the importance of his chosen field, but also denounced the lay sanitarians of the Citizens' Committee and their investigations into Manhattan's stenches.

The Board of Health's members escaped legal censure, but not without going on the defensive and parsing, for all who would listen, the difference between the odors of sludge acid and others smells that might be encountered in the city. As Board President and a trained chemist, Chandler led the education effort. In courtrooms, in conversations with the press, and before his professional peers, Chandler insisted that "sludge acid" caused the physical discomfort and complaints of the previous summer, not any factory operating within Manhattan. When subpoenaed, Board members appeared with maps and charts [Figure 1.3], and explained how the wind conveyed the distinctive stench of oil rendering from distant Brooklyn plants to midtown. Before the Medical Society of the County of New-York, Chandler recounted how the Board of Health had banished bad smells from the city, and claimed that "having eliminated all other smells, [the Board] has uncovered this one [sludge acid]."[78]

In Chicago, the press and the Common Council dismissed the chemist and his findings because people believed their own noses were just as effective at locating the sources of stenches as the scientific analysis of the waterborne odors. Chandler, going on the offensive against lay sanitarians, hoped to convince New Yorkers to trust the Board of Health and its chemists more than the casual smeller. When he addressed New York's

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[77] "Prof. Chandler's Defense," *New York Times* 4 Jun 1878, pg. 5
[78] *Ibid.*

Medical Society, Chandler attacked members of the Citizens' Association for having "selfish personal ends to gain," because many of them owned tenement houses that were subject to the Board of Health's regulations. In 1876, these tenement house owners, unhappy with the Board of Health's orders for repairs, had gone to Albany in the attempt to undermine the Board of Health's power by attacking its scientific authority. Chandler recalled the pamphlet that had appeared on the desk of every state senator, insisting that sanitary science "was a new and experimental thing, that it was a 'Board of Abstract Scientists' experimenting with their property and ruining them."[79] Chandler recognized Musgrave's report and the injunction as another ploy to eliminate the Board of Health.

In response, Chandler tried to take away the basis for lay sanitarians' claims, the authority of personal experience. In an interview, Chandler stated that, "The trouble is that citizens are very poor smell detectives. They are annoyed by a stench and in most instances ascribe it to some industry near them and believe it to be perpetual."[80] While any nose might be able to detect an odor, few had both the professional training and skill to pursue that odor to its source, where the odor would inevitably be far more intense and nauseating. It was much easier for a lay person or "amateur sanitarian" to cast blame on the nearest offensive trade without trying to pursue the odor and validate the allegation.

Chandler reasoned that these amateur sanitarians, such as the members of the Citizens' Association, were, "to the professional and official sanitarians what a horde of ambitious and officious guerillas would be to a General of an army at a critical moment. They insist on thrusting forward theories and advice and acting independently …while

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[79] Charles F. Chandler, Address before a Meeting of the New York County Medical Society, 3 Jun 1878, Box 52, Folder 1, Series II.3, "Charles Frederick Chandler Papers," Columbia University, New York.
[80] "The Hunter's Point Stenches: Work of the Special Committee of the State Board of Health—Prof Chandler on the Evil," clipping in Box 52, Folder 12, "Charles F. Chandler Papers," Columbia University Rare Books and Manuscripts, New York.

they are unable to render any real service."[81] Given the struggle Chandler and Musgrave were engaged in, the references to warfare were fitting. Criminal charges against the Board of Health for neglecting its duties did not serve the public interest of eliminating stenches; instead, the trial absorbed the time and energy of Board of Health members who might otherwise have spent their time upholding their duties rather than defending their right to do so. Furthermore, the Citizens' Association did not offer an alternative to the Board of Health in its attack, and thus did nothing to that might be considered a 'real service.' Chandler interpreted the lack of alternatives as an indication that the attacks were baseless, rather than motivated by real concern for the health of New Yorkers.

Chandler could not stop New Yorkers from smelling and complaining, but he hoped that lay sanitarians, rather than 'acting independently,' might take part in the Board of Health's efforts to identify and control the sources of odors. He first pursued this course, harnessing sniffers throughout the city, by setting up a chain of command for individual complaints. Chandler deputized his former student, chemist Samuel Goldschmidt, as Inspector of Offensive Trades in 1879. Goldschmidt had been a fertilizer inspector in Savannah, and thus was well acquainted with the difference between the smells of organic decomposition and of chemical waste. As Inspector of the Offensive Trades, Goldschmidt spent his days monitoring the winds and inspecting the practices of the New York's slaughterhouses, gas works, fat renderers, fertilizer manufacturers and other redolent businesses. He remained on call at night, when perturbed citizens might arrive on his doorstep and drag him out into the dark city streets to track down a disgusting smell.

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[81] Ibid.

One night visitor arrived on November 30, 1880. Herbert Turner called on the inspector at 10:30, determined that this time the inspector would be able to identify a nuisance that kept him awake. Turner's earlier complaints had been in writing, and thus arrived too late for the chemist to corroborate the amateur sanitarian's report. When Turner arrived at Goldschmidt's door that November night, he expected that Goldschmidt would discover the source of this stench. Turner soon discovered what Goldschmidt well knew; odors were fleeting. Goldschmidt recorded, "it had died away by the time Mr. Turner reached my residence." [82] In the morning, Goldschmidt consulted Chandler and learned that Chandler thought last night's wind was "'Hunter's Point' strong." Dr. Walter, also on the Board of Health, concurred, and Goldschmidt "subsequently learned that a visitor had noticed 'Hunter's Point' as he was leaving my house about 10PM." Goldschmidt noted all of these opinions and used them as evidence for his conclusion: "there is not much doubt that Hunter's Point and not the 'East Side' was in fault."[83]

Amateur sanitarians like Herbert Turner hoped that the Board of Health, once alerted to noxious stenches, would order businesses to abate the odors that woke them at night, but Goldschmidt was working on a different issue for the Board of Health. As Inspector of the Offensive Trades, Goldschmidt was continuing the work that the Board had begun before its 1878 Grand Jury hearing, determining which stenches originated on the East Side of Manhattan, and which blew across the East River from Hunter's Point and Newtown Creek, areas outside of the Board of Health's jurisdiction. In his reports, Goldschmidt adopted the shorthand that the trial proceedings and newspaper coverage

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[82] SA Goldschmidt to Walter F. Day, MD, Sanitary Superintendent, Jul 1881, Box 1302, "Office of the Mayor, William Grace Administration, Subject Files, 1881-1882," New York Municipal Archives, New York.
[83] *Ibid*.

had created: Hunter's Point meant sludge acid odors that the Board of Health could not regulate because they originated beyond its jurisdiction, and East Side meant odors from businesses in Manhattan, subject to the Board of Health's control.

When Goldschmidt found that East Side businesses were at fault, he was able to stop the offending practice, even if determining their exact source was difficult. Just like the air and breezes that carried them, odors were ephemeral. Their constant arrivals, mixtures, shifts and departures were well-known but still problematic for the trained chemist: "The wind was blowing strongly from the East North East, and by careful watching mingled with the Hunter's Point smell, could be obtained slight puffs from the manure and garbage dumps, and the slaughter house smell. About 9:50 came for a few moments the rendering odors, and this gradually died away…"[84] Even when Goldschmidt was on the scene, as he was that morning, he could not track all of the odors in this ever-changing nasal cocktail. He focused on the rendering odors, but could not determine if they came from the dropped tank at Rafferty and Williams, or a malfunctioning condenser at Schwartzchild and Sulzberger, so he cited both offenders and ensured that their problems would not persist.

When Goldschmidt submitted his reports to Chandler, he noted two types of stenches: those he had abated, and those beyond his control. Chandler was keenly interested in both. He spoke of nuisances abated when questioned about the effectiveness of the Board's regulations, and amassed a record of nuisances unable to be abated for political reasons. Because New York's stenches often travelled with the wind, Chandler

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[84] SA Goldschmidt to W de F Day, MD, Sanitary Superintendent, 17 September 1881, in Folder 60, Health Dept, Box 1302, "Subject Files, 1881-1882, Office of the Mayor, William Grace Administration," Municipal Archives, New York City.

hoped to create a new regulatory body through which he could control industries upwind of the city and buttress public health against attacks like that of 1878.

In the politics of regulation, jurisdiction determined effectiveness by establishing the boundaries of who could control what. The 1878 indictment of the Board of Health was as much about the Board's jurisdiction as it was about who was a reliable smell detective. In the years before the incorporation of the boroughs, independent Boards of Health existed in and governed Manhattan, Queens, and Brooklyn respectively. Each was wary of intrusions from neighboring governments, which might erode local authority and enable Manhattan's expansion beyond its borders—a fate feared by neighboring counties until the construction of the Brooklyn Bridge made it a reality at the end of the century. The jurisdictional dilemma kept the neighboring health boards at odds, quibbling with each other about stenches and turning to the legislators to address this issue in Albany. The state assembly was also an ineffective arbiter. Bills deadlocked year after year, a testament to the power of lobbying in the nineteenth century.

When the New York State Board of Health formed in 1880, Chandler received the governor's appointment and served as chair of the Sanitary Committee. In this position, Chandler had the power he needed to deal with the complaints of citizens and abate the smells of Hunter's Point.[85] In the first year of the Board's existence, Chandler's committee prepared a report on the offensive trades, which was the steppingstone to Chandler's recommendation in 1881. At the first quarterly meeting of the State Board, Chandler introduced the first item of business: "Resolved—That a special committee be appointed by the chair to proceed to New York City to take testimony with regard to the

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[85] *First Annual Report of the State Board of Health* (Albany: Weed, Parsons and Company, 1881), 4, 90.

nuisances alleged to exist there…"[86] The Special Committee on Effluvium Nuisances solved Chandler's worries in a number of ways: it gave him new jurisdiction over New York City's air, it gave the citizens of New York a new audience for their complaints, and a new scapegoat for their disappointments.

The Special Committee consisted of three men: Albany doctor J. Savage Delavan, whom Chandler had known since teaching at Union College, state senator Erastus Brooks, who had owned and edited the *New-York Express*, and Dr. Elisha Harris, New York City's well known sanitarian and vital statistics registrar as well as secretary of the State Board of Health. These three men were not only well known to Chandler, but also were the State Commissioners of Health, as appointed by the Governor and Senate. This committee began its work in much the same way that Goldschmidt had, gathering testimony about the odors from New York's professional and amateur sanitarians, co-opting citizens' authority of experience by folding it into their investigative methods. Thirty-one gave their accounts in person, with another fifty-eight committing their experiences to writing and sending them to the committee.[87] Doctors commented on the health problems associated with the stenches, while laypersons from Murray Hill testified primarily to their own discomfort. Mr. Montgomery put it plainly and powerfully when he said, "the stench was simply terrible. It could not be described, but must be smelled to be appreciated… I have been broken of my rest night after night in the Summer,…until I

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[86] *Second Annual Report of the State Board of Health* (Albany: Weed, Parsons, and Company, 1882), 51.
[87] Ibid, 44.

was nearly sick and unfit for business. There is no alternative but to open the windows and let in the stench or close the windows and suffocate."[88]

Others seconded Montgomery's comments, offering experiences that closely resembled his own. George G. DeWitt commented that the odors depressed spirits and robbed people of their appetites. Henry Bergh verified that the odors caused intense discomfort, if not outright sickness. Bergh also insisted, like Montgomery, that these stenches needed to be experienced to be understood: "It is impossible to describe the perfume of the rose, and equally impossible to describe the detestable odors of Hunter's Point." Dr. Hitchock echoed this assertion, noting that, "the violence of the stenches is indescribable."[89] Throughout the testimony about stenches and illness ran one insistent refrain; if the members of this new committee wanted to understand the odors, they had to smell and experience them for themselves. Experience equated authority in the minds of concerned citizens as well as in the efforts of insincere amateur sanitarians.

While requesting special investigations by experts on "the chemistry of stenches," the committee decided to make a tour of inspection.[90] Like Mahla and Goldschmidt before them, committee members put their noses to the wind and went in search of the stenches' sources, combining the scientific and political authority with the authority of personal experience. A *New York Times* reporter used heavy sarcasm in recording the experience of these three men with the powerful, but commonplace, odors: "The homes of these [sickening stenches] are along the shores of the East River, and by dodging in

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[88] "Foul Odors in the City: Loud Complaints Against Those from Hunter's point," *New York Times* 24 Feb 1881, pg. 8.
[89] Ibid. See also *Second Annual Report*, pgs. 339-342. The testimony was stenographically recorded and subsequently written out in full, but not published in the Board's annual report and subsequently lost or destroyed.
[90] *Second Annual Report*, 338.

and out of slips with a tug-boat, and by creeping and climbing over oil-lighters and rotten string-pieces, they were finally reached by the committeemen without loss of life or limb."[91] Though safe for the moment, things changed when the state officials found "the home of the most powerful stench of the day…Assemblyman Brooks started as if a knife had pierced him after taking one whiff. The other members of the party were visibly affected."[92] This powerful stench was found at a fertilizer factory, which used sludge acid in production. The *Times* reported that the factory's owner, "forces steam through [sludge acid], which, he asserts, carries off its disgusting gases, and, in a measure, makes it odorless."[93] Judging from Brooks's response, and Elisha Harris's comment that "it was one of those diabolical smells which no amount of profanity could relieve," the deodorizing process was far less than successful.[94]

After they had smelled the odors New Yorkers complained about, the committee members took firsthand accounts of the stenches and their effects back to Albany. More than a catalogue of testimony or chemical reports, their own noses and turned stomachs convinced the committee members of what everyone had been saying; the state government should intervene on the behalf of public health and regulate wind-borne odors by restricting their production. The Special Committee, in the report accepted and adopted by the State Board of Health, "urges upon the Governor the importance of requiring the owners of other oil refineries to adopt the same or equally effective methods of accomplishing the same results [containing and controlling odors]."[95] Harris, Brooks

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[91] "Where Stenches Abound: A Still-Hunt by the State Board of Health," *New York Times* 27 May 1881, pg. 10
[92] Ibid.
[93] *Ibid.*
[94] *Ibid.*
[95] *Second Annual Report,* 52.

and Delavan, by virtue of their membership in the Special Committee on Effluvium Nuisances, possessed official noses and decided if a smell was disagreeable or diabolical. After their voyage in New York, they agreed that "the complaints are well founded, that the odors emanate chiefly from the portions of Kings and Queens counties bordering upon Newtown creek, and that they are caused by carelessness in the management of the businesses..."[96]

When presenting their conclusions and recommendations in Albany, the Committee on Effluvium Nuisances stressed the testimony of doctors and laypersons, as well as their own experiences in New York, to validate the frequent complaints against stenches. Chemists also had a place in the final report, but only at the end of their comments and with reference to chemical reports appended for those interested. The evidence that spoke most forcefully was not the research and opinion of chemical experts, but the experiences of multiple New Yorkers and of the committee members themselves:

> The most pungent and suffocating of all effluvia smelled by the committee, or complained of by those who have testified, are those from the sludge-acid and from the superphosphate [fertilizer] establishments…This series of stenches, and the causes of them, have acquired a magnitude that can hardly have been witnessed elsewhere in the world; for the businesses with which they are connected are conducted upon an enormous scale.[97]

After receiving the committee's report and recommendations, bolstered by testimony, experience and chemical evidence, the state intervened for the first time.[98] On behalf of "the health and comfort" of Manhattan's residents, Governor Alonzo Cornell proclaimed that "the causes of nuisances…be…removed or abated by the first day of June, 1881…"[99]

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[96] *Ibid*, 51.
[97] *Ibid.*, pg. 343-44.
[98] At successive legislative sessions in the 1870s, Manhattan sponsored bills to order restrictions on air-borne nuisances were defeated.
[99] *Second Annual Report*, pg. 353.

In both New York City and Chicago, the struggles with urban odors began and ended with the not so simple question of who decided that an odor was a nuisance and required abatement. Complaints against odors were commonplace, but city leaders heeded these only when odors were linked with consequences of political importance, such as economic wellbeing or political power. Chemists played an important role in the politics of regulation because their science established the validity of complaints; chemists were the 'smell detectives' whose professional training qualified them to track odors to their sources. However, since scientific authority did not automatically translate into political power or cultural respect, chemists needed to claim and fight for the place of their science in political debates. Chemists both needed to be adept politicians, within rather than consulting urban governments, and they needed to be responsive rather than hostile to the knowledge of lay citizens. Personal experience, especially of an invisible but perceptible health threat, carried its own powerful cultural authority. Neither chemical reports nor individual complaints created air regulation; health officials had to work within the government and bring scientific and lay knowledge together to make a compelling case for controlling industrial pollution in the form of odorous substances.

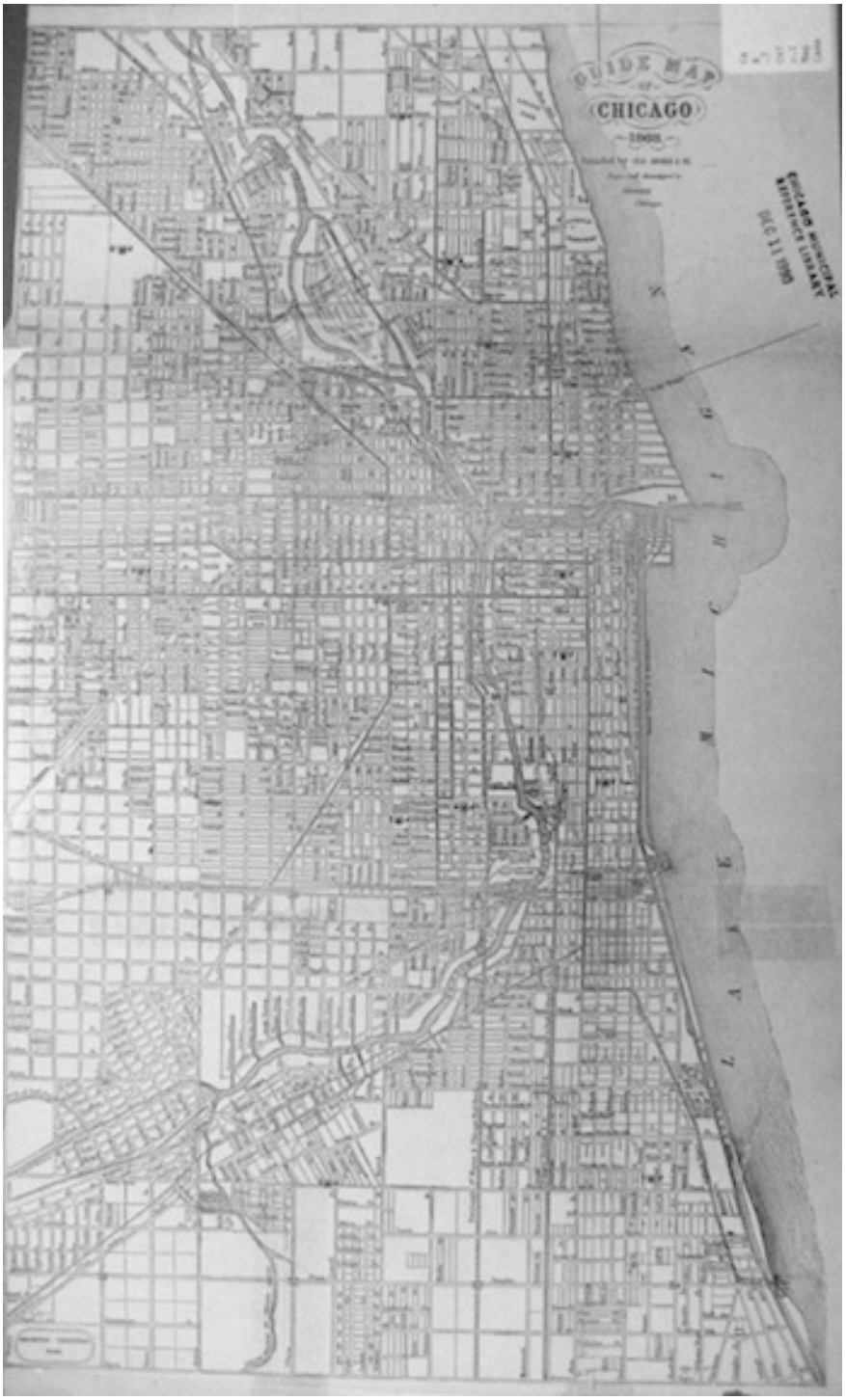


Figure 2.1. Map of Chicago, 1868. Note how the city is built around the branches of the river, with its mouth as the city center.

Source: Chicago Public Library.

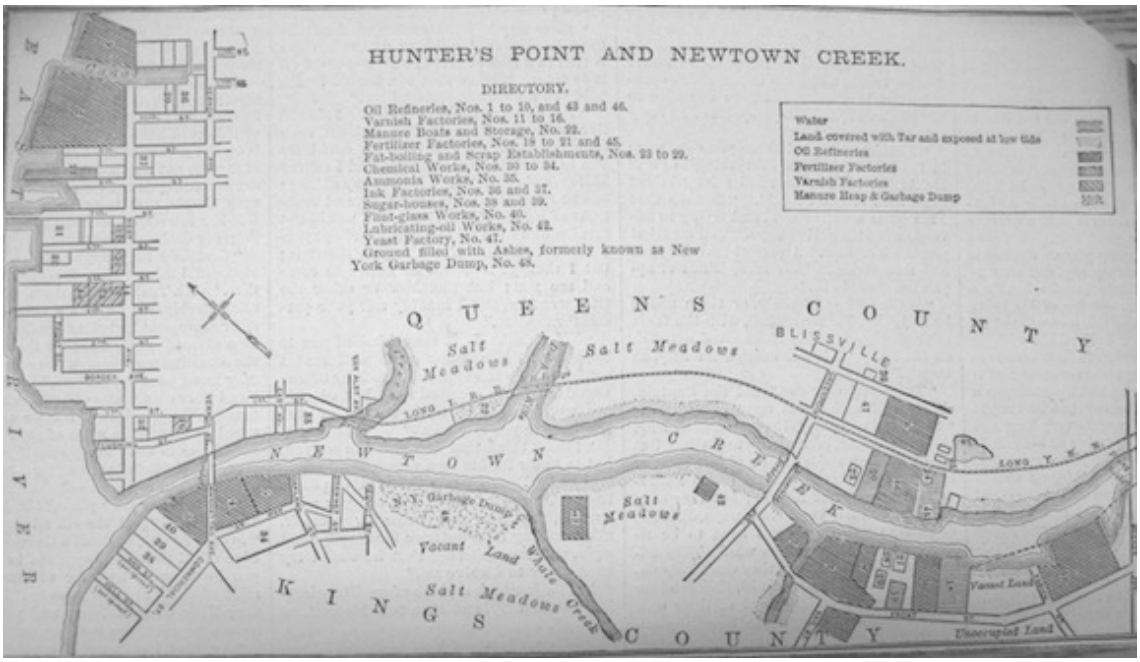


Figure 2.2. This map documents the factories located along Newtown Creek between Queens and Kings Counties of New York. Note the shading along the shoreline, which indicates "land covered with tar and exposed at low tide." This is where sludge acid, which had been dumped into the creek, coated the land and was agitated with each change of the tide, releasing pungent odors into the atmosphere.

Source: "Hunter's Point and Newtown Creek," *Harper's Weekly*, 6 Aug 1881, pg. 536.

# Chapter 3.

## "The Nose as Sanitary Agent":

## Scenting and Protecting the Home

In September 1873, *The Sanitarian*, a new monthly journal dedicated to sanitary science and reform, mailed its sixth issue to subscribers. Nestled between articles that explained how to prevent cholera and the appropriate methods of sea-bathing appeared a short paragraph simply titled "Disinfectants."[1] Without comment or elaboration, the paragraph quoted a student's response to an exam question about how disinfectants worked: "He replied: 'They smell so badly that the people open the windows, and fresh air gets in.'"[2]

The editors probably included this piece for some humorous relief from the long and serious articles about how to preserve and improve public health. One can easily imagine the teacher smiling and shaking his head at the clever answer. However, readers of *The Sanitarian* recognized that the student, while evading the spirit of the question,

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[1] John Simon, "Resistance to Cholera," *The Sanitarian* 1(6): 263-267; Abbotts Smith, MD, "On Sea-Bathing," *The Sanitarian* 1(6): 268-276.
[2] "Disinfectants," *The Sanitarian* 1(6): 267.

was correct. The student's answer emphasized the paradox of disinfectants—they worked, but the powerful smell of household disinfectants required open windows and thus ushered fresh air, one of nature's disinfectants, into the room.

Disinfectants were just one of many paradoxes of urban domestic life. In order to make the home a refuge from the outside world and its ills, the nineteenth-century ideal, women had to control the very air of the home.[3] This was no easy task. The home was a fixed location, but the air was constantly in motion, moving in and out through windows, cracks, chimneys, pipes and vents, or swirling around rooms in dangerous drafts. The air might be sweet, fresh and pure, but more often it harbored the pestilential odors of decomposition, nauseating chemical smells, and bodily exhalations. Industrial cities, with their concentration of stench-belching factories, threatened to overcome urban homes by infecting their air. To fulfill their gender responsibilities and create healthy, comfortable domestic environments, women had to protect household air from dangers both within and without.[4]

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[3] For attitudes toward the home as refuge and its role in nineteenth-century American society, see Clifford Edward Clark, Jr., *The American Family Home, 1800-1960* (Chapel Hill: The University of North Carolina Press, 1986); Richard Bushman, *The Refinement of America: Persons, Houses, Cities* (New York: Vintage, 1993), esp. 238-279; Katherine C. Grier, *Culture and Comfort: Parlor Making and Middle-Class Identity, 1850-1930* (Washington, D.C.: Smithsonian Institution Press, 1988), esp. 1-21; Dolores Hayden, *The Grand Domestic Revolution: A History of Feminist Designs for American Homes, Neighborhoods, and Cities* (Cambridge, MA: The MIT Press, 1981); Gwendolyn Wright, *Moralism and the Model Home: Domestic Architecture and Cultural Conflict in Chicago, 1873-1913* (Chicago: The University of Chicago Press, 1980).

[4] The gendered responsibility and labor of women as nursemaids, midwives, and family caretakers remained constant from the colonial period through the professionalization of medicine in the late nineteenth century. See Laurel Thatcher Ulrich, *Goodwives: Image and Reality in the Lives of Women in Northern New England, 1650-1750* (New York: Vintage Books, 1980); Ulrich, *A Midwive's Tale: The Life of Martha Ballard, Based on Her Diary, 1785-1812* (New York: Alfred A. Knopf, 1990); Jeanne Boydston, *Home and Work: Housework, Wages and the Ideology of Labor in the Early Republic* (New York: Oxford University Press, 1990); Emily K. Abel, *Hearts of Wisdom: American Women Caring for Kin, 1850-1940* (Cambridge, MA: Harvard University Press, 2000); and Kathleen M. Brown, *Foul Bodies: Cleanliness in Early America* (New Haven: Yale University Press, 2009).

To protect the health of the family and the home in smelly cities, women combined the folk knowledge that had been passed down through generations of women by word of mouth with the latest advances in scientific and medical thought. [5] Women read about air currents in the pages of domestic manuals and technical tracts, gathering insights into new technologies and adapting their knowledge of fragrant plants and potpourris to a world that included chemical disinfectants and ventilation systems. The ideal home had its own atmosphere, one that smelled better than city streets and was as healthy as a country breeze. Women created this atmosphere.

Knowledge about fresh air, foul odors and health, much like the air itself, was constantly in motion. Knowledge did not exist only within the home or within the laboratory, and was not consistently better in one than the other, but circulated constantly throughout American life in conversations and the written word. Scientists and sanitarians investigated the effectiveness of women's practices; women sometimes employed and sometimes rejected the recommendations of scientific research. This chapter uses women's manuals, magazines and experiences in conversation with men's scientific and engineering magazines to document how women honed a set of skills for cleaning, policing and scenting the air. In a world of bad and pestilential stenches, women sought out, cultivated and used good smells. With these scents, women created olfactory buffers between outdoors and in, emphasizing the walls of the house as barriers between public and domestic life. The efforts of women to control and police the air within the home were important correlatives to contemporary public health campaigns for

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[5] On domestic manuals as the amalgamation of folk knowledge with recent scientific advances, see, Glenna Matthews, *"Just a Housewife": The Rise & Fall of Domesticity in America* (New York: Oxford University Press, 1987), 149.

improved ventilation and against the stenches of the offensive trades. This chapter tells the story of domestic efforts to understand the air and exert local environmental control as a preventive health measure.[6]

Air control began in the very entryway of the home. Entryways were liminal spaces; when standing in an entry hall, one was no longer outside but not yet admitted into the heart of the home, suspended between the public street and private realm of domesticity.[7] Entryways featured doors and the main staircase that conveyed visitors into more intimate domestic spaces, and might contain furnishings such as elaborate hallstands and ornamental newel posts that suggested the gentility, good taste and social standing of the home's residents. Just as the sight of these objects gave the visitor his or her first impression, the odors of the entryway also communicated information about the family and its habits. For a first olfactory impression that differentiated the interior space of the home from the world outside, the ideal entry held vases of flowers on a low, three-legged table behind the door, in the nook above the closet, in the recess between closet and stairway, or on the landing of the stairs [Figure 3.1].

In assembling bouquets for their entries, women chose from a wide range of fragrant plants and recorded their favorite scents in domestic advice and women's magazines. In her *Treatise on Domestic Economy*, "one of the most widely circulated volumes of advice literature in antebellum America," Catharine Esther Beecher listed sweet alyssum, sweet-smelling stevia, sweet sultan, sweet scabius, and sweet-scented

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[6] For similar arguments about the importance of women's campaigns and domestic duties to sanitation and public health, see: Hoy, *Chasing Dirt: The American Pursuit of Cleanliness* (New York: Oxford University Press, 1995); Nancy Tomes, *Gospel of Germs: Men, Women and the Microbe in American Life* (Cambridge, MA: Harvard University Press, 1998).

[7] On the importance of entryways in the homes of middle-class Americans, see Kenneth L. Ames, *Death in the Dining Room and Other Tales of Victorian Culture* (Philadelphia: Temple University Press, 1992), ch. 1.

monthly honeysuckle as fragrant staples of household gardening.[8] Each of these "sweet" plants released a fragrance that improved the air of the home and helped women protect their families' health. According to *Prairie Farmer*'s Household Affairs column, "a bad smell alone will bring on disease," but the good smells of flowers could protect health: "A patch of sweet peas here, a bed of sweet mignonette there, with stocks, iberias, pinks, and the fragrant phloxes, all about, and a patch of clover beyond—are they not greatly conducive to health, by the sweet odor they diffuse?"[9]

While the readers of *Prairie Farmer* could cultivate an olfactory barrier between home and farm by planting flowers along the perimeter of the dooryard, urban women adapted their ambitions for sweet smelling domesticity by planting gardens on their windowsills.[10] Women grew fragrant plants in window-boxes where they would "scent the air that enters [the home], through the whole of a long summer's day."[11] Of all the fragrant plants that women grew around their homes, the most popular was the mignonette, "the perfume jar of the flower garden," or *reseda odorata* in Linnaeus's categorization [Figure 3.2].[12] This commonly recommended plant was affordable and reliable, so that "a single plant in bloom fill[s] the whole atmosphere around with its delicate fragrance…No garden should be without it."[13] In her 1881 gardening manual, popular author Ella Rodman Church noted that mignonette, beloved by both poor men

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[8] Mary Kelley, *Learning to Stand and Speak: Women, Education and Public Life in America's Republic* (Chapel Hill: University of North Carolina Press, 2006), 139; Beecher, *Treatise*, 337-339.
[9] "Disinfection," *Prairie Farmer* 8, no. 9 (Sep. 1848):286.
[10] For an overview of the advent of indoor gardening and the cultivation of houseplants in nineteenth century America, see Tovah Martin, *Once Upon a Windowsill: A History of Indoor Plants* (Portland, OR: Timber Press, 1988).
[11] James F. Johnston, *The Chemistry of Common Life,* 8th ed. (New York: D. Appleton and Company, 1856), 2:214.
[12] DM Ferry & Co Trade Cards, Cabinet 8, Drawer 4, "The John and Carolyn Grossman Collection," Winterthur Library, Winterthur, Delaware; *Language of Flowers; with Illustrative Poetry: to which is now first Added, the Calendar of Flowers*, 5th American ed., (Philadelphia: Lea & Blanchard, 1839), 156.
[13] DM Ferry & Co Trade Cards.

and poets, was a perfect indoor plant: "an ornamental window-box filled only with this low-growing, violet-scented annual is a desirable addition to any room."[14] *The Ladies' World* outlined a variety of plant combinations for window-boxes in 1865, but insisted that heliotrope or mignonette, "must be there for scent."[15] Flowers, like all other objects in the Victorian home, had an important role to play in the creation of middle-class domesticity.[16]

Flowers, stationed near doors and in windows, also played an important role in sweetening the fresh air of the city, addressing the paradox how to have fresh air within smelly urban environments. When women had fragrant window boxes to counteract the city smells, they were more likely to open their windows, admitting fresh air that had not yet been breathed and releasing the built up carbonic acid of vitiated air. Catharine Beecher, in her campaign for improved female health, agreed with John Hoskins Griscom and other health advocates that fresh air acted as a potent stimulant, strengthening the health of both mind and body, and as a powerful purifier, removing "noxious effluvia" from garments.[17] As she instructed women in better knowledge of how to perform their household duties, the main subject of Beecher's treatise and of her work as an educator, she emphasized the health benefits of fresh air. The careful placement and cultivation of fragrant plants was one of many practices that Beecher recommended as she guided

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[14] Ella Rodman Church, *The Home Garden* (New York: D. Appleton and Company, 1881), 15-16, 98.
[15] E. A. Maling, "Window Plants for Towns," *The Ladies' Friend* 2, no. 7 (Jul 1865): 493.
[16] Many works of material culture have explained how objects established and reinforced middle class status. See, for example, Clark, *American Family Home*; Grier, *Culture and Comfort*; Kristin Hoganson, "Cosmopolitan Domesticity: Importing the American Dream, 1865-1920," *American Historical Review* 107, no. 1 (Feb 2002): 55-83; and Marina Moscowitz, *Standard of Living: The Measure of the Middle Class in Modern America* (Baltimore: The Johns Hopkins University Press, 2008).
[17] Catharine E. Beecher, *A Treatise on Domestic Economy: For the Use of Young Ladies at Home and at School* (Boston: Thomas H. Webb, 1843), 120, 131, 196-198.

women on how to increase their exposure to "the first and most indispensable requisite for health."[18]

The primary audience of domestic advice and women's magazines were those among or aspiring to be middle-class, but the appeal and recognized importance of fragrances crossed class lines. Poor families also cultivated flowers, though in smaller window-boxes that received less sunlight. *The Daily Graphic* recorded this practice in 1873, noting that, "It does not require much time or money to cultivate a few flowers. At least, this is the experience of the poor, as many of the window benches in our second and third class streets bear witness."[19] The accompanying illustration depicted a poor family appreciating the fruits of their labor, the sweet smell of roses growing in a pot [Figure 3.3]. Tellingly, women carried the pot of roses to the invalid male and helped him to inhale the fragrance, a reference to the caretaking labor of women. Though the labor of cultivating flowers was female, the fragrant benefits obviously crossed gender lines and improved the lives of all who lived in this cramped, decrepit apartment.

Middle-class women capitalized on the universal appreciation and desire for sweet scents when they launched flower missions in the 1870s in cities such as Boston, New York, Cincinnati, and St. Louis. [20] The goal of flower missions was to deliver bouquets to the impoverished sufferers in city hospitals, and early successes of these charities soon led to an expansion of recipients. The New-York Flower Mission

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[18] Catharine E. Beecher and Harriet Beecher Stowe, *The American Woman's Home: Or, Principles of Domestic Science; Being a Guide to the Formation and Maintenance of Economical, Healthful, Beautiful and Christian Homes* (New York: JB Ford and Company, 1869), 43.
[19] "Pictures of the Day," *The Daily Graphic* 21 Jun 1873, pg. 2.
[20] Robin L. Cadwallader, "'The Flower Charity. Heaven bless it!': A Study of Charity in Literature and Culture," *Legacy* 2 (2009): 377-387.

distributed its fragrant bounty to prisons, crowded factory rooms, asylums, Children's Aid Society schools, and tenement houses.

With their fragrances, these charitable flowers brought health and comfort into the air of tenement apartments and hospital wards [Figure 3.4]. The decorations visibly brightened hospital wards and, just as importantly, dispelled "the sickening odor of chloroform."[21] Doctors and surgeons frequently praised the work of the flower charity, testifying that the flowers did as much good work as their own ministrations. "The most eminent surgeons and medical men in the city" looked forward to the start of the Flower Mission's season in 1878, explaining that, "surgical operations were more successful on the flower days."[22] Writers for *Harper's Weekly* and *The New York Times* did not require an explanation of the how fragrances aided surgery. The benefit of flowers was as obvious as that of the newly formed Fresh Air Fund or of day excursions to the shore or mountains. The 'change of air' held the cure.

Accounts of the New-York Flower Mission indicate that the charity's recipients did not simply want flowers; the poor, infirm and incarcerated desired good smells. Though the flower missionaries dispensed flowers as a way of spreading health, recipients asked for specific plants whose fragrances triggered memories of better times in better places: "More than once, some wasted, hollow-eyed creature has smiled at the bunch of wild flowers handed her, saying feebly, 'They bring back the fields—I was a country girl, Miss!'"[23] These interactions impacted the missionaries and shaped the Flower Mission's instructions for donors. In an 1879 profile of the charity, *The New*

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[21] "Christmas Decorations," *New York Times* 21 Dec 1878.
[22] "The Helping Hand," *Harper's Weekly* (17 Aug 1878), 647.
[23] Eugenia Harper, "The Work of the New York Flower Mission," *The Chautauquan*12 (Oct 1890), 87.

*York Times* noted, "While all flowers are gladly received, the most acceptable have proved to be lilacs, laurel, pond lilies, roses, pinks, and sweet geranium."[24] As the women of the mission put their floral arranging skills to productive use outside the home, they were careful to include both "a sweet-scented and bright-colored flower" in each bouquet [Figure 3.5].[25]

Good fragrances thus became an important marker of health and home, and women carefully tended to the air of their homes to maintain the appropriate sweet scents in domestic air. In the winter months, when frost claimed gardens and window boxes, pine boughs or potpourris replaced bouquets both in location and scent. The deliberate diffusion of fragrance was part of routine household cleaning. Author Annie Marie advised readers of *The Ladies' Floral Cabinet*, "Every week after the usual sweeping, dusting and airing, open your jar and shake the contents thoroughly; this will give your room a delicate perfume…"[26] She also suggested that her readers keep their potpourri jars "in a corner of the front hall," so that the fragrance would "penetrate the whole house," and be the first welcome into the home, much as the exterior flower beds and entryway bouquets were in warmer months.[27]

As each woman chose ingredients and prepared her own potpourri, she determined the scent of her home, and thus differentiated her home from the homes of all others, as well as from the world at large. Annie Marie thought that, even when the same ingredients were used, "The method of combining the ingredients, the length of time they stand, and the strength of the various articles forming the compound, all seem to give

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[24] "A Beautiful Charity," *New York Times* 6 May 1879.
[25] "New-York Flower Mission," *New York Times* 4 Jul 1893; "A Beautiful Charity," *New York Times* 6 May 1879.
[26] Annie Marie, "A Pot of Perfume," *The Ladies' Floral Cabinet* 13, no. 6 (Jun 1884): 191.
[27] Ibid.

each jar an individual smell." When recipes passed from mother to daughter, successive generations added scents that pleased them, creating modern variations on the traditional scents that meant "home" to the family. An 1889 issue of *The Home-Maker* compared the preparations of a New England grandmother and her granddaughter.[28] The grandmother dried petals of white damask roses for use year round against inflamed eyes and infant illnesses. Her granddaughter also cherished the fragrance of roses throughout the year, but added orris-root, musk, lavender and spikenard to her jar of roseleaves. Though the granddaughter followed her grandmother's example, she adapted the family recipe to her own preferences and thus created her own version of the familiar scent. Despite the variation in odor, the granddaughter used her potpourri jar in the same way as her grandmother had, keeping it next to her bed for a calming and healthful fragrance.

At the same time that women prepared potpourris, they often created fragrant sachets for use through the home. Unlike potpourris, which were stored in tight jars, then opened and stirred when the need for atmosphere sweetening arose, sachets continuously gave off their smells. Sachets containing musk and white rose, lavender and verbena, sweet clover and herbs, or pine, spruce, hemlock, sassafras and spicewood leaves were popular gifts for friends as well as useful domestic articles [Figures 3.6 and 3.7].[29] Women deliberately placed sachets through the home to keep foul odors at bay. Sachets were particularly effective in closed spaces, such as closets and dresser drawers, where fresh air could not enter with its purifying power. These sachets combated disagreeable

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[28] "Rose Leaves from a Grandmother's Jar," *The Home-Maker* 2, no. 3 (Jan. 1889), pg. 251.
[29] "A Perfume Sachet," *Ladies' Floral Cabinet* 12, no. 3 (Mar. 1883): 89; [Untitled], *The House Wife* 4, no. 4 (Aug 1888): 16;"New Year's Gifts," *The Ladies' World* 17, no. 1 (Jan. 1896): 20; Azelia Grant, "About Scents," *The American Woman* 3, no. 2 (Jul. 1898), 14-15.

odors that might be introduced through carelessness, or through changes to the architecture and technologies of the home.

In the course of the nineteenth century, three new domestic technologies significantly changed patterns of air movement: the stove, ventilation systems, and wastewater plumbing. Prior to these technologies, women used their knowledge of how and where the air moved into and around the home to guide their uses of fragrant plants, potpourris and sachets. Doors, windows and fireplaces were the openings for air's entrance and exit, so women monitored these portals carefully. Stoves, ventilation systems and wastewater plumbing added new portals for fresh and foul air. Consequently, women learned new ways of monitoring domestic airflow, of recognizing health dangers in the air they breathed, and of improving the air. In the process, women both adapted their traditional use of fragrance and acquired new air-cleansing skills.

When Beecher wrote her first domestic manual in 1841, she took her cues from ventilation proponents such as Griscom and Philadelphia's Dr. John Bell. Beecher insisted that every room needed windows, doors and open fireplaces to facilitate the free circulation of air. Open fireplaces were natural ventilators, as they both heated the air and drew it up and outward while pulling fresh air in through doorways and windows. The fresh air that fed the flames also supported the respiration of a room's occupants. Yet roaring fireplaces consumed prodigious amounts of wood, gave off little heat and left those in the recesses of the room chilled on a cold winter night.[30] Stoves promised greater efficiency of both fuel and warmth by restricting the airflow that made fires consume wood faster, and by offering control over the movement of heated air.

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[30] Peter C. Baldwin, "How Night Air Became Good Air, 1776-1930," *Environmental History* 8:3 (July 2003): 414.

Stoves brought perils with this promise, as did the airtight construction of winter storm windows and caulking that went along with stoves.[31] Fresh air could not enter the impervious rooms that stoves heated so well and so cheaply, and the rooms' occupants consequently breathed vitiated air, grew weak and took ill. Susan Fenimore Cooper, sister to the famous author and a fan of open fireplaces, knew stoves' danger by the smell. In the 1850s, Cooper wrote in her diary that, "The smell of the heated iron is always disagreeable, and the close atmosphere they give to a room must necessarily prove unhealthy."[32] Architect Andrew Jackson Downing railed against "the vitiated air of *close stoves* and the unventilated apartments which accompany them," calling this health menace, "the favorite poison of America."[33] The new technology was an insidious killer, for the women, children, aged and infirm whose health suffered most from stoves considered the poison to be the height of domestic comfort and economy. Downing sympathized with the desire for warmth, but questioned the economic wisdom of saving a little on fuel only to pay "twice its savings to the family doctor."[34]

Downing's concerns did not turn public opinion against the use of stoves for heating, but raised the important issue of balancing health with economy, an issue directly in line with Beecher's interests in domestic economy. Though Beecher joined Cooper and Downing in their preference for the open fireplace in 1843, she was increasingly attentive to educating householders about stoves and ventilation in subsequent versions of her housekeeping manual. In her 1855 *Letters to the People on*

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[31] *Ibid.*
[32] Susan Augusta Fenimore Cooper, *Diary of Susan Fenimore Cooper, January, 1850?*, in *Journal of a Naturalist in the United States, vol. 2.* (London: Richard Bentley & Son, 1855): 244.
[33] Andew Jackson Downing, "The Favorite Poison of America," *Rural Essays* ed. George William Curtis (New York: De Capo Press, 1974): 278-279.
[34] Downing, "Favorite Poison," 280.

*Health and Happiness*, Beecher incorporated biological explanations of respiration that calculated one hogshead of air per hour as the minimum necessary to ensure health. To meet this bodily demand, Beecher gave directions for securing "a *gentle current* of air that shall constantly pass in and out of a room or building where the lungs and skin of human beings are vitiating the atmosphere."[35] This could be easily done, "by simply having an opening at the top of one window and another at the top of the door."[36] Beecher instructed readers that these openings "must be proportionate to the number of lungs that are to use the air."[37] One-inch openings were sufficient for two people in the average sized room, but if the room were larger or the occupants more numerous, proper ventilation was more difficult to obtain.

One could always increase the openings at the tops of windows and doors, but too much ventilation would create a draft instead of the gentle current specified by Beecher. This was no small matter; according to Celia M. Haynes's *Happy Home Health Guide*, "Draughts are, to the young and to the aged alike, more dangerous than any other peril to which they are exposed."[38] Beecher warned her readers of draft-induced colds, and urged that they take care to have multiple small openings or, in particularly large spaces, to use furnaces and mechanical ventilators. In ventilating their homes, women walked a fine line between creating a flow of fresh air for healthy breathing, and allowing too much cold air to enter. Winter winds and still days further complicated the system of air inlets and outlets. Proper ventilation required constant attention.

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[35] Emphasis in original. Catharine E. Beecher, *Letters to the People on Health and Happiness* (New York: Harper & Brothers, 1855), 92.
[36] *Ibid*.
[37] *Ibid.*
[38] Celia M. Haynes, *The Happy Home Health Guide* (Chicago: Emmert Proprietary Co., 1887), 153.

When Beecher published *The American Woman's Home* with her sister, Harriet Beecher Stowe, in 1869, the pair wrote two full chapters on ventilation, and included the subject as a subheading in chapters about the care of infants, children, the aged, rooms, fires and lights. Information about fresh air and ventilating found its way into nearly every topic under discussion, especially because of the need to address a technology new to Beecher's domestic manuals: household plumbing.

Household plumbing, like heating, was a technology for domestic comfort that required new skills from the housewife, and was becoming much more common in the 1850s and 1860s than earlier in the century.[39] With the introduction of water-closets or indoor toilets, whose popularity grew dramatically during the 1860s, plumbing brought the odors of the outhouse and cesspool into the home on a permanent basis.[40] For the first time, the stinks of urine and excrement threatened to become a regular feature of domestic air instead of quarantined to the distant outhouse or poorer urban neighborhoods. As foul odors crossed into the home, women developed methods for cleaning and deodorizing the toilet, and learned to guard against the perils of faulty plumbing.

Beecher and Stowe strongly urged women to learn the art of ventilation through their detailed and repeated discussions of ventilation schemes, but they were reluctant to

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[39] In Boston, "usage climbed to 6,500 by 1857 and more than doubled to 14,000 out of approximately 87,000 water fixtures by 1863. By 1870 the total number of fixtures had reached 124,000. As of the 1850s, New Yorkers put Croton water to use in some 14,000 baths and more than 10,000 water closets." Jamie Benidickson, *The Culture of Flushing: A Social and Legal History of Sewage* (Vancouver: UBC Press, 2007), 82. On the widespread use of household plumbing beyond the upper classes, see Maureen Ogle, *All the Modern Conveniences: American Household Plumbing, 1840-1890* (Baltimore: The Johns Hopkins University Press, 1996), esp. ch. 1.

[40] The water closet—referring to the toilet fixture, not the bathroom—became a common feature of New York residences during the 1860s, roughly thirty years after becoming common in English homes. See May N. Stone, "Plumbing Paradox: American Attitudes toward Late Nineteenth-Century Domestic Sanitary Arrangements," *Winterthur Portfolio*, 14, no. 3 (Autumn 1979), 294.

embrace plumbing in the same way. Writing in 1869, the sisters advocated avoiding wastewater plumbing altogether by installing an earth-closet instead of a water-closet. They favored the earth-closet as an invention that "prevents the disagreeable and unhealthful effluvium which is almost inevitable in all family residences."[41] The earth-closet was more economical than the water-closet because the former did not entail "the outlays for plumber's work, the almost inevitable trouble and disorders of water-pipes in a house, and the constant stream of petty repairs consequent upon careless construction" that were routine expenses of water-closet owners.[42] Instead of flushing wastes down a pipe with water, so that they might be carried out to sea or buried deep below buildings, patrons of the earth-closet mixed dried earth with their excrement to create "compost [that] is without disagreeable odor, and is the richest species of manure."[43] Converting urban effluent into productive fertilizer for countryside crops was a long cherished dream of sanitarians, and the earth-closet was only the latest in a series of inventions and schemes for making this dream a reality.[44] Though sanitarians hailed the productive potential of the earth-closet, the Beecher sisters cared more for its inodorous promise for the home.

Beecher and Stowe penned only a few paragraphs celebrating the virtues of the earth-closet before turning the rest of the chapter over to the words of George E. Waring, Jr. Waring had trained as an agricultural chemist and made a name for himself in the

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[41] Beecher and Stowe, *American Woman's Home*, 403.
[42] *Ibid*.
[43] *Ibid.*
[44] See Benjamin Ward Richardson, *Hygeia: A City of Health* (London: Macmillan and Co., 1876); Joel Tarr, "From City to Farm: Urban Wastes and the American Farmer," *Agricultural History* 49, no. 4 (Oct. 1975): 598-612; and Natalka Freeland, "The Dustbins of History: Waste Management in Late-Victorian Utopias," in Cohen and Johnson, eds., *Filth: Dirt Disgust and Modern Life* (Minneapolis: University of Minnesota Press, 2005), 225-249.

1850s as the Agricultural Engineer of Central Park, where he oversaw the drainage of New York's new breathing space. With his background in agricultural chemistry, Waring was keenly aware of the value that water-closets literally flushed away, estimating "$50,000,000 as the money value of the wasted night-soil of the United States every year," and further losses in the annual leaching of soil's minerals without replenishment.[45] As consulting director of "The Earth-Closet Company" in Hartford, Connecticut, Waring used his training and his reputation to advocate the benefits of the earth-closet for agriculture, future prosperity, and current comfort of the household.

The Beecher sisters included selections from Waring's agricultural commentary, then reprinted his olfactory promises verbatim. Waring guaranteed instantaneous relief, saying that "from the moment the earth is discharged, and the evacuation is covered, all offensive exhalation entirely ceases."[46] Notwithstanding the occasional "slight odor of guano mixed with earth," which Waring assured readers was trifling and local, the earth-closet was so inoffensive that it might be installed in any room of the house. Waring insisted that the earth-closet was particularly suited to bedrooms, sickrooms and hospitals; "It is entirely free from those faint, depressing odors common to portable water-closets and night-stools, and through its admission one of the greatest miseries of human life, the foul smells of the sick-room, and one of the most frequent means of communicating infection, may be entirely prevented."[47] Any failure came not from the earth-closet itself, but from the user's failure to obtain properly dried earth.

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[45] Beecher and Stowe, *American Woman's Home*, 406.
[46] *Ibid.*, 407.
[47] *Ibid.,* 412.

Though earth closets obviated fears of faulty plumbing and promised inodorous convenience, the need to collect properly dried earth, fill and empty earth-closets made them more labor intensive than water-closets with sewer connections. Beecher, Stowe and Waring were fighting a losing battle, and soon switched allegiances from the earth closet to water closets. By 1873, Catharine Beecher turned her attention the plumbing needs of water-closets, noting that earth-closets might replace wastewater plumbing in the future, "though at present the water is much more convenient."[48] Waring's enthusiasm for the earth-closet also waned, and he went on to become the nation's "most conspicuous anti-contagionist, environmentalist, and propagandist of the late nineteenth century," a champion for sanitary engineering and an expert on sewerage systems who designed and oversaw the construction of sewers for Memphis after the yellow fever epidemic of 1878.[49]

While Beecher, Stowe and Waring were advocating the earth-closet and its inodorous possibilities, most householders with means were installing water-closets, sinks, boilers, and the ultimate luxury of bath tubs. As they connected new plumbing fixtures to city sewer lines for effortless waste removal, householders soon discovered plumbing's danger. Foul smells and sewer-gas entered the home through its plumbing connections and ultimately escaped from unsealed pipes and faulty fixtures to poison domestic air. Instead of protecting the health of homes by making waste removal easy

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[48] Catharine E. Beecher, *Miss Beecher's Housekeeper and Healthkeeper* (New York: Harper & Brothers, 1873), 145.

[49] Quote from Hoy, *Chasing Dirt*, 66. Apparently Waring realized there was more money to be made in water-closets. See James H. Cassedy, "The Flamboyant Colonel Waring: An Anti-Contagionist Holds the American Stage in the Age of Pasteur and Koch," *Bulletin of the History of Medicine* 36 (1962): 165; Ogle, 127-128.

and instantaneous, plumbing connected houses to the sewage of an entire city, making the home more susceptible to the infiltration of odors and illness.

Roger S. Tracy, a sanitary inspector in New York City, claimed that breathing concentrated sewer-gas would produce immediate unconsciousness and death, and that lower concentrations of sewer-gas caused nausea, vomiting, low fever and a "tedious convalescence."[50] This list of afflictions only grew; by 1893, sewer gas was blamed for, "small pox, scarlet fever, measles, malaria, diphtheria, typhoid, inflammations of the ear, eye, throat, etc., dyspepsia, diarrhoeal affections, coughs, colds, lung diseases, liver affections and skin troubles." [51] Tracy instructed women to recognize sewer-gas by its odor of rotten eggs, which indicated the presence of sulphide of ammonium and sulphuretted hydrogen. However, since Tracy thought sewer gases other constituents—carbureted hydrogen, nitrogen and carbonic acid—were odorless, he recommended taking control of the sense of smell with the peppermint test. The other reason for the peppermint test was to ensure that the smells came in through the pipes; odors in city homes could also emanate from rats decomposing in the walls or waft through walls from faulty plumbing in an adjoining house. While leaking or improperly sealed pipes were the most likely source of sewer gas, "the walls of buildings [were] full of channels and openings, through which offensive gases might be carried by currents of air, so as to emerge at a considerable distance from their origin."[52]

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[50] Roger S. Tracy, *Handbook of Sanitary Information for Householders* (New York: D. Appleton and Company, 1884), 13.
[51] Though John Shaw Billings no longer believed that sewer gas caused illnesses by 1893, he noted the many diseases for which sewer gas was commonly blamed. Billings, *Ventilation and Heating* (New York: The Engineering Record, 1893), 99.
[52] Tracy, 65.

The principle of the peppermint test was simple—introduce a distinctive odor into the pipes and then sniff around the home. Wherever one smelled peppermint, there was "an opening in some pipe, through which sewer-air may escape."[53] Whereas Tracy and other sanitary inspectors knew the danger of sewer gas and the necessity of testing for its presence in homes before illness struck, the vast majority who embraced household plumbing remained ignorant of sewer gas. Brooklyn's Moreau Morris, a doctor and sanitary engineer, warned the readers of *The Sanitarian*, a journal dedicated to issues of sanitation and the intersection of medical issues with the law, that "the slow insidious poison from these sources [defective drainage and sewerage], so gradually and imperceptibly infects the system, that it is oftentimes with the greatest difficulty that persons thus exposed can be aroused to a true sense of their danger."[54] Morris and other sanitary engineers launched a public education campaign in the pages of trade journals and the popular press to convince householders of the threat's existence and how to remain vigilant against an invisible nemesis. These lessons even took the form of verse: "Our drains! our drains! our foul, leaking drains! / They poison the air of our streets and our lanes, / … / How can we have health if the blood in our veins / Is poisoned by breathing foul air from drains?"[55]

Illustrations were even more explicit than rhymes. In 1875, a full-page illustration of the dangers of sewer gas appeared in *The Days' Doings*, Frank Leslie's penny paper better known for its licentious coverage of criminal, sporting and theatrical

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[53] Tracy, 64.
[54] Moreau Morris, "Defective Drainage—House Drainage," *The Sanitarian* 1, no. 7 (Oct 1873), 303.
[55] "Our Drains," *The Sanitarian* 4, no. 37 (Apr 1876), 180.

events than attention to sanitary issues [Figure 3.8].[56] In "The Death-Traps We Live In," a family sobbed over the body of their young daughter and a nurse administered medicine to an ill infant, oblivious to the sewer gas steadily and silently seeping into the bedroom from the corner sink. The home's extensive plumbing, which included a large bathtub in the adjoining room, conveyed death and despair on the family, rather than the desired convenience. The chief problem was a familiar one: a lack of ventilation. In this case, the sewer connection needed to be ventilated by continuing the waste pipe to the roof of the house, where sewer gases could escape to the harm of none but possibly a few birds. Without pipe ventilation, a foul air trap, the bend of pipe beneath drains was ineffective; sewer gases would build in pressure and find the nearest exit, sometimes bursting in flame from cracked pipes. Women might try to fill a basin with water to block the gases' pathway, but the overflow pipe offered easy ingress. Even in the finest homes, inattention to "the new style of waste pipe system" would result in pestilence and early graves.

The new style of waste pipes was the result of technological innovation: engineers ventilated sewers and drainage systems with air-inlet pipes, vent-pipes, and the extension of soil-pipes above the roof.[57] Sanitarians also devised traps, literally bends in the pipe that retained enough water to block the movement of sewer air [Figure 3.9]. These innovations were often marketed as "stench traps" to address consumers' desires for indoor toilets without the smell of the outhouse. Water seals were an improvement over straight pipes, but an imperfect solution since evaporation, back-pressure and siphonage

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[56] Joshua Brown, "The Days' Doings: The Gilded Age in the Profane Pictorial Press," *Joshua Brown*, http://www.joshbrownnyc.com/daysdoings/index.htm; "The Death Traps We Live In," *The Days' Doings* (November 27, 1875), pg. 8.

[57] "Soil-pipes" were the direct connection that carried wastes into the sewer, so named because nineteenth-century Americans referred to human excrement as "night-soil."

could break the seal and leave the home vulnerable. Pan closets, and incomplete flushing added to the dangers of plumbing, as both retained rather than expelled wastes from the home. Excrement that clung to the sides and corners of pan closets, a type of toilet flushed not by water but gravity as the user raised the pan to slide wastes into the soil pipe, released the noxious effluvia of human waste into living and sleeping rooms. Furthermore, leaking drains spilled foul water and wastes into the ground beneath the home. In winter months, fires and furnaces created strong upward drafts of ground air thus tainted.

In 1883, Charles F. Wingate, the editor of *Plumber and Sanitary Engineer*, echoed the sentiments of the illustration for the wide audience of *North American Review*. [58] Wingate wrote after the death of Prince Albert, using the discovery that Albert's study seat had been located directly above a cesspool, "whose emanations were undoubtedly the cause of his disease," to frighten wealthy Americans into evaluating the safety of their own domestic sanitary arrangements. In Murray Hill, where some of New York's wealthier residents made their homes in "palatial residences," the houses crowded so close together that sunshine rarely entered. Fresh air was also absent from these homes, since "careful housekeeper[s]" shut the windows tightly against the smells of stables, factories, and the stink of Hunter's Point.[59] In excluding the city's stenches, women shut their families in with poorly ventilated air of the furnace register, made worse by the odors of kitchen, laundry and faulty plumbing. The air of the mansion was

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[58] Charles F. Wingate, "The Unsanitary Homes of the Rich," *The North American Review* 137, no. 121 (Aug. 1883): 172-184.
[59] Wingate, 174.

just as bad as that of the overcrowded tenement. Wingate concluded that, "our people are starving for the want of fresh air," and "ventilation is decidedly one of the lost arts."[60]

Ventilation hadn't been lost exactly, but domestic guides had not kept pace with the rapid changes in household technologies. To address this imbalance, Boston's Harriette Plunkett wrote *Women, Plumbers and Doctors* in 1885. Plunkett included copious illustrations of ominous arrows emanating from plumbing fixtures to show her readers how dramatically their drains changed the air of their homes [Figure 3.10].[61] Foul air entered through every crack and fissure, swirling around rooms and finding its only exit through the chimney, as all the windows were tightly closed. Most of the sewer gas then remained, vitiating the air before the family could even inhale. Only a perfectly plumbed home [Figure 3.11] with a full system of traps and ventilating pipes controlled and contained air currents, safely conducting sewer gases out of the house rather than poisoning domestic air. The same women who had carefully studied Beecher's instructions for ventilating rooms with stoves now turned to Plunkett's manual for lessons detecting and controlling the air currents created by plumbing.

Like Beecher before her, Plunkett synthesized the writings of leading voices on home sanitation and repackaged their ideas for a female audience. Plunkett noted that the newest domestic advice of the 1880s focused almost exclusively on cooking methods, as women adapted their recipes to new cook stoves.[62] Plunkett left the important subject of wholesome and appetizing food to these other writers, focusing instead on "the less

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[60] Wingate, 175, 184.
[61] Mrs. H.M. Plunkett, *Women, Plumbers, and Doctors, or Household Sanitation* (New York: D. Appleton and Company, 1885), 123.
[62] On changes in cooking and cooking technology, see, Ruth Schwartz Cohen, *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave* (New York: Basic Books, 1983), esp. 53-62.

obvious but equally important topics of pure air and pure water."[63] In exploring these issues, Plunkett directed women to reexamine their entire homes, from the trees in the yard to the soil beneath their basements and the air entering attic windows. This was especially important in cities, where houses often changed hands, obscuring the blunders of previous owners, and sewers linked buildings of various degrees of healthfulness over a large geography. Plunkett instructed her readers that, though improving sewer systems was the province of voting men and city governments, women had complete control of and responsibility for the home—and Plunkett defined the home widely: "her 'sphere' begins where the service-pipe for water and the house-drain enter the street-mains, and, as far as sanitary plumbing goes, it ends at the top of the highest ventilating pipe above the roof."[64]

Between the street-main connections and the highest ventilating pipe there were numerous spaces that demanded women's attention lest they infect the air. Plunkett moved methodically through the house, from cellar floor to attic roof, teaching women to look for openings, vents, cracks, and construction defects that made the home permeable, and constantly reminding women of the importance of fresh air. The goal was not to seal the home off entirely, as that would violate principles of ventilation, but to control the home's permeability and thus the family's health. In the cellar, a floor of Trinidad asphalt, "as impervious as glass," would offset the risks of wet soil and ground air loaded with carbonic acid that were the bane of cellar apartments everywhere.[65] A safe basement was important to the entire house, as public health authorities and doctors

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[63] Plunkett, 16.
[64] *Ibid*., 94.
[65] Plunkett, 27.

believed that buildings acted as bell jars, retaining the gases exhaled from the ground below them. To make this point, Plunkett used the example of a family who abandoned their $40,000 home on Fifth Avenue because of recurrent bouts of illness that killed two children. The new owner discovered the home's fault in the cellar, where a sickening stench emanated from a heap of discarded turnips, mildewed sponges and decaying wood. The previous mistress had never been in the cellar, leaving the nether regions of the house to her servants, and this was her fatal mistake. Plunkett noted that this fashionable woman, "never drank a glass of water without holding it up to the light to detect visible impurities. It never occurred to her to investigate the vital air she was hourly breathing."[66]

Even if she never entered the cellar, the fashionable Fifth Avenue wife must have smelt the foul air emanating therefrom. Her familiarity with the smell kept her from thinking it dangerous or investigating its source. Many bad odors were commonplace and thus escaped notice, their offensiveness having been overcome by habituation.[67] Yet the danger of these smells remained. As Celia Haynes explained, "If we ignore Nature, and submit ourselves to foul air until our sense is dulled, that does not save us from the consequences. Many a case of malaria owes its origin to a filthy cellar."[68] Individuals needed to train their noses to recognize unhealthy odors, so that they might use "the nose as a sanitary agent," as sanitarian Charles H. Brigham recommended in the pages of

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[66] Plunkett, 41.
[67] David S. Barnes has written about the variability of disgust, explaining, "this emotion has been historically variable in its manifestations," and that disgust is "both natural and manmade, instinctual and learned." See Barnes, "Confronting Sensory Crisis in the Great Stinks of London and Paris," in William A. Cohen and Ryan Johnson, eds., *Filth: Dirt, Disgust and Modern Life* (Minneapolis: University of Minnesota Press, 2005): 103-129.
[68] Haynes, *Happy Home Health Guide*, 150.

*Herald of Health*.[69] Brigham argued that the nose "warned of danger as effectually as a watch-dog, or as an alarm-bell," and summed up the nose's sanitary importance with three simple rules: "It is a safe rule to follow, never to eat anything that has an unpleasant smell, never to wear any thing that offends this sense, never to live in a place where this sense is vexed and irritated."[70]

Noses could only object to the bad smells of food, clothes and homes if people trained themselves to recognize rather than ignore dangerous odors. Therefore, domestic advice authors launched an olfactory reeducation campaign. Beecher began this work with gentle reminders about the offensiveness of everyday smells: "Fish and cabbages, in a cellar, are apt to scent a house."[71] In *House and Home Papers*, Stowe explained how the "effluvia of vegetable substances" infused cream in storage, and tainted butter with the flavors of cabbage and turnip.[72] Plunkett contributed with her explanation of how to banish the cellar's dangerous vapors. Christine Terhune Herrick, a frequent author on domestic issues and daughter of the popular author Marion Harland, chastised women for assuming that "the unwholesome and unpleasant odor that rises like a cloud whenever the cellar-door is opened" was natural to underground rooms.[73] Instead, Herrick argued, the accumulation of rubbish that had been discarded in a place of poor drainage created the odor associated with cellars. Rather than enduring this musty smell, women should recognize that the cellar's emanations caused "slight but persistent unhealthiness in the family" and labor to keep the space below ground as clean and airy as the rooms above.[74]

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[69] Charles H. Brigham, "Take Care of Your Noses," *Herald of Health* 15, no. 3 (Mar 1870), 114.
[70] *Ibid.*, 116.
[71] Beecher, *Treatise,* 322.
[72] Stowe, *House and Home Papers* (Boston: Ticknor and Fields, 1865), 243.
[73] Christine Terhune Herrick, *Housekeeping Made Easy* (New York: Harper & Brothers, 1888), 165-166.
[74] Herrick, 166.

Attention to plumbing materials would help protect the airiness of rooms above ground and contain the odors that might vex and irritate the sanitary nose. Plunkett cited the recommendations of William Paul Gerhard, Waring's friend and protégé, for pipes of iron or other "strong, hard, well-burnt, vitrified" materials instead of brick and wood.[75] Like the cellar floor, these pipes should be impervious both to moisture and to gas. Lead, though easily pliable for bends and traps, was not strong enough for household plumbing; Gerhard recalled tracing the smell of sewer-gas "to a picture-nail driven into a lead vent-pipe concealed behind the plaster of a room."[76] This error might have been avoided if the mistress of the house had kept a map of the piping, one of Plunkett's key recommendations. Gerhard, less concerned with ornamentation than Plunkett, preferred visible and easily accessible plumbing to a mere map. Where pipes were visible, one would not accidently nail through the plumbing, and defects could be quickly ascertained and fixed.

Plunkett and Gerhard disagreed about more than just the visibility of pipes; they also differed on the subject of germ theory. Plunkett and Gerhard wrote about sewer gas when germ theory was first gaining acceptance in the United States, but the idea of germs did little to change their beliefs about the dangers of sewer gas. [77] Gerhard cited recent work of assistants to Bavarian chemist and hygienist Max Joseph von Pettenkofer that argued the exclusion of odors was only necessary for comfort, not for health. Gerhard, not yet convinced of the germ theory's veracity, argued instead, "as long as there are

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[75] William Paul Gerhard, *House Drainage and Sanitary Plumbing*, 2nd ed., rev. (New York: D. Van Nostrand, 1884), 21.
[76] Gerhard, 65.
[77] Tomes, esp. Part I,; Perry G. An, "Constructing and Dismantling Frameworks of Disease Etiology: The Rise and Fall of Sewer Gas in America, 1870-1910," *Yale Journal of Biology and Medicine* 77 (2004), 75-100.

doubts as to the causes of infectious disease, it is wise to err on the side of safety."[78] Rather than debate the infectiousness of sewer gas, Gerhard accepted lay knowledge about smells and urged his readers to prevent the contamination of domestic air by foul gases. Plunkett was more open to the idea of germ theory than Gerhard, but she folded new ideas about germs as the seeds of disease into older beliefs about miasmas as the source of illness. Consequently, she urged the same course of action as Gerhard, taking preventive measures to exclude sewer gases and all other foul odors from the home. Though Plunkett worried about germs where Beecher had feared miasma, Plunkett's recommendations for a healthy home echoed Beecher's in emphasizing the inclusion of fresh air and exclusion of foul smells.

With their attention to foul smells and air currents, women learned and honed a set of practices for maintaining healthy homes and families, even in the midst of city stenches. Women recorded and shared these household practices with each other in advice manuals and magazines, entering the public sphere of print culture and making their domestic labor intelligible to doctors, chemists and sanitarians. These men, who were struggling to establish their fields as professions, did not always applaud women's practices. Unlike the student of sanitary science who thought disinfectants worked by encouraging the lay practice of opening windows and admitting fresh air, professional sanitarians argued that disinfectants worked through chemical reactions that neutralized or eliminated potential sources of disease. Not surprisingly, the use of flowers and distilled fragrances, while effective, had their detractors.

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[78] Gerhard, 17.

In 1858, *Popular Science* founder Edward Livingston Youmans criticized the use of "palliatives and disguisers" instead of disinfectants: "When atmospheric impurities report themselves to the olfactory sense, they are pretty sure to receive attention, though we too often seek only relief from the disagreeable smell. This is done, not be removing it, but by smothering or overpowering it with sweet scents."[79] Youmans worried that by masking foul, unhealthy odors with the strong but pleasant smells of musk, attar of roses, fragrant spices and aromatic vinegars, people tricked their noses—their biological sanitary agent—into thinking the air was pure and healthy.

Rather than overpowering bad odors with sweet ones, Youmans advocated "cleansing the air" by "*removing* rather than concealing or destroying the offensive bodies."[80] Beecher's tacit condemnation of keeping fish and cabbage in the cellar was one way to remove an offense, to which Youmans added a list of disinfectants that "destroy evil odors and injurious gases."[81] Freshly burned lime, or quicklime, purified the air by attracting and removing carbonic acid, the danger in vitiated air. Chlorine gas cleansed and disinfected the air by attracting, decomposing and destroying hydrogen compounds, "the gaseous poisons of the air," and sulphurous acid had a similar effect.[82] But both chlorine and sulphur were noxious--chlorine irritated and inflamed one's nose and throat, and sulphur had a "noxious odor…injurious to health" so the use of either disinfectant required the evacuation of the apartment being cleansed. Better still was chloride of lime, which was lime charged with chlorine gas and had the cleansing powers

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[79] Edward L. Youmans, *The Hand-Book of Household Science: A Popular Account of Heat, Light, Air, Ailment, and Cleansing, in Their Scientific Principles and Domestic Applications* (New York: D. Appleton & Co., 1858), 436.
[80] Ibid.
[81] Ibid, 437.
[82] Ibid, 437.

of both these agents, removing carbonic acid and decomposing "noxious compounds of hydrogen."[83] Youmans directed his readers in the liberal use of chloride of lime: "It may be dissolved in water and sprinkled through bad smelling apartments, or cloths dipped in a diluted solution of it can be hung up in the room. After infectious diseases, a weak solution of chloride of lime should be sprinkled over sheets and family linen before washing, and the walls of the room washed down with it."[84]

Beecher did not discuss disinfectants in her 1843 *Treatise*, though lime was a primary ingredient in her recipes for both lye soap and whitewash. In 1869, the Beecher sisters addressed the issue of disinfectants and augmented Youmans instructions for the household use of disinfectants with alternative uses. Many of the same chemicals that cleansed the air could be used to remove vermin from the home. For instance, chloride of lime and water killed rats, mice and cockroaches.[85] But the disinfectants were not a cure-all, and they carried dangers of their own. In their discussions of these chemicals, the Beechers included a warning that Youmans neglected: "great care should be taken to guard against [the disinfectants] getting into any article of food or utensil or vessel used for cooking or keeping food, or where children can get at them." The same substances that cleansed the air and created a healthy atmosphere were also poisons that would cause sickness and death if used improperly.

*Scientific American* also commented on the issues of scenting, deodorizing, and ventilating in 1869 with a keen awareness of both the benefits and dangers of chemical disinfectants, especially in the sick room. Of all the rooms in the house, the sick room

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[83] Ibid, 437-8.
[84] Ibid, 438.
[85] Beecher and Stowe, *American Woman's Home*, 377-78.

was most in need of fresh air for its ill inhabitant: "What he desires is pure air: the life-giving oxygen."[86] The importance of fresh air to healing was a lesson hard learned during the Civil War, when the patients of open-air and tent hospitals recovered more quickly and completely than fellow soldiers in hospital buildings.[87] Sick rooms had more in common with hospital buildings than tents, however, and using ventilating techniques to bring fresh air into the room without drafts was too slow a process in the constant presence of a body that released the noxious of effluvia of sickness with every breath and from every pore. *Scientific American* commented on new disinfectants such as carbolic acid, recently "recommended for 'killing' the offense of human excreta and the other offenses of the sick room," that were effective but smelled abhorrently: "the sense of smell instinctively revolts at it."[88] This 'scientific' article recommended a compromise between fresh air and foul chemical odors with the use of roasting coffee, which gave off an agreeable aroma to deodorize the air of the sick room, but concluded that no scent or deodorant compared with "the comfort of pure air."[89]

Because of the dangers of chemical disinfectants, and the tried-and-true success of using fresh air and fragrances in the home, discussions of these two air freshening techniques developed in different venues and intersected sporadically. The enthusiasm for the disinfecting possibilities promised by ozone offers an excellent example of how rarely professional and domestic conversations intersected. Following German chemist Christian Friedrich Schönbein's 1839 discovery of ozone, a form of oxygen consisting of three atoms instead of the usual two, chemists and doctors fixated on the presence of this

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[86] "Scenting, Deodorizing, and Ventilating," *Scientific American* 20, no. 12 (20 Mar 1869), 186.
[87] On the Civil War, sanitation, and the diffusion of health knowledge among women, see Hoy, *Chasing Dirt*, esp. ch. 2.
[88] "Scenting, Deodorizing, and Ventilating."
[89] *Ibid.*

gas and its connection to health.[90] Atmospheric measurements revealed that ozone was abundant in the countryside, at the seashore and higher elevations—places that people sought for good air—and lacking in cities. The inverse correlation between ozone levels and epidemic disease led many to conclude that ozone, an oxidizing agent, was the active ingredient in fresh air that removed odors and purified air: "By virtue of its extraordinary affinity for the products of decomposition it undoubtedly purifies the air of localities in which it abounds by destroying noxious gases and by oxidizing decomposing organic substances."[91]

Doctors and public health officials soon recommended the use of ozone in a wide variety of contexts. In 1878, Nashville doctor J.D. Plunket recommended stringing interrupted wire through sewers, connected to a battery or engine that would provide the spark to produce ozone. Ozone thus generated would "antagonize and render harmless the hydra-headed monster, sewer-gas."[92] In the *Encyclopedia of Health and Home*, Isaac N. Reed gave instructions on how to mix permanganate of potash and sulphuric acid to generate ozone in the sick room. Reed recommended the constant presence of ozone for the "invigorating quality…imparted to the atmosphere of the room," especially when the

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[90] Peter Thornsheim, *Inventing Pollution: Coal, Smoke and Culture in Britain since 1800* (Athens, OH: Ohio University Press, 2006), 22-25; Mordecai B. Rubin, "The History of Ozone: The Schönbein Period, 1839-1868," *Bulletin for the History of Chemistry* 26, no. 1 (2001), 40-56; Rubin, "The History of Ozone: II. 1869-1899," *Bulletin for the History of Chemistry* 27, no. 2 (2002), 81-106.

[91] Editorial Insertion, G.L.A. to George L. Andrew, M.D., "the Sanitary Value of Forests," *Public Health Papers and Reports* 4 (1880), 34, n. 2. For a contemporary evaluation of the relationship between ozone and illness, see L.H.S., Review of *Ozone, or Chemical, Meteorological, Physiological, and Medical Researches into the Nature of Electrized Oxygen*, by H. Scoutetten, *American Medical Monthly* 9 (1858), 200-216.

[92] J.D. Plunket, M.D., "Disinfection of Sewers by Ozone," *Public Health Papers and Reports* 4 (1880), 298.

room could not be open to fresh air.[93] Inventors addressed the lack of ozone in city homes by patenting their own ozone generators and advertising them for household use [Figures 3.12, 3.13, and 3.14]. Advertisements for domestic ozone generators repeatedly stressed the same qualities: that ozone was healthful, would destroy both odors and germs, and create the healthy air of seashore or mountaintop in the home. In Chicago, public health pioneer John H. Rauch went so far as to found The American Ozone Company with the motto "Health is Wealth." The goal of this venture was to create and manufacture ozone generators for use in coal-mines, hospitals, quarantines, public buildings, and private dwellings.

Despite the proliferation of ideas about and uses for ozone among sanitarians and chemists, women seldom mentioned ozone and its health-conveying properties. In the few discussions of ozone among women, authors preferred natural ozone to its artificial generation by electricity or chemical combination. In 1884, *Ladies' Floral Cabinet* recounted recent ozone experiments that scientifically validated women's knowledge about the healthfulness of fragrant plants. In Philadelphia, a Dr. Andrews, "has shown that plants in sleeping or sick-rooms fulfill two functions, namely: that of the generation of ozone and exhalation of vapor, by which the atmosphere of the room is kept in a healthful condition of humidity."[94] In Italy, Professor Mantegazza "discovered that ozone is generated in immense quantities by all plants and flowers possessing green leaves and aromatic odors."[95] Consequently, Mantegazza recommended the same fragrant plants that women had long been planting in their windows: hyacinths,

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[93] I.N. Reed, ed., *Encyclopedia of Health and Home: A Domestic Guide to Health, Wealth and Happiness; Thorough and Exhaustive and Adapted to the Easy Apprehension of All Classes,* (New York and St. Louis: I.N. Reed & Co., 1880), 260.
[94] "Sanitary Value of Plants," *Ladies' Floral Cabinet* 13, no. 10 (Oct 1884), 327.
[95] *Ibid*.

mignonette and heliotrope. In 1895, *Ladies' World* briefly mentioned ozone in its "Health Notes" when reminded readers to air their bedding and clothes as often as possible: "Try it every day, and don't forget that the mattresses and the feather beds, bolsters and pillows will part with their peculiar body odors, and bring in an abundance of oxygen and vivifying ozone, if you will only hang them out of the window for a couple of hours in windy weather every few days."[96] In lay practice, ozone became part of fresh air, but not its defining quality or a necessity for health within the home.

"Airing" rooms, bedding and clothing remained an important practice for women in cleaning their homes of scents and germs, and many closely associated the practice with disinfection. As a frequent contributor to *Good Housekeeping*, Christine Terhune Herrick gave specific and detailed directions on how to cleanse the house of odors, relying both on airing and on disinfectants. According to Herrick, "the odor of stale breakfasts and dinners is extremely de-appetizing," and could be avoided by daily airings of the dining room following each meal.[97] Herrick also advocated airing out clothes before hanging them in the closet, and airing the closet itself by removing all the clothes and leaving both closet door and the room's windows wide open for hours. All bedding, from coverlet to the mattress itself, should be hung in the open air to release the effluvia absorbed from resting bodies. Though Herrick recommended airing for every room and nearly every article in the household, she directed women to use disinfectants in one place only, the drains.

Plumbing made disinfectants ever more useful, as chemicals such as copperas and lime could scour surfaces inside pipes that women could not reach with their cleaning

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[96] "Health Notes," *The Ladies' World* 16, no. 2 (Dec 1895), 13.
[97] Herrick, 224.

implements. Elsewhere in the house, women preferred the natural disinfectant power of fresh air and sunshine, as did many medical men. In debates over disinfectants at the American Public Health Association, cautionary voices spoke out against an over-reliance upon chemical disinfectants. In his vision of "The Yellow Fever Quarantine of the Future," Augusta doctor Henry Fraser Campbell insisted that fresh air would remain a central and important agent for health:

> Freezing, steaming, and the diffusion of atomized chemical *germicides*, have caused us greatly to forget the trust we so long have given to *thorough ventilation* in *fresh and healthy air* as a disinfectant, not only in the case of germs, but even where the virus of the most contagious diseases was to be combated. What other disinfectant do we practically now depend upon for the protection of families, when, as physicians, we go from the bedside of scarlatina, of diphtheria, and measles, but the *airing* of our clothes in passing from house to house? And it is known how seldom medical men carry infection in their daily rounds of attendance. This, we can all remember, must have been the great disinfectant which, in the slow-going days of stages and coaches, and private travel, so purified the refugee from all atmospheric propagating germs…[98]

Writers of domestic advice took note that medical men still celebrated fresh air, even in the face of germ theory, and cited this fact in support of traditional housekeeping methods. Celia Haynes inverted the logic that Youmans had used against housewives when she commented, "Many of the wisest sanitarians are in doubt as to whether disinfectants are really not of more harm than service to the world. They must not be used as a cloak for dust, dirt and neglect; they will not take the place of fresh air, sunlight, soap suds and the dusting brush."[99] Disinfectants were wonderfully useful for cleaning troublesome drains, but the rest of the house benefitted more from fresh air.

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[98] *Emphasis in original*. Henry Fraser Campbell, "The Yellow Fever Quarantine of the Future, Based Upon the Portability of Atmospheric Germs, and the Non-Contagiousness of the Disease," in American Public Health Association, *Public Health Papers and Reports* 5 (1879), 143.
[99] Haynes, *Happy Home Health Guide*, 147.

Though women's domestic practices and men's professional opinions often were at odds on the subject of disinfectants, there were moments when the two came together, as in sachets that disinfected as well as fragranced the air. In 1896, *The Ladies' World* published an enthusiastic account of "a delightful method of disinfecting sick rooms" that was practiced abroad, consisting of "special sachets capable of diffusing certain perfumes that are disinfective."[100] When moistened, the sachets released carbonic acid gas and an odor, "saturating [the room] with a fragrant medium that disinfects the air."[101] These sachets, which contained "oxalosaccharic acid" and "dry bicarbonate of soda" as well as perfume, satisfied both scientific ideas of disinfection and domestic methods of improving the air.

Throughout the debates about fragrance and disinfection, and through the changes wrought by new technologies, the necessity for fresh air within homes remained a constant about which everyone agreed. The need for fresh air in urban homes created many paradoxes, not the least of which was the question of tobacco smoke. Women learned and practiced new methods for controlling household technologies, but patrolling the air also required controlling the activities of the members of the household. While women could move washday outside and carefully tend to the dishes they cooked in order to reduce possible odors, controlling their husbands' activities was not so simple. Unlike other knowledge conflicts over household management, which divided along lay/professional lines, the question of tobacco was a gendered disagreement that percolated through American culture.

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[100] "Health Notes," *The Ladies' World* 17, no. 8 (Aug 1896), 11.
[101] *Ibid.*

When Barry Gray, a fictionalized newlywed in the 1850s, thought about the changes marriage had brought to his life, he pondered a lengthy list of improvements. His only complaint was the loss of "sundry habits" which Mrs. Gray expected him to lay aside, such as smoking after dinner or in the parlor during the evening—habits that had been perfectly acceptable in his boarding-house. When Mrs. Gray visited her mother out of town, Mr. Gray took advantage of his momentary freedom and invited over his bachelor friends. After a celebrating George Washington's birthday with food, ale and tobacco, Mr. Gray "expended several dollars in the purchase of fumigating powders; and for thirteen hours prior to my wife's return, had distributed them liberally through the house." Mr. Gray smelled every scent but that of his pipe; his wife detected the odor of tobacco as soon as she opened the door. After the confrontation that inevitably ensued, Barry Gray concluded that, "Mrs. G.'s sense of smell is altogether too acute."[102]

Those who read about the Grays' marital discord recognized several elements: the man's love of tobacco, the woman's sensitive nose, and the failure of fumigants to cleanse the air. If Mr. Gray wanted to trick his wife's nose, the sanitary agent that patrolled the air of their home, he should have turned to fresh air rather than fumigating powders. According to Christine Terhune Herrick, whose husband also enjoyed cigar and pipe, the same airings that eliminated odors from closet and dining room were equally effective against smoke: "when a room is thoroughly aired every day, and the curtains are well shaken, there is very little trouble from stale tobacco smoke."[103]

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[102] Barry Gray, *My Married Life at Hillside* (New York: Hurd and Houghton, 1865), 9. Barry Gray is the pseudonym of Robert Barry Cofflin, the author of many books and poems in the 1800s. Cofflin first published his humorous account of marriage in serial form in *Home Journal* during 1855 and 1856.

Because daily airings removed the objectionable smell of tobacco smoke, Herrick's husband did not have to go to the same lengths as Barry Gray.

Herrick seems to have been in the minority with this opinion. The disagreement between husbands and wife over smoking was a frequently cited and highly gendered conflict in the late nineteenth century.[104] As better ventilation systems conveyed air from room to room, they also dispersed the odors of tobacco smoke throughout the home, and made it ever more difficult for women to banish the odor of tobacco smoke from their homes. Women described tobacco as "foul-smelling," "fetid," "sickening" and "offensive."[105] Though some anti-tobacco agitators talked about addiction and the dangers of nicotine, most women objected to smoking because of the scent it produced. Women defined tobacco smoke as sickening for the same reasons that they had shunned rotten vegetables and excrement: it stunk and the odor lingered.

Women's objection to tobacco smoke appeared in the pages of etiquette manuals for gentlemen. These guides to appropriate behavior made the female objection to smelly cigars and pipes the governing norm, urging men to curb their affection for tobacco in public places and especially in the presence of women out of regard for women's delicate constitutions. In 1844, Charles William Day advised men to "smoke where it is least likely to prove personally offensive by making your clothes smell; then wash your mouth, and brush your teeth."[106] Day condemned smoking not only because it offended women,

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[104] On the gendered dimension of smoking culture in nineteenth-century Canada, see Jarett Rudy, *The Freedom to Smoke: Tobacco Consumption and Identity* (Montreal: McGill-Queen's University Press, 2005).

[105] Haynes, 282; Beecher and Stowe, 344; Meta Lander, *The Tobacco Problem* (Boston: Cupples, Upham and Company, 1886), 26, 128, 136.

[106] Charles William Day, *Hints on Etiquette and the Usages of Society, with a Glance at Bad Habits* (Boston: William D. Ticknor & Co., 1844), 53.

but also because it "contaminat[ed] the pure and fragrant air."[107] *Beadle's Dime Book of Practical Etiquette* similarly cautioned men against smoking, either in the direct presence of women or when likely to join their company, as "There are few well bred women to whom tobacco is not extremely offensive."[108] In *American Etiquette and Rules of Politeness*, Walter Houghton and his associates (which included Mrs. Houghton), stated Mrs. Gray's preferences clearly: "A gentleman should not smoke in the presence of ladies, even though they have given permission, nor should he smoke in a room which ladies are in the habit of frequenting."[109] For the same reasons that polite Americans shunned onions as imparting an offensive smell to the body, etiquette instructed men to avoid smoking tobacco.[110] Onions and tobacco often appeared in the same sentences.

Etiquette guides, like domestic advice manuals, reflect the ideal more than the actual conventions of the nineteenth century. Etiquette guides deferred to female sensibilities, but men were not always so considerate. Just as often as men bowed to their wives' demands or, like Mr. Gray, tried to cover their misdeeds, men asserted their prerogative to smoke. A light-hearted anecdote in *Ladies' Floral Cabinet* quoted a young man who thought that immediate action was the best way to head off friction: "I would light a cigar in the carriage after the wedding breakfast, and settle the smoking question forever." His female companion retorted, "I would knock the cigar out of your mouth."[111]

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[107] *Ibid*., 54.
[108] A Committee of Three, *Beadle's Dime Book of Practical Etiquette for Ladies and Gentlemen* (New York: Irwin P. Beadle & Co., 1859), 43.
[109] Walter R. Houghton, James K. Beck, James A. Woodburn, Horace R. Hoffman, A.B. Philpott, and Mrs. W.R. Houghton, *American Etiquette and Rules of Politeness,* 21st ed. (Chicago: Rand, McNally & Company, 1889), 213.
[110] Chewing tobacco—which involved frequent spitting—was an even worse breach of etiquette than smoking and drew a range of approbations and directions for improved manners. See John F. Kasson, *Rudeness & Civility: Manners in Nineteenth-Century Urban America* (New York: Hill and Wang, 1996), 125-126.
[111] "Newspaper Waifs," *Ladies' Floral Cabinet* 3:4 (Apr 1884), 134.

Smoking got in the way of this romance, and it threatened many others. At the hands of concerned satirists, the marital disagreement over smoking could become an all-out battle between the sexes like the one depicted in *The Daily Graphic* in 1873 [Figure 3.15].

In the upper left corner, Maria's beau lounges nonchalantly with his friend at the smoking club and the pair exhale billows of smoke into the air with not a care in the world. Maria languishes forgotten in the upper right corner, all dressed and ready to go out in public. Maria strongly suspects that cigars and male companionship of "that horrid 'Smoker's Club'" detained her suitor. Frustration with the habits of male smoking and female scorn forms the subtext for Maria's plight, and the metatext for the battle scene at the bottom of the illustration. Here, men and women square off in Central Park, armed with cannons made of oversized cigars and smelling bottles. The men, rallying under the banner "We love our cigars and our sweethearts one at a time," deliberately blast the lines of women with tobacco smoke. Women retaliate by turning to their smelling bottle cannon that, unlike the cigar, is aimed towards themselves for olfactory relief. The woman who inhales from the smelling bottle seems unaffected by the battle, but the unprotected woman on the wrong side of the smelling bottle has fallen to the ground as a victim of the smoke—a direct reference to the effect that the offensive smells had on the weaker bodies of women. Without the protection of sweet fragrances or access to fresh air, women could not physically tolerate tobacco smoke.

As the central image of "The Smoking Question" makes clear, women's attempts to restrict smoking in public spaces such as Central Park Garden transformed the common gender and marital disagreement over the smell of tobacco from a domestic issue into the public forum of the graphic press. In leisure spaces such as these, men and

women mingled together without the controls and safeguards of the regulated domestic environment. Men preferred to smoke but women, without by the olfactory protections that they carefully constructed in their homes, protested men's right to do so. In the illustration, angry women arm themselves with furnace bellows, open umbrellas, and pinched noses as makeshift defenses to keep the tobacco smoke at bay. In reality, women were vocal about their displeasure, both in person and in print, and sought to curb smoking in public. The offensive smell of smoke and women's culturally established authority over the definition of smells as healthy or bad, gave women a platform for speaking out and controlling air beyond the home.

Women spoke out about the air of leisure spaces, and also of publicly shared amenities, such as omnibuses, streetcars, trains and ferries, where women were a frequent presence. In 1887, Anna Garlin Spencer catalogued the struggles of an urban woman to breathe fresh air—even when vacationing outside the city for that purpose—because of the prevalence of cigars and pipes. "The Rights of Those Who Dislike Tobacco," followed "a woman, not overstrong, and tired with a year's hard work" on her way to the healthful air of the seashore. On the train, this woman finds herself too close to the partitioned smokers' apartment for comfort, but luckily is able to change her seat—a solution that only works until her companion in the new seat returns from the smoking apartment, "his clothing and person…saturated with old and new flavors of the weed."[112] He hangs his tobacco-scented coat in front of the ventilator which the woman had opened for fresh air, and thus contaminates all of the air available for the woman's inhalation. Similar assaults continue during the long train ride, and the total absence of fresh and

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[112] Anna Garlin Spencer, "The Rights of Those who Dislike Tobacco," *The Open Court, A Quarterly Magazine* 1:3 (17 Mar 1887), 60.

pure air leaves the woman with "an aching head and rebellious stomach." The train station, with its separate waiting rooms for gentlemen and ladies, offers little relief, for the partition between the two spaces does not restrict the wafting of smoke. Aboard a ferry, the aggrieved woman finds "nature's bounty of healing" in the fresh breeze over the open water—until a man at the railing "puffs and puffs his column of airy contamination right into the sea breezes which were so full of healing for body and mind but a minute before."[113] The woman, thoroughly agitated that tobacco again infects the available fresh air, learns that her only option for relief is to go into the saloon and out of the open air, the same option that she again receives when she meets more smokers on the veranda of her hotel.

Garlin's voice emerged from the story of the afflicted woman's fruitless search for fresh air to question, "the right of the smoker to render the air of cars, steamboats, public coaches, hotels and boarding-houses, and all other places where he elects to be, disagreeable and often sickening."[114] Garlin compared the smoker to unclean neighbors who kept decaying garbage about their city houses. In both cases, the habits of one polluted the air for many. When a neighbor's smells entered her home, Garlin could complain to the sanitary authorities, who would fine the neighbor and remove the source of the stench. Women had no such redress against smokers in public. In a strident tone, Garlin argued that this situation, where the rights of the smoker overcame the rights of the non-smoker to fresh air, must be reversed. Tellingly, Garlin made this public argument on the grounds of eliminating smells and protecting health—grounds that had

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[113] *Ibid.*, 60-61.
[114] *Ibid*., 61.

long been acceptable for female commentary because they were female and domestic concerns.

Moves like Garlin's anti-tobacco agitation built upon women's knowledge of odors and health, and applied that knowledge to spaces beyond the home. Women's experiences with domestic odor control and the technologies that changed air movement allowed them to speak knowledgably against environmental ills that threatened their homes and their bodies. By the end of the nineteenth century, women tried to overcome the paradoxes of having fresh air in urban homes by moving beyond the home's boundaries, professionalizing the ordinary duties of the housewife and engaging scientific knowledge with practical experience of the mundane in campaigns for municipal housekeeping.[115] Smoking in public spaces was merely one issue against which women effectively argued as a dangerous odor. Garlin, like Catherine Beecher before her and Ellen Swallow Richards shortly after her, carefully chose her words and examples from those areas of knowledge that culturally belonged to women as part of the domestic realm.

The practices of women around odors and fresh air remained important in the domestic sphere even as some women used these practices to claim an actively public role. Throughout the nineteenth century, women's concern for the home and health made them attentive to smells both good and bad, and led them in developing a range of

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[115] Suellen Hoy, "Municipal Housekeeping: The Role of Women in Improving Urban Sanitation Practices, 1880-1917," in Martin V. Melosi, ed., *Pollution and Reform in American Cities, 1870-1930* (Austin: University of Texas Press, 1980), 173-198; Maureen Flanagan, "The City Profitable, The City Livable: Environmental Policy, Gender and Power in Chicago during the 1910s," *Journal of Urban History* 22, no. 2 (Jan. 1996), 163-190; Daphne Spain, *How Women Saved the City* (Minneapolis: University of Minnesota Press, 2001). Women's voices were so prominent in municipal housekeeping and environmental reform at the turn of the century that they threatened the masculinity of men who supported the same causes. See Adam Rome, "'Political Hermaphrodites': Gender and Environmental Reform in Progressive America," *Journal of Environmental History* 11, no. 3 (Jul. 2006), 440-463.

practices effective against local air impurities. Whether by planting fragrant flowers or airing rooms, women used scents and fresh air to protect the family's health and differentiate the home from the wider world. In their traditional roles as caretakers of home and family, women created and disseminated practical knowledge for ensuring health in dangerous urban environments by understanding and controlling the boundedness and permeability of the home.

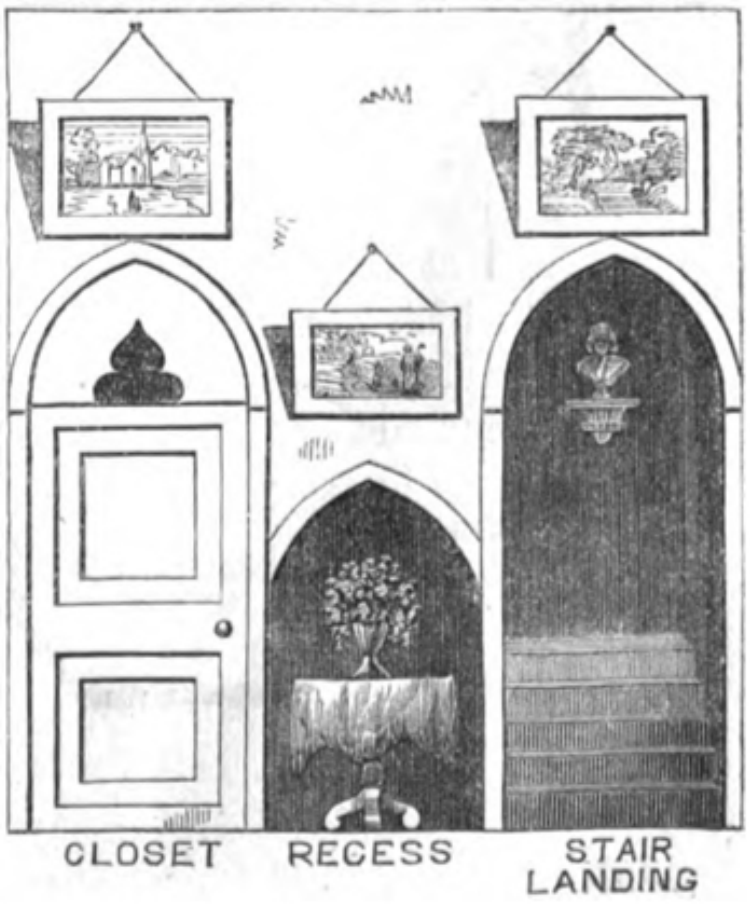



Figure 3.1 The ideal entry, from Beecher and Stowe's *American Woman's Home*. Note the vase of flowers in the central recess, in the direct line of sight and smell for those entering the home. Beecher and Stowe also recommended placing flowers on the stair landing, above the closet, and in a corner next to the entrance door. On the adjacent page, they sketched a floor plan showing the current of fresh air entering the home through this entrance, moving to stoves in the drawing room and kitchen, and ventilating the cellar.

Source: Beecher and Stowe, *The American Woman's Home*, pg. 27.

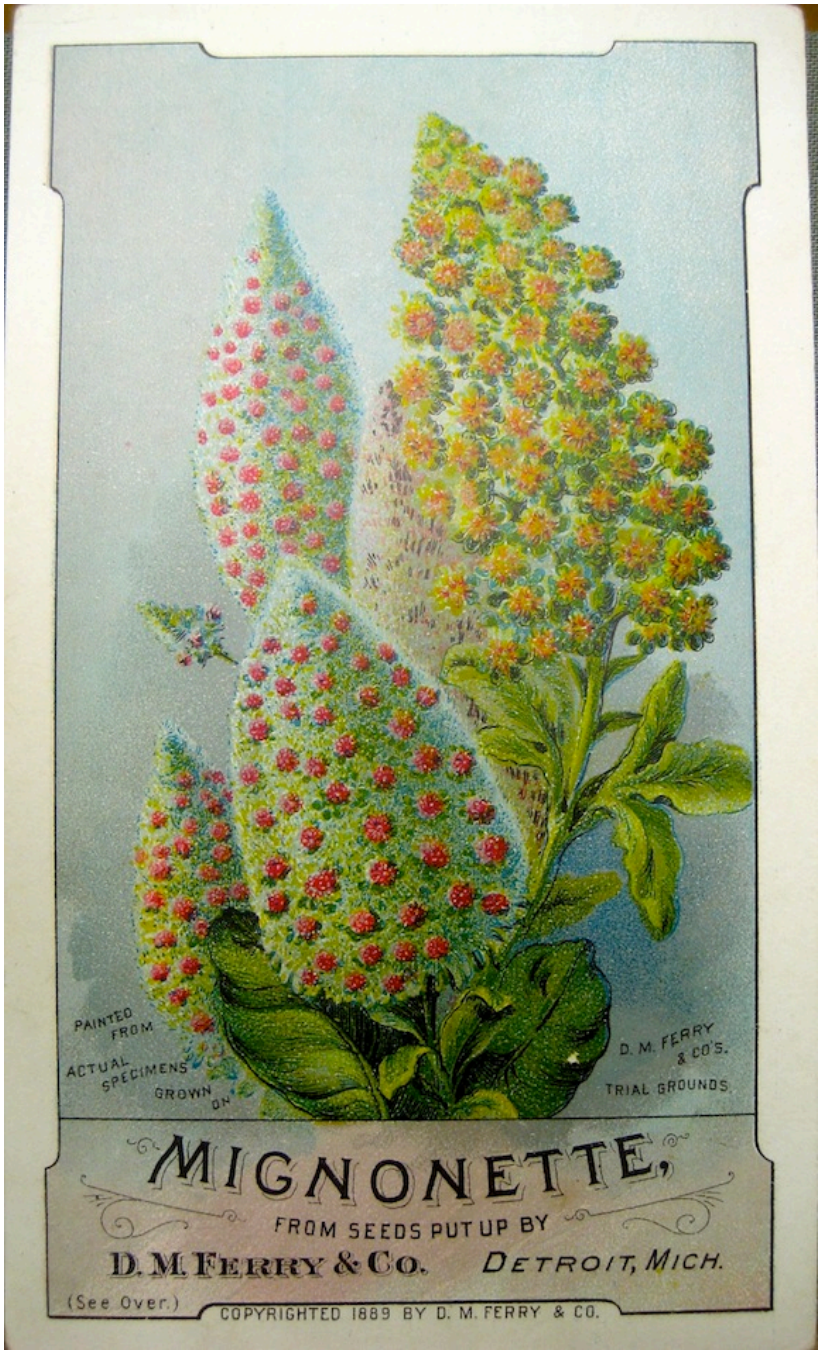



Figure 3.2 On the reverse of this trade card, seed wholesalers D.M. Ferry & Co. claim that "This is the perfume jar of the flower garden, a single plant in bloom filling the whole atmosphere around with its delicate fragrance." Mignonette was a perennial favorite for window boxes because of its scent.

Source: Mignonette Trade Card, D.M. Ferry & Co., Cabinet 8, Drawer 4, "The John and Carolyn Grossman Collection," Winterthur Library, Winterthur, DE.


Figure 3.3 This illustration shows both that the poor practiced window gardening, and how raising flowers brought respite into humble homes with floral fragrances. The elderly man who smells the rose appears to be an invalid who needs a cane to move and is so weak that he cannot hold the rose to his nose himself. The husband sits to the side with a knife and a cutting in his hand, and seems to help with window gardening, but women carry the flowers and help the elderly man to smell, an indication of how women used window boxes and fragrances more generally for health and domestic comfort.

Source: "Window Gardening by the Poor," *The Daily Graphic* (21 Jun 1873), pg. 7.

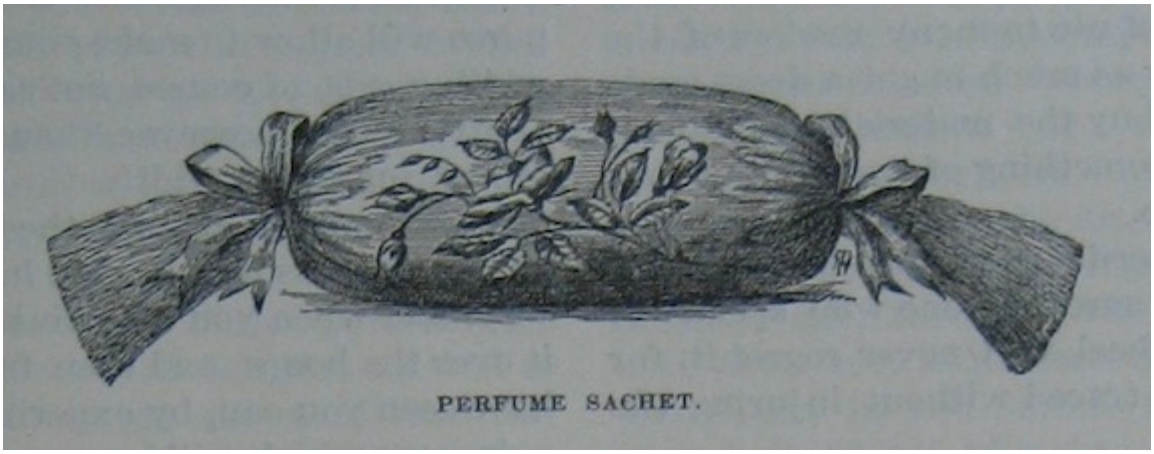
Figure 3.4 This images depicts the acceptance of fragrance and a calm domestic atmosphere, even in the humblest apartments.

Source: Alfred Fredericks, "The Flower Mission," *Harper's Weekly* (13 Jun 1874), pg. 492.

THE FLOWER MISSION—MAKING BOUQUETS FOR HOSPITALS AND PRISONS.—Drawn by C. S. Reinhart.—[See Page 590.]

Figure 3.5 The illustration of women assembling bouquets for the Flower Mission displays industriousness of middle and upper class women at the mundane task of flower arranging. Note the third woman from the left, who holds a flower up to her nose—an indication of the fragrant benefits that these bouquets would bring to invalids and prisoners.

Source: C.S. Reinhart, "The Flower Mission," *Harper's Weekly* (28 Jul 1877), pg. 590.





Figures 3.6 and 3.7 Examples of fragrant sachets given as gifts. The top is an illustration from an article that explained how to make sachets for gifts. The bottom sachet, embellished with a birthday poem, is inscribed on the reverse, "from Miss Parnell to Florence [unclear]"

Top: "A Perfume Sachet," *Ladies' Floral Cabinet* 12, no. 3 (Mar. 1883): 89.
Bottom: Sachet Card [date unknown], Cabinet 8, Drawer 2, "The John and Carolyn Grossman Collection," Winterthur Library, Winterthur, DE.

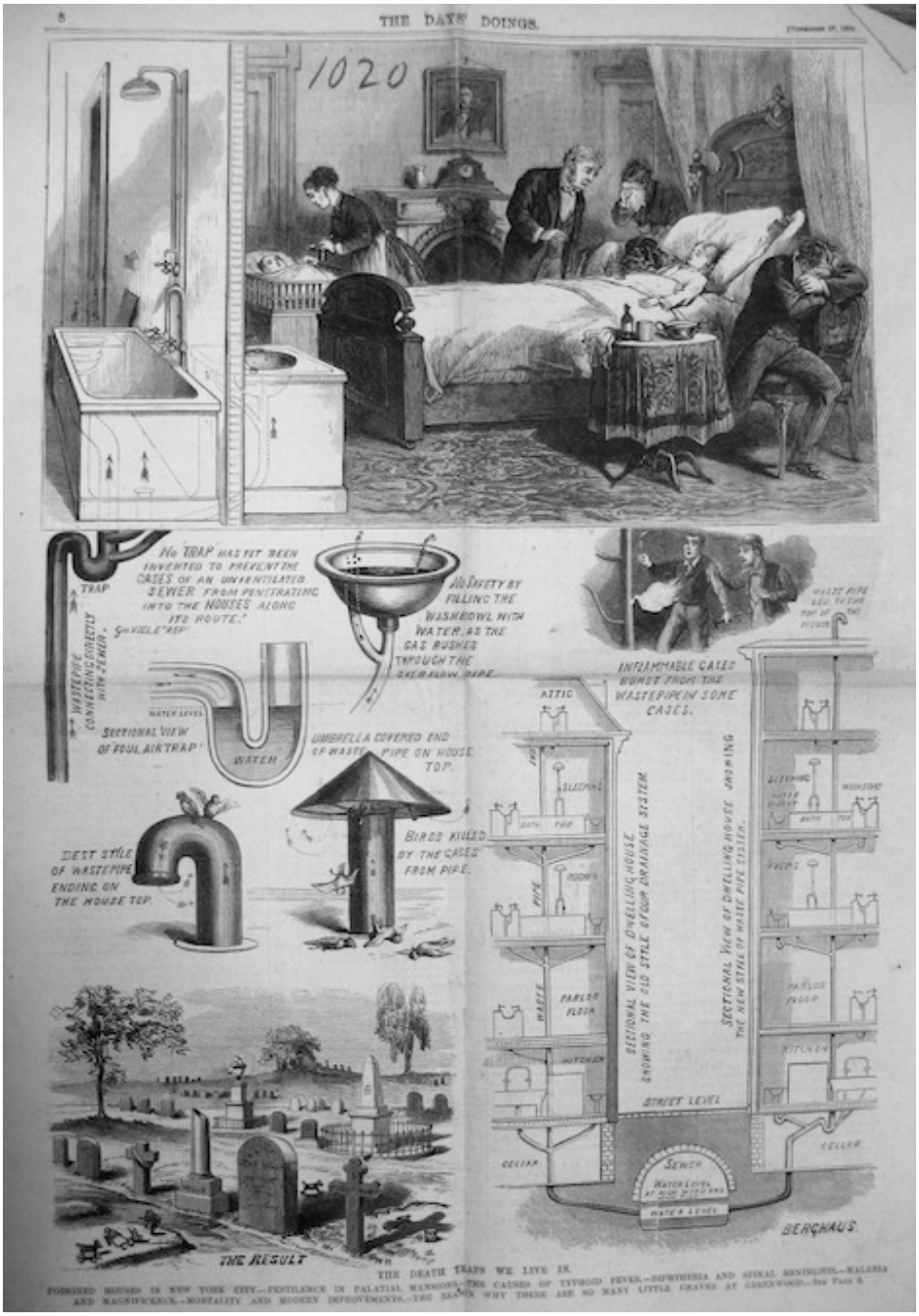



Figure 3.8 Arrows indicate the movement of sewer gas through pipes and sanitary fixtures, while the family, birds and graves show the consequences of old-fashioned and faulty plumbing.

Source: "The Death Traps We Live In," *The Days' Doings* (November 27, 1875), pg. 8.

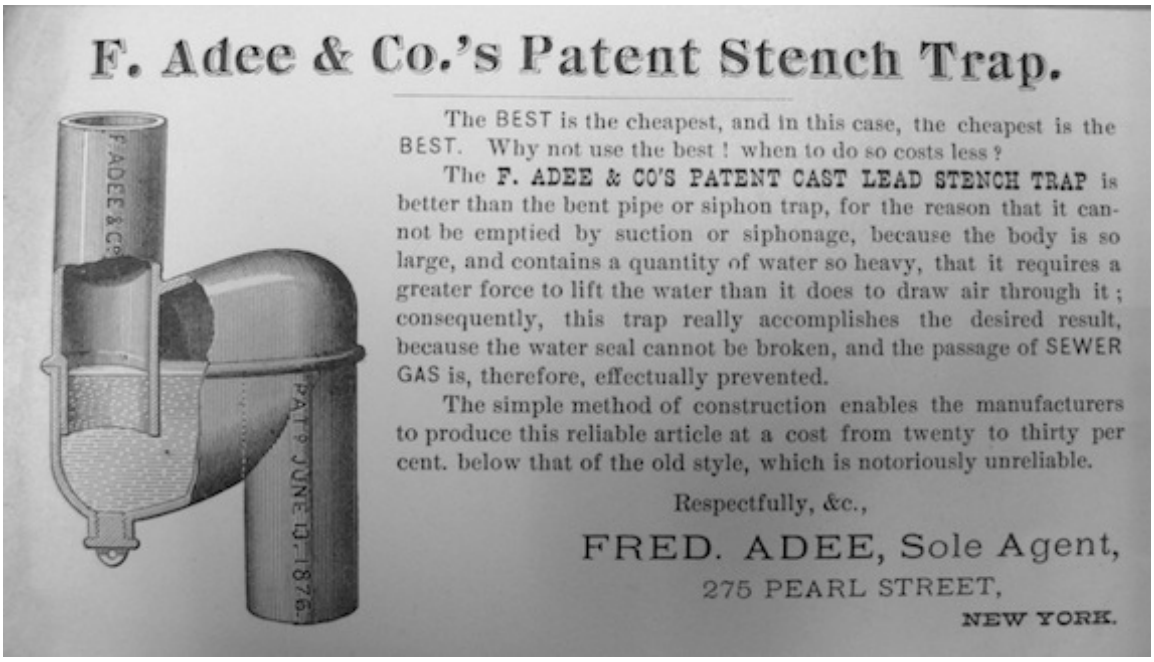



Figure 3.9 This advertisement for F. Adee & Co.'s Patent Stench Trap illustrates the bend in the pipe with its water seal, and lists the usual problems with water seals that this new trap promises to remedy.

Source: [Advertisement] "F. Adee & Co.'s Patent Stench Trap," Box 244, Folder 17, Series III, "Charles F. Chandler Papers," Columbia University, New York.

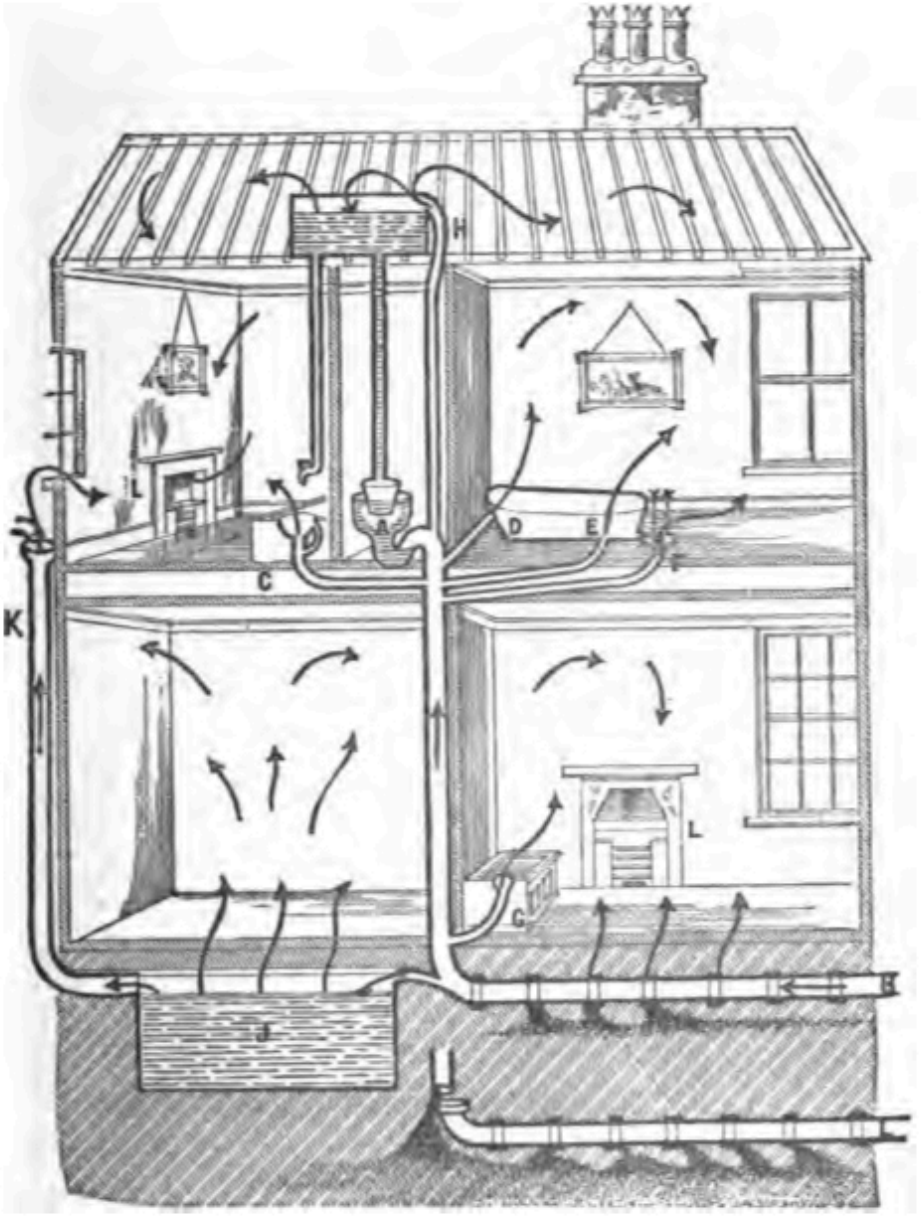



**Fig. 28.—House with every sanitary arrangement faulty.**

Figure 3.10 Arrows indicate the entrance of sewer gas through unsealed pipes and its movement throughout the rooms of the home. Note that the only exit for sewer gas in a home with closed windows was through the fireplaces and chimneys.

Source: Plunkett, *Women, Plumbers, and Doctors*, pg. 123.

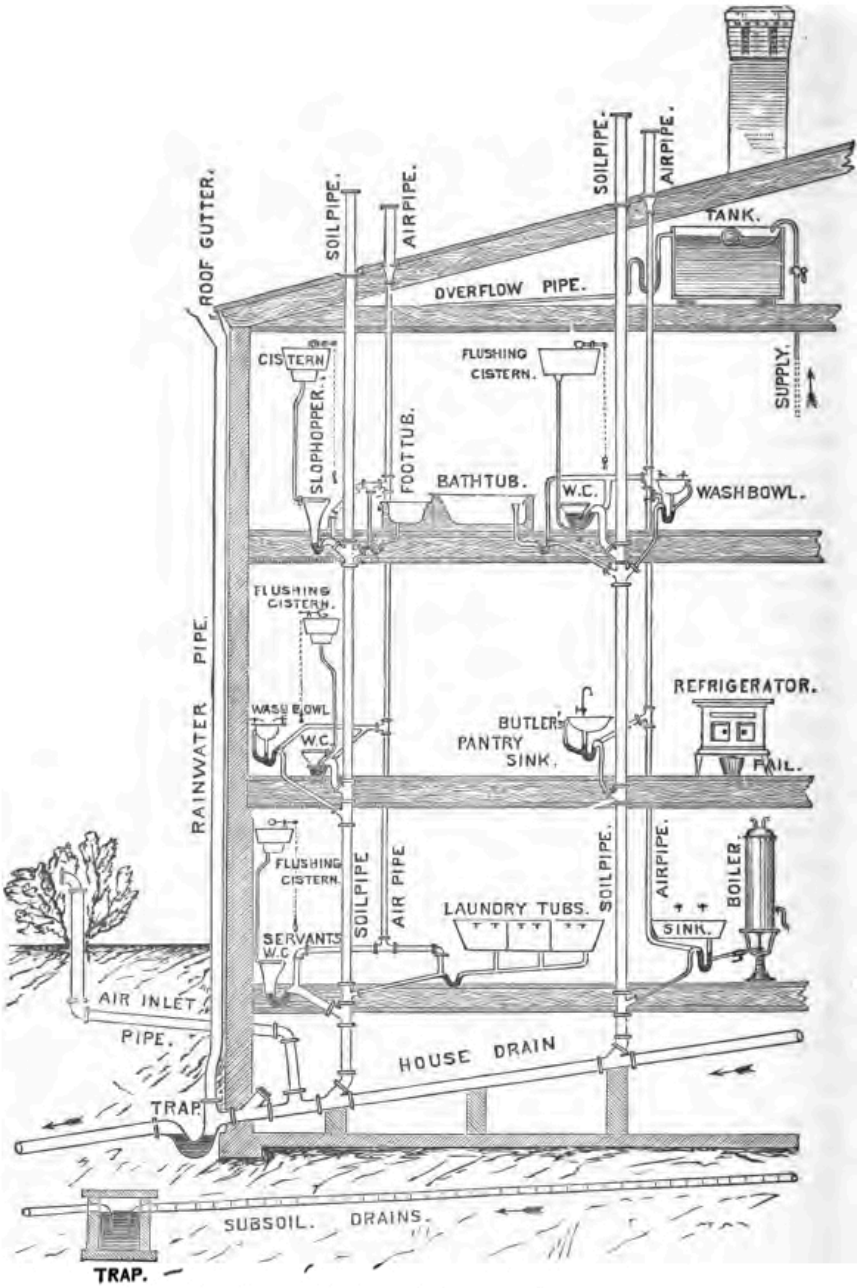
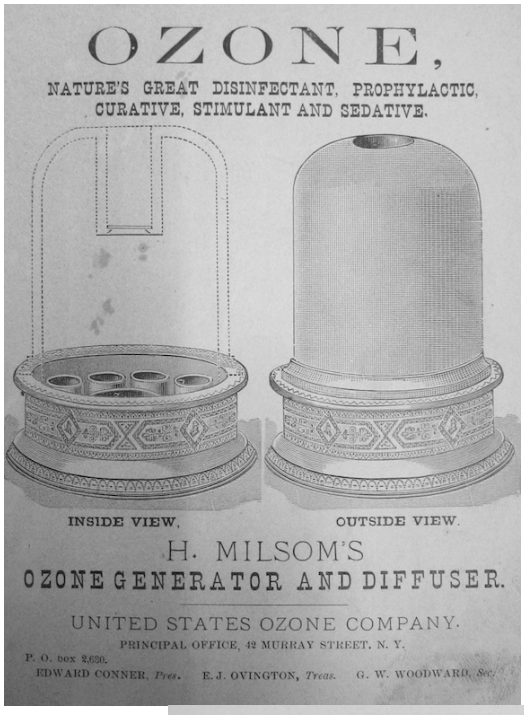
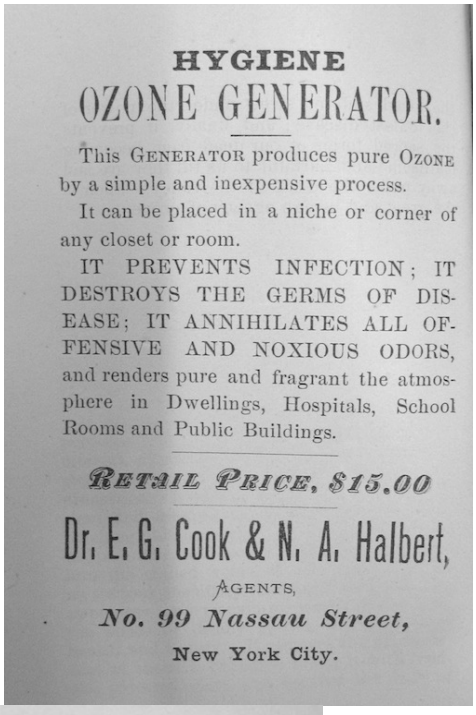


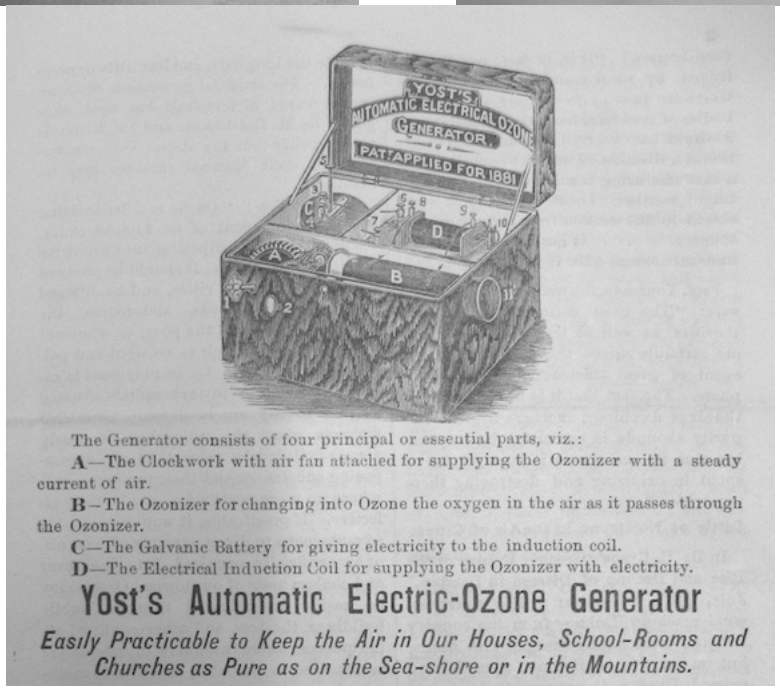

**Fig. 17.—A properly plumbed house—Woman's sphere.**

Figure 3.11 The only arrows in a perfectly plumbed house indicated that air currents were moving out of the home rather than into each living room. Plunkett thought the control of sewer gas and air currents belonged squarely within the women's sphere.

Source: Plunkett, *Women, Plumbers, and Doctors*, pg. 112.




Figures 3.12, 3.13 and 3.14 Advertisements for patented ozone generators for household use, circa 1880s. Note the healthful qualities attributed to ozone in each advertisement, and the emphasis on domestic use against odors and germs.

Source, all images: Advertisements, Box 230, Folder 12, Series III, "Charles F. Chandler Papers," Columbia University, New York.

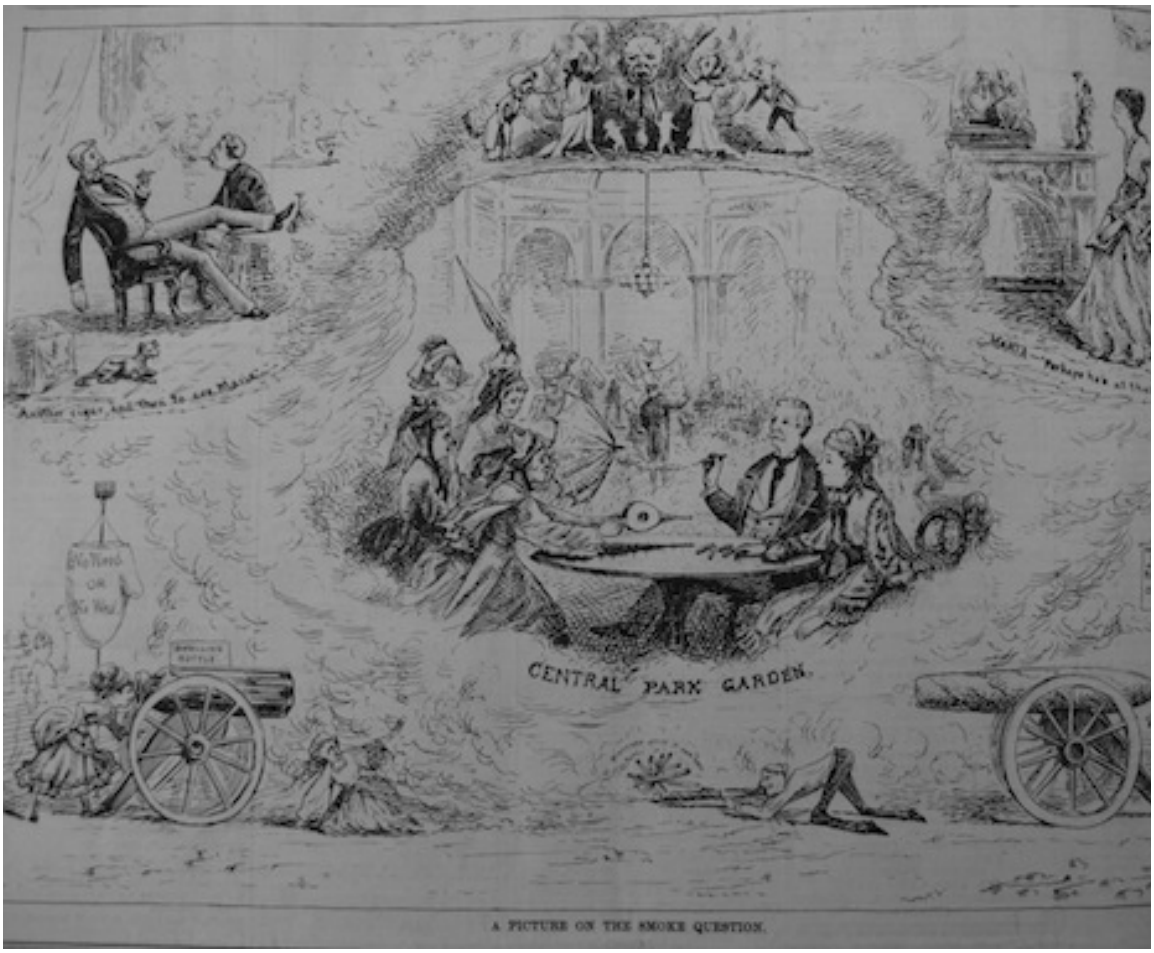



Figure 3.15 The gendered dynamic of the debate over smoke visualized as a Central Park battlefield. On the right, men aim their cigar-canon at the women under the banner, "We love our cigars and our sweethearts one at a time." On the left, women fight back with a smelling bottle-canon that they aim towards themselves, to breathe a pleasant fragrance instead of tobacco's stink, with the motto "No Weed or No Wed." In the central image, women appear on both sides of the smoking debate, as a fashionable young woman sits next to a smoking man and reaches for a cigar herself. Editors of *The Daily Graphic* concluded that, "smoking will be discontinued when women unanimously unite to put it down—and not a moment before."

Source: "A Picture on the Smoke Question," *The Daily Graphic* 1, no. 94 (20 Jun 1873), 8.

# Chapter 4.

## Visualizing Vapors:

## Learning to See Air Quality through the Graphic Press

In 1869, Unitarian minister and Michigan Board of Health member Charles H. Brigham posed the urgent question, "What Shall We Breathe?" to *Herald of Health* readers. Brigham prophesied a dismal yet not so distant future when the air's "quality will be destroyed and its benefits lost…by many circumstances and contrivances for which men are responsible."[1] Brigham listed the many ways that men and women spoiled the air, including the tightly sealed rooms that worried Catharine E. Beecher and the cellar apartments that troubled John Hoskins Griscom. Brigham linked local atmosphere with local health, and enumerated dangerous place-specific airs: "Here there is an atmosphere of petroleum, there an atmosphere of boiling beer, and in another place a very trying atmosphere of pork and lard….Cologne has its atmosphere, which is not that of its aromatic water. The New York docks have their atmosphere. The Five Points

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[1] Charles H. Brigham, "The Air Cure. What Shall We Breathe?" *Herald of Health* 14:1 (Jul 1869), 9.

has its atmosphere. Pittsburgh has its atmosphere, and Oil City, and Bergen Point, and Bristol with its onions, and Taunton with its herrings in the spring of the year."[2]

Though Brigham made a passing mention, on the final page of his article, that "smoke, too, whether made by coal or tobacco, defiles the air," his real focus in describing local atmospheres was local odors.[3] By mentioning Cologne, the subject of Samuel Coleridge's oft-quoted ode to the city of "two and seventy stenches," Brigham signaled his preoccupation to his readers even before they got to Bristol's onions and the fishy smell of Taunton.[4] Even when talking of Pittsburgh, the poster city for the anti-smoke crusades twenty years later, Brigham thought about the smell. Yet, as the wealth of literature on Pittsburgh and its environment has made clear, smoke was the fault with Steel City's air in the nineteenth and early twentieth centuries—and through fighting smoke, Americans learned to care for their environment and fight air pollution.[5] So why did Brigham, when speaking about air quality, focus on the smell? And just as importantly, how did a mid-century concern with stench become a Progressive Era fight against smoke?

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[2] *Ibid.*
[3] *Ibid*., 13.
[4] Excerpts or the full text of Samuel Taylor Coleridge's "Cologne" frequently appeared in newspaper and magazine articles about urban odors in the nineteenth century. "In Köln, a town of monks and bones, / And pavements fang'd with murderous stones, / And rags, and hags, and hideous wenches; / I counted two and seventy stenches, / All well defined, and several stinks! / Ye Nymphs that reign o'er sewers and sinks, / The river Rhine, it is well known / Doth wash your city of Cologne; / But tell me, Nymphs! What power divine / Shall henceforth wash the river Rhine?"
[5] E. Melanie DuPuis, ed., *Smoke and Mirrors: The Politics and Culture of Air Pollution* (New York: NYU Press, 2004); R. Dale Grinder, "The Battle for Clean Air: The Smoke Problem in Post-Civil War America," in Martin V. Melosi, ed., *Pollution and Reform in American Cities, 1870-1930* (Austin: University of Texas Press, 1980); Adam Rome, "Coming to Terms with Pollution: The Language of Environmental Reform, 1865-1915." *Journal of Environmental History* 1, no. 3 (July 1996): 6-28; David Stradling, *Smokestacks and Progressives: Environmentalists, Engineers, and Air Quality in America, 1881-1951* (Baltimore: The Johns Hopkins University Press, 1999); Joel Tarr, ed., *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region* (Pittsburgh: University of Pittsburgh Press, 2003); Peter Thorsheim, *Inventing Pollution: Coal, Smoke, and Culture in Britain since 1800* (Athens, OH: Ohio University Press, 2006); Frank Uekoetter, *The Age of Smoke: Environmental Policy in Germany and the United States, 1880-1970* (Pittsburgh: University of Pittsburgh Press, 2009).

This chapter answers these questions by closely examining the connections between anti-stench and anti-smoke agitation. Rather than viewing the anti-smoke crusades as a departure from an earlier complacency about industrial pollution, this chapter argues that the fight against smoke was a direct outgrowth of earlier worries about bad odors. The graphic press played a significant role in the transition from smell to smoke by making the connection between the two entities visible and legible. In the press, the demands of a visual medium mandated sensory translation; as artists tried to illustrate the issue of Hunter's Point, they sought an iconography for smell, and found their answer in billows of smoke. To explain this shift in the perception of air degradation, one must focus on the details rather than a large sweep of time. This chapter focuses on New York City during August and September 1881, an important moment after the 1878 outcry against Hunter's Point and the Metropolitan Board of Health that catalyzed the creation of the New York State Board of Health and instigated the state investigation into New York City stenches. The first section interrogates images of the graphic press during these months, and establishes how these illustrations and cartoons transferred ideas of air pollution from stenches to industrial smoke. The triumph of the anti-smoke crusades in defining smoke as air pollution also recast the meaning of odors. The chapter then takes up the question of what stenches meant when they were not attached to fears about the air, health and environmental degradation. The shift from smell to smoke in defining air pollution had significant consequences for social relations in the city, as the middle and upper classes revised their ideas of environmental odors so that those who lived in smelly environments were responsible for, rather than victims of, the stenches.

The history of air pollution in the United States grew out of 1970s legislation for clean air, and developed as a history constantly pushing back the origins of the fight against air pollution. When Robert Dale Grinder wrote his 1973 dissertation on the anti-smoke crusades, he was countering the idea that, "concern over pollution is something new, something that at least post-dates the Second World War."[6] Grinder noted that such timelines relied upon technological devices that consumed smoke, rather than looking for the genesis of the idea that smoke was a problem and early attempts to abate smoke. Grinder successfully located the origins of the anti-smoke crusades in the 1890s, situating them within other attempts to reform cities during the Progressive Era. In doing so, Grinder accepted the postwar idea that the first cognizance of air pollution was of smoke, rather than exploring the possibility that smoke was one idea of air pollution that rose to the fore in places and times of increased coal consumption.

Subsequent environmental historians have followed Grinder's lead and adopted the definition of air pollution as smoke. Christine Meisner-Rosen, David Stradling, and Angela Gugliotta have probed the transformation of smoke from a symbol of civic pride and progress to the harbinger of a polluted atmosphere—an unlikely perceptual shift that has proved difficult to explain, both for anti-smoke agitators at the time and environmental historians since.[7] Others have compared smoke regulations of the United States, Germany and Great Britain to explain the peculiarities in the development of air

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[6] Robert Dale Grinder, "The Anti Smoke Crusades: Early Attempts to Reform the Urban Environment, 1893-1918," (PhD diss., University of Missouri-Columbia, 1973), 1.

[7] Christine Meisner Rosen, "Differing Perceptions of the Value of Pollution Abatement across Time and Place: Balancing Doctrine in Pollution Nuisance Law, 1840-1906," *Law and History Review* 11:2 (Fall 1993): 303-381; Rosen, "Businessmen Against Pollution in Late Nineteenth Century Chicago," *Business History Review* 69:3 (Autumn 1995), 351-397; Stradling, *Smokestacks and Progressives*, 37-60; Angela Gugliotta, "How, When, and for Whom was Smoke a Problem in Pittsburgh?" in *Devastation and Renewal: An Environmental History of Pittsburgh and Its Region*, edited by Joel A. Tarr (Pittsburgh: University of Pittsburgh Press, 2003), 110-125.

pollution controls in each nation and provide the historical context for continuing challenges.[8] By re-examining the birth of the anti-smoke crusades with an eye for the connections between smoke and stench, this chapter not only helps to answer the vexing question of how smoke went from good to bad, but also contributes to the growing literature on the history of the senses by tracing how the cultural significance—and limits—of foul odors contributed to the this shift.[9] The same ocularcentrism of modern society that has made environmental scholars largely blind to Brigham's definition of air quality on the basis of odors was the product of the specific moment and set of institutional contexts within which air pollution was redefined as smoke. Rather than argue for the elevation of smell, one of "the lower senses," to even footing with sight, this chapter explains the historically contingent reasons that visions of smoke rather than stenches of industry launched a widespread campaign for improved air quality.[10]

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[8] On the United States and Germany, see Uekoetter. Comparisons between the United States and Great Britain can be found in Platt, *Shock Cities*; and David Stradling and Peter Thorsheim, "The Smoke of Great Cities: British and American Efforts to Control Air Pollution, 1860-1914," *Environmental History* 4, no. 1 (Jan. 1999), 6-31. Noga Morag-Levine includes discussions of all three nations in her work, though her treatment of Germany is less thorough than that of the United States and Great Britain. Morag-Levine, *Chasing the Wind: Regulating Air Pollution in the Common Law State* (Princeton: Princeton University Press, 2003).

[9] For overviews of the work in sensory history, see recent roundtables in *The American Historical Review* (Apr 2011) and *Journal of American History* (Sept 2008). In exploring the shift from smells to sights, I have found the thoughts of Mark S.R. Jenner and Joy Parr especially helpful. Jenner, "Follow Your Nose? Smell, Smelling, and Their Histories," *The American Historical Review* 116, no. 2 (Apr 2011), 335-351; Jenner, "Civilization and Deodorization? Smell in Early Modern English Culture," in *Civil Histories: Essays Presented to Sir Keith Thomas*, edited by Peter Burke et al. (Oxford: Oxford University Press, 2000): 127-144; and Joy Parr, "Smells Like?: Sources of Uncertainty in the History of the Great Lakes Environment," *Environmental History* 11 (Apr 2006), 269-299.

[10] Many sensory historians, in laying out their agenda, have lamented the ocularcentrism of modern Western culture and the field of history in particular, and urged the rescuing or elevation of the other senses to parity with sight. See Mark M. Smith, *How Race is Made: Slavery, Segregation, and the Senses* (Chapel Hill: University of North Carolina Press, 2006), esp. introduction; David E. Howes, "Empire of the Senses," in *Empire of the Senses: The Sensual Culture Reader*, ed. David Howes (New York: Berg, 2005); 1-17. While direct and focused attention to hearing, smelling, tasting and touching is a useful starting point for sensory history, James W. Cook rightly notes that historians need to consider "how our own efforts to mitigate, to unthink, ocularcentrism might relate to the lived histories of those who first identified visual representation as a primary arena of ideological struggle." Cook, "Seeing the Visual in U.S. History," *Journal of American History* 95, no. 2 (Sept 2008), 434.

Robert Wiebe has characterized the years between 1877 and 1920 as a search for order, when people and communities, "in a manner that eludes precise explanation,…sensed that something fundamental was happening to their lives, something they had not willed and did not want, and they responded by striking out at whatever enemies their view of the world allowed them to see."[11] As a visual medium led by images of notable events and daily life, the graphic press played an important role in constructing worldviews by helping people to see, quite literally, what was going on and what was wrong in their world.[12] Editors favored activism in pictorial journalism because it increased circulation, and thus they often devoted artwork to controversial and scandalous issues of the day.[13] Woodcuts and eventually photographs not only documented events and physical conditions, but also showed readers places and activities that were often hidden from sight.

Frank Leslie's first pictorial reform campaign, taking on New York City's "swill milk" issue in 1858 and 1859, is a perfect example of how the images of the graphic press reflected and influenced public opinion as they revealed facts that, while well-known or widely assumed, were hidden from the casual observation of daily life. Furthermore, the

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[11] Robert Wiebe, *The Search for Order, 1870-1920* (Westport, Ct: Greenwood Publishers, 1967), 44.
[12] On the important of images in the press to public opinion, see Bert Hansen, *Picturing Medical Progress from Pasteur to Polio: A History of Mass Media Images and Popular Attitudes in America* (New Brunswick, NJ: Rutgers University Press, 2009); and Kristin L. Hoganson, *Fighting for American Manhood: How Gender Politics Provoked the Spanish-American and Philippine-American Wars* (New Haven: Yale University Press, 1998). On the press as a shaper of public opinion more broadly in the nineteenth century, see Patricia Cline Cohen, Timothy J. Gilfoyle, and Helen Lefkowitz Horowitz, *The Flash Press: Sporting Male Weeklies in 1840s New York* (Chicago: University of Chicago Press, 2008); David M. Henkin, *City Reading: Written Words and Public Spaces in Antebellum New York* (New York: Columbia University Press, 1998); Paul Starr, *The Creation of the Media: Political Origins of Modern Communications* (New York: Basic Books, 2004); and Andie Tucher, *Froth & Scum: Truth, Beauty, Goodness and the Ax Murder in America's First Mass Medium* (Chapel Hill: The University of North Carolina Press, 1994).
[13] On activist reporting and increased paper sales, see Joshua Brown, *Beyond the Lines: Pictorial Reporting, Everyday Life, and the Crisis of Gilded Age America* (Berkeley: University of California Press, 2002), 27-29.

success of this campaign points to the importance of the visual representations of sanitary conditions in affecting urban governance and policies relative to public health. Historian Joshua Brown has framed Frank Leslie's foray into reform reporting as "sensation and revelation," both categories that aptly apply to Leslie's pictorial coverage of controversial issues.[14] To these emphases, one should add the practice of bearing witness. The illustrations themselves bore witness to unsanitary conditions, by recording and displaying interior views of distillery and stable complexes, workers pouring boiling swill into cow feed troughs and animal dissections on offal docks in a visual medium for readers to examine. These "exposure" illustrations rendered visible conditions that were usually hidden from sight.[15] On another level, the illustrations documented that others—health wardens, elected officials, Frank Leslie and his artists—had witnessed the same conditions and thus could not deny the existence of health threats. If seeing was believing, the graphic press made believers of both its readers and its subjects.[16]

The walls and out-of-the-way locations that hid dairy operations from milk consumers were one type of invisibility in the urban environment. Smells, which had no visual traces, were another issue altogether. When the smells of Hunter's Point took center stage in New York's graphic press during the summer of 1881, artists not only exposed conditions that were hidden but translated olfactory knowledge into a visual medium, creating an iconography for smell. Such sensory translation was not new.

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[14] Brown, *Beyond the Lines*, 28.
[15] "Exposure" was the world that *Frank Leslie's* used throughout its coverage of the swill milk scandal, and it appeared in every illustration caption of stable and distillery interiors. *Frank Leslie's Illustrated Newspaper* May-July, 1858.
[16] Similar techniques can be found in the photography and reform efforts of Jacob Riis, Lewis Hine, et al. See Maren Stange, *Symbols of Ideal Life: Social Documentary Photography in America, 1890-1950* (Cambridge: Cambridge University Press, 1989); and Alan Trachtenberg, *Reading American Photographs: Images as History, Mathew Brady to Walker Evans* (New York: Hill and Wang, 1989).

When people smelled something in the air, they often used their sense of sight to identify the odor's source. In investigating complaints against foul odors, sanitary inspectors' primary task was to connect invisible stenches to their visible sources. Sanitary inspectors such as Edward H. Janes translated the olfactory into the visual for their reports. In 1876, Janes documented "wooden floors [that] by absorption of blood and grease yield an offensive odor," walls "bespattered with bloody and semiliquid manure," and yards "filthy with manure," in response to complaints about bad odors from slaughterhouses.[17] These sodden floors and muck-filled yards were hidden from the casual sniffer behind high walls. Janes' reports were important not only for their recommendations but also because the reports created a record of conditions that future inspectors could readily identified by sight. Though the smell was the offense, it was the unsightly that became the target of reform.

When making complaints, lay citizens also connected their olfactory knowledge to visual conditions, and this moment of sensory translation was the bone of contention between amateur sanitarians and public health professionals. When Metropolitan Board President Charles Frederick Chandler denounced amateur sanitarians as poor smell detectives, he did not question the noses of these individuals. Chandler found fault with the ways in which complaining citizens "are annoyed by a stench and in most instances ascribe it to some industry near them…"[18] Chandler's frustration and the methods of the sanitary inspectors reveal the extent to which the senses of smell and vision interacted in producing knowledge about the environment. When amateur sanitarians smelled

[17] Reports of E H Janes MD, Asst. San. Supt., Box 50, Folder 1, "Charles F. Chandler Papers," Columbia University, New York.
[18] "The Hunter's Point Stenches: Work of the Special Committee of the State Board of Health—Prof Chandler on the Evil," clipping in Box 52, Folder 12, "Charles F. Chandler Papers," Columbia University Rare Books and Manuscripts, New York.

something bad, they attributed the odor to whatever industry they could see.[19] When sanitary inspectors investigated the sources of foul smells, they recorded the source of the problem in visual terms. Conflating olfactory and visual knowledge was natural for nineteenth-century Americans, as the connections between what people smelled and saw seemed obvious. This was true even for odors that travelled. When the press spoke about "the smells of Hunter's Point," they attributed the odors that crossed the East River to the community that everyone could see on the shoreline. The name stuck, even though the Metropolitan and New York State Boards of Health concluded that the offensive odors originated at industries along Newtown Creek, out of sight from Manhattan. [20]

The graphic press followed this tradition of connecting invisible odors with their visible sources in its coverage of the smells of Hunter's Point during August and September of 1881. This coverage included numerous articles, editorials and a series of cartoons drawn by Thomas Nast and William Allen Rogers for *Harper's Weekly*. *The Daily Graphic* also contributed a cover cartoon to this campaign. These cartoons, like the photographic reform exhibitions of Jacob Riis and Lewis Hine, should be read as a series.[21] While each image is individual and nuanced, it contributes to the overall message that New York's air and New Yorkers' health suffered because of industries in Brooklyn. In the course of their illustrations, the artists of *Harper's Weekly* and *The Daily Graphic* eventually settled on dark billows of smoke as the visualization of stench,

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[19] On the interplay of the senses more broadly, see David Howes, *Sensual Relations: Engaging the Senses in Social and Cultural Theory* (University of Michigan Press, 2003) and Smith, *How Race is Made*.
[20] For more on how sensory impressions affected naming practices, see Sarah Keyes, "'Like a Roaring Lion': The Overland Trail as a Sonic Conquest," *Journal of American History* 96, no. 1 (June 2009), esp. 26-28.
[21] On Riis and Hine, et al., see Stange, *Symbols of Ideal Life*.

an iconography that developed through experimentation with other signifiers for smells.[22] Smoke was not the de facto visualization of foul odors and the ill health they boded, but the best option that emerged from cartoons of the sickroom, the shores of the East River, and the struggle between life and death.

In the first week of August 1881, *Harper's Weekly* sent its artists out to Hunter's Point and Newtown Creek to document the factories that New York State's Board of Health had found responsible for the odors that tormented Manhattan's residents. The State Board's report had been "so decisive and so forcible a justification" of the citizens' complaints that Governor Alonzo Cornell issued a proclamation the causes of the nuisances must be "prevented, removed, or abated" by June 1st.[23] Governor Cornell issued his proclamation in April, but New Yorkers could smell no difference by August. Summer's heat once again amplified the familiar odors of sludge acid, oil refining and superphosphate fertilizers.

So in August, when the *Harper's Weekly* "special artist" visited Queens and Brooklyn, his goal was similar to that of *Frank Leslie's* artists in investigating distilleries and stables. The artist wanted to expose the unsanitary conditions that affected the health of New Yorkers and make the readers of *Harper's Weekly* witness to "Unsavory Hunter's Point" [Figure 4.1]. The artist began with the State Board of Health's map of offensive trades at Hunter's Point and Newtown Creek as his guide to the malodorous region. The mapmaker had employed various shading techniques to demarcate the sources of foul odors. The intensity of shading correlated with odor intensity; while widely spaced dots

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[22] During the same period, the smells were curiously absent from the pages and illustrations of *Frank Leslie's Illustrated Paper*. However, given *Frank Leslie's* coverage of the Garfield assassination and convalescence—which far exceeded that of its peer papers—the inattention to urban odors is understandable.

[23] "The Pest at Hunter's Point," *Harper's Weekly* 6 Aug 1881, pg. 530.

marked the garbage dump, tightly spaced lines indicated the sources of the worst smells, such as varnish factories, fertilizer factories and oil refineries. Darkness equaled foulness, on scales on increasing intensity.

The artist's goal was to bring these ominously shaded plots of land to dramatic visual life. New Yorkers knew the communities of Hunter's Point and Greenpoint from afar, as plumes of smoke, or through their travel on the Long Island Rail Road, from whose Hunter's Point depot many discovered incredible stenches in their journey to the refreshing breezes of the seashore. As the artist rendered his multisensory experience of the environment in the solely visual medium, he redeployed the map's shading to represent the area's true noxiousness—not as spatially bounded locations but as dark clouds of smoke already moving on the wind. The series of vignettes present oil refineries, ammonia works, manure barges, and fertilizer factories at the center of a bleak and barren landscape in which few men labored under omnipresent plumes of black smoke. In focusing on the industries that produced stench and smoke, the artist effaced the labor of thousands of immigrants on both banks of Newtown Creek. Dark smoke dominates these images, connecting the many different industries as the plumes twine together in the wind, forming the nasal cocktail so familiar and noxious to New Yorkers. These plumes are darkest at their source, but dissipate little as the wind carries them away. Rather than marring a clear sky, the black smoke becomes the darkness that was the air New Yorkers breathed.

In comparison to the dark and smoky sky, the waters of Newtown Creek appear as white space, calm and placid. A shipwreck references the decline of the vibrant shipbuilding industry that had previously anchored economic development in Greenpoint

and produced the *USS Monitor* for the Civil War. This shipwreck and a few barrels on the edge of the shore are the only indications that the factories might also be degrading the water quality. The difference between the representations of the water and the air emphasize that air quality, not water pollution, was the concern of *Harper's Weekly* and the element that its special artist sought to document. In comparison to the lightly colored and still water, the dark and turbulent smoke twisting in the wind appears especially dangerous. Yet smoke held connotations of prosperity and employment in the nineteenth century.[24] Those who read these images without the accompanying text would have seen a flourishing economy and job opportunities in the belching smokestacks.

The editors and authors of *Harper's Weekly* shared this positive view of smoke. In articles that attacked "the pest at Hunter's Point," smoke received only one mention. Instead, authors focused on "impure gases," "foul and dangerous effluvia," "poisonous vapors," and "fumes of putrefaction."[25] When they saw the images of "unsavory Hunter's Point," *Harper's* editors had their own moment of sensory translation, and smelled an unmistakable "disgusting, suffocating, and sickening stench." The images instantly recalled the stench for those who had smelled it before, while riding on the Long Island Rail Road or when it wafted through their open bedroom windows. For those unfamiliar with Hunter's Point and its aroma, the images would not convey the full sensory misery foreboded by that dark air.

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[24] In the words of historian David Stradling, "So closely connected were smoke and economic growth in the minds of urban Americans of all classes that smoke symbolized prosperity, and images of thick smoke, both literary and pictorial, frequently represented economic health in turn-of-the-century America." Stradling, *Smokestacks and Progressives*, 2. This viewpoint can be seen in the many illustrations of American cities in the nineteenth century, in which smoke plumes prominently mark the skyline.
[25] "The Pest at Hunter's Point," *Harper's Weekly* 6 Aug 1881, pg. 530-531.

This set of images, sinister though they might make smoke, could not upend the positive connotations of smoke. Cartoons took up the iconography of smoke as dark and ominous, making explicit the association between smoke plumes and noxious odors even as they explored alternative visualizations of stench. Thomas Nast, the best-known illustrator of his time, formerly an artist for *Frank Leslie's* and a long-time employee of *Harper's Weekly* by 1881, included smoke as his main visualization of odors in the first cover cartoon about smells, "The Governor and the People of New York Defied" [Figure 4.2]. Like the editors of *Harper's Weekly*, Nast interpreted the seeming non-reaction of the Brooklyn and Queens businesses to Governor Cornell's proclamation as corruption and disregard for human wellbeing. To indicate his view that the smells of Hunter's Point had become a political problem as well as a public health issue, Nast placed the governor's proclamation at the center of the illustration. Nast's message was that the businesses of Kings and Queens counties, if not the counties themselves, were flaunting the governor's direct order to curtail their offensiveness.

Nast's expressed his message both through his visual renderings and his pairing of text with the images. Nast depicted Kings and Queens counties as skeletons, his customary icon for evil or death, who wore money lined robes, snickered and looked smug as they echoed Boss Tweed's well-known sneer, "What are you going to do about it?" In his cartoons, Nast had made Tweed notorious as the symbol and lynchpin of corruption in New York. By putting Tweed's sneer into the mouths of Kings and Queens counties, Nast equated New York City's industrial neighbors with callous disregard for the public good. Overall, Nast portrayed corporate greed as the only reason underlying resistance to the governor. Nast strengthened his message by placing the dollar sign on

the forehead of the skull and crossbones that he labeled "Standard Empire," attaching a full moneybag marked "Might Makes Right" to the base of the image and captioning the whole thing "The people have no rights that we are bound to respect"—a paraphrase of Chief Justice Taney's infamous decision in the Dred Scott case.

Although conveying an overwhelmingly negative message, this illustration of corporate greed that mocked public health made only subtle references to the odors, whose persistence was the impetus for the cartoon's creation. Governor Cornell's proclamation, the centerpiece of the illustration, was explicit about "nuisances dangerous to life and detrimental to health," but the only other reference to odors or Hunter's Point is the shoreline of spires and smokestacks at the bottom of the cartoon. Smoke, visibly emitted from the industrial shoreline, stands in for stench. The horizon of dark chimneys release clouds of smoke that billow up behind and around Kings and Queens counties. A final puff of smoke emerges at the top of the image, where it shrouds another dollar sign. *Harper's Weekly* readers might usually see money in smoke, but the literal appearance of dollars in the smoke, when considered alongside the negative connotations of greed and corruption throughout the cartoon, is an inversion of the positive associations between smoke and money. The connection between smoke and money here was not a positive sign of jobs and progress, but a negative reference to the greed and corruption of large industries that ignored human health. Smoke could be read as a visual substitute for odors, and it most certainly appeared as dark, foreboding, and bad to *Harper's Weekly* readers.

On a two-page spread inside the issue, artist William Allen Rogers, Nast's eventual successor at *Harper's Weekly*, continued the negative depictions of smoke even

as he explored a different iconography for smell. Whereas Nast excelled at translating political controversy into visual images, Rogers emphasized the human dimension and was especially adept at portraying human suffering. In his first illustration of the smells, Rogers transported the hags of *Macbeth* from the shores of Scotland to those Brooklyn [Figure 4.3].[26] These half clothed creatures danced and incanted around a cauldron labeled "Hunter's Point." The cauldron poured forth both voluminous smoke and bats with wings of sludge acid. The smoke moved little from its source, but the foul-winged mammals flew across the East River, toward New York City's tall tenements and their open windows. As in *Macbeth*, the hags and their cauldron signaled poison and nefarious deeds. The bats, a familiar image of witchcraft, death, disease and night, carried both smell and disease far from the cauldron of their origin.

It is fitting that Rogers chose nighttime imagery for his depiction of the odors, as the Board of Health received far more complaints about smells after dark and people frequently testified that foul odors disrupted their sleep. The nocturnal increase in odor concerns may have been a perceptual issue; many scholars have written about how humans, when deprived of sight, find their other senses are heightened. Yet it was also the result of urban temporal order. Health regulations that specified certain activities, such as the removal of manure from stables, could only take place under cover of darkness.[27] For Rogers, depicting odors at nighttime required a different iconography

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[26] Shakespeare's plays were familiar to nineteenth century Americans of all classes, who frequently attended performances and delighted in impromptu rewordings of well-known lines. For an explanation of how such alterations and parodies were a common feature of American humor, see Lawrence W. Levine, "William Shakespeare and the American People: A Study in Cultural Transformation," *The American Historical Review* 89, no. 1 (Feb. 1984), 34-66; and Shane White, *Stories of Freedom in Black New York* (Cambridge, MA: Harvard University Press, 2002).

[27] Peter Baldwin, *In the Watches of the Night: Life in the Nocturnal City, 1820-1930* (Chicago: University of Chicago Press, 2012), 105-108.

than daylight illustrations, because night rendered smoke invisible. In this dark image, the fire below the cauldron momentarily illuminates the smoke, but its ominous billows quickly disappear into the dark background, just as smoke from oil refineries and fertilizer manufacturers disappeared in the inky blackness of night. The swift motion of the bats, made them barely perceptible to the naked eye, but the sound of their wings would have caused alarm—a sound that, in another moment of sensory translation, was nearly as loud for the image's readers as the sound of the witches' evil incantations.

As the hags danced around the cauldron, they answered the query that allegorical New York borrowed from Macbeth: "How now, you secret, black, and midnight hags, What is't you do?" As they explained their 'deed without a name,' the hags named the ingredients in their 'charm of powerful trouble' and thus identified themselves as the owners of businesses along Newtown Creek. Rather than using 'poison'd entrails' in their potion, these hags began with "poison compounds"—a direct reference to chemical industries that was strengthened by the inclusion of "sludge acid" in the following stanza. The hags' incantations also made smell explicit as the subject of the illustration: "Spread a nuisance everywhere; / With sludge acid load the air; / Send the stench through every street; / Mix death-vapors with the heat:". Not only were the hags, as Newtown Creek business owners, consciously producing stench and nuisance, but they—like the twin images of money-robed death in Nast's illustration—"laugh" at the miseries of the ill and rejoice in their monetary "gains." Shakespeare's Hecate had praised the hags, " O, well done! I commend your pains, / And everyone shall share i' the gains." Rogers' hags, by contrast, appropriated Hecate's lines to praise themselves for ignoring the common good as they enriched themselves and poisoned the wider public: "We can laugh at all their

pains; / They get the smells—we get the gains!" This inversion would have been at once both recognizable and damnable in the minds of *Harper's Weekly* readers.[28]

Because the witches were so readily identifiable, Rogers returned to this iconography for stench-producers in subsequent weeks, each time heightening the dramatic tension as the hags stalked their prey, weak women and children, in the streets and sickrooms of New York City. In contrast, the bats that represented the smell of sludge acid disappeared, easily replaced by respired air, burning incense, and the cauldron of poison itself. Rogers, like Nast, sought an iconography for smell, but only settled on smoke once he had spent the dramatic power of Shakespearean hags. In a series of cartoons, the hags served as an iconographic bridge between smell and smoke; once Rogers had established this connection through repetition, he no longer required the hags to indicate dangerous stenches in his billows of smoke.

In the August 13 issue of *Harper's Weekly*, both cartoons of Hunter's Point made explicit references to death. Nast included his skeletal renderings of death personified, and Roger's cartoon of the hags was titled "The Death Cauldron at Hunter's Point." The accompanying text furthered this dark imagery, especially in Eugene Lawrence's article, "Death and Hunter's Point."[29] In addition to Lawrence's title, this article contained many allusions to stench and death, including descriptions of Newtown Creek as "dark as Styx" and "a curious seat of miasma and disease." Lawrence, like Nast and Rogers, blamed factory owners for the smells and consequent illnesses: "They are the scourges of New York, the enemies of the poor, the slayers of children and the weak." Those who read the articles as well as the images would have a clear impression that the chimneys of this

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[28] See Levine, "William Shakespeare and the American People," 36 and 44.
[29] Eugene Lawrence, "Death and Hunter's Point," *Harper's Weekly* 13 Aug 1881, pg. 554.

industrial area belched forth a combination of dark smoke, poisonous gases, and death-dealing stenches: "disease and death flow from its [Hunter's Point's] poisonous atmosphere, and its stenches kill more certainly than the bullet or the sword."[30]

In the following weeks, both Nast and Rogers repeated their use of smoke as the visual marker for death-causing stenches. On the cover of the August 20 issue, Nast depicted Death as rising in the smoke billowing out of Hunter's Point chimneys, until this dark specter dominated the entire atmosphere and loomed menacingly over New York [Figure 4.4]. Nast's imagery constructed a metonymy wherein smoke is stench is death, a string of correlations built from the commonly perceived relationship between bad smells and illness. On the magazine's interior pages, Rogers portrayed the miseries of the sickroom, where the hags killed a convalescing woman by fouling the air she breathed with sludge acid incense and fetid exhalations of respired air [Figure 4.5]. Father Knickerbocker appeared on the cover of the August 23rd issue of *The Daily Graphic*, clutching both his stomach and his head in physical distress while black smoke billowed from numerous sources behind him [Figure 4.6]. Apparently Knickerbocker drew no relief from the numerous medicines at this feet, including "air and stomach disinfectant," "air-poison antidote and convulsive reliever," and smelling salts. For the September 3rd cover of *Harper's Weekly*, Rogers drew a struggle between allegorical New York and the hags that choked her as they preyed upon the city's children before a smoke-filled sky [Figure 4.7]. Finally, neither Nast nor Rogers needed intermediary iconography to explain that smoke was bad because it was stench. On September 10, Nast published a small cartoon of allegorical New York striking skeletal Death with the

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[30] *Ibid*.

sword of law before the smokestacks and smoke-filled sky of Hunter's Point [Figure 4.8]. When Rogers illustrated popular poet Will Carleton's ballad for the September 17th cover of *Harper's Weekly*, he omitted the hags and their various accoutrements of stench [Figure 4.9]. Rogers relied upon smoke-shrouded buildings to illustrate that foul smells had eliminated fresh air from the city atmosphere.

As a series, these cartoons both illustrated and constructed a shift in the perception of smoke. Through illustrating stenches, the graphic press and its readers realized that smoke, a visible entity that left its traces in soot across the city, was a ready substitute for or equivalent of odors. Each cartoon also functioned individually to make a specific point about the relationship of urban residents to the air they breathed, the press, and the government. The artists for *Harper's Weekly*, like those for *Frank Leslie's Illustrated Newspaper* in the first illustrated campaign for sanitary reform, explicitly referenced the role of the press and the importance of active witnessing in their cartoons. References to witnessing, like the iconography of smell, appeared in a variety of guises during this pictorial campaign.

Nast's cartoon of August 20th recast the cleaning of the Augean stables as a modern labor for the "Hercules" Commissioner of Street-Cleaning James S. Coleman [Figure 4.4]. According to the well-known myth, the Greek Hercules had once faced daunting the task of cleaning the Augean stables, the smelly home over 1,000 cattle that had not been cleaned in thirty-odd years.[31] Hercules completed this foul labor in a single day by rerouting two nearby rivers through the stables, so that the water flushed out the

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[31] On the influence and use of classical antiquity in the Early Republic and nineteenth-century United States, see Caroline Winterer, "From Royal to Republican: The Classical Image in Early America," *Journal of American History* 91, no. 4 (Mar 2005): 1264-1290.

odiferous mess. In Nast's retelling, Coleman sees the problem of Hunter's Point, which literally threatens to overwhelm the street-cleaning commissioner from its menacing aerial position. Coleman scratches his head in confusion, wondering how he can approach a mess of such enormous scale armed with only a broom and a shovel, the implements of a humble street cleaner. In the bottom left corner, Nast inserted a version of Hercules's successful plan for cleaning the Aegean stables, captioned, "turn the course of the East River over Hunter's Point." This plan was both metaphoric and literal; though Nast specified the East River in the caption, the illustration showed the walls of "the press" turning a river of "public opinion" against the stench-producing trades of Hunter's Point. The river of public opinion, as channeled by the press, destroys factories—recognizable by their tall chimneys—with the force of its current.

Witnessing occurs on a number of levels in Nast's Hercules cartoon. Most obviously, Coleman recognizes Hunter's Point is a mess in need of a thorough cleaning like the streets of New York City. Coleman literally sees the problem as he gazes at death, smoke and smell across the East River. Readers, as they view this cartoon, see that sanitarians and the city government, both of whom were embodied by Coleman, are cognizant that the smells of Hunter's Point threaten the health of city residents. This puts the knowledge of the city government and health officials on record in a visible way. The text within *Harper's Weekly*'s pages similarly documented the knowledge of health officials, referring to the recent "sudden and unannounced visit" of State Board of Health members and New York City sanitarians Elisha Harris and Erastus Brooks to "pestiferous factories."[32] Now that Harris and Brooks had seen and smelt the problem themselves,

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[32] "The Plague-Spots around the City," *Harper's Weekly* 20 Aug 1881, pg. 562.

they could not plausibly deny the existence or production of stench. By making the knowledge of sanitarians Coleman, Harris and Brooks visibly legible, this cartoon kept government officials in check. The cartoon's audience, now aware that sanitarians understood Hunter's Point stenches as a health danger, would distrust future disavowals of the problem. The cartoon could also influence public opinion; as readers saw that health authorities thought death arose from Hunter's Point, readers previously unconvinced would accede to the knowledge of city and health authorities and develop a negative opinion of the factories' effect on air and health.

Finally, the cartoon's reference to "the plan" for changing public opinion was a device that worked in a number of ways. It explicates *Harper Weekly*'s and Nast's motivations for illustrating Hunter's Point, thereby maintaining the honesty of the graphic press and situating *Harper's Weekly* as a reform-minded paper. The plan both emphasizes the importance of the press for its ability to change public opinion and, though Nast's referencing of Hercules's labor, recommends that health officials like Coleman make deliberate use of the press. Just as Hercules used walls to move the river through Augeus's stables, so might New York's sanitarians use the press to turn public opinion against the offensive trades and their smokestacks. This moment both reveals that public opinion was believed to be a powerful force capable of destruction, and that there was not universal opprobrium for stench and smoke belching industries. One of the reasons that *Harper's Weekly* devoted so many of its pages to Hunter's Point, even as President Garfield languished on the New Jersey seashore after being shot, was to convince those who believed that "these poisoning establishments are the seats of necessary but unpleasant industries, to which the community must reconcile itself as well

as it can," that the stenches were unnecessary and should not be endured.[33] The press wanted to inflame public opinion into a frenzy that could not be ignored, and thereby demand enforcement of Governor Cornell's proclamation against the offensive trades. In this way, *Harper's Weekly* and other papers inserted themselves forcefully into the debate over the city's air.

Rogers also emphasized the importance of the press. In Rogers' August 20 cartoon, "the press" stands in the doorway with a somber expression, making a sweeping gesture of revelation to expose the miseries of the sickroom to allegorical New York [Figure 4.5]. By displaying the miseries of the sickroom, the press forces its readers to confront the reality of stenches' effects upon health. There is no hope for the mother's recovery in this tableau of family grief, wherein the father sobs in distress and a toddler, about to be robbed of his mother by a poisonous atmosphere, grasps his father's chair with one hand and covers his nose with the other. New York, like the audience of the illustration, is aghast at what she witnesses, clutching both her head and her heart. Though New York is armed, she is as powerless in this cartoon as she was when the East River divided New York and her anger from the hags with their cauldron at Hunter's Point. The sword dangles from New York's hand, as it was impossible to attack the air of the sickroom. Here, the spectral hags with their incense burner of sludge-acid and exhalations of vitiated air embody the odors from Hunter's Point rather than the businesses that produced the poisonous stench.

By displaying a private domestic scene in his cartoon of the sickroom, Rogers' goal was to force *Harper's Weekly* readers to confront how odors affected health.

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[33] *Ibid*.

Citizens and physicians frequently attributed nausea, headaches, insomnia and general debility to the stenches. Before the State Board of Health, doctors explained that, "the violence of the stenches is indescribable," "the stenches produce sickness, especially in children, and in all invalids to whom fresh air is most essential," and "stenches are active factors in generating disease."[34] By dramatizing these accounts and showing the human toll in a dying woman and grieving family, Rogers invoked sympathy for the suffering of fellow man. Sympathetic witnessing of the sickroom was especially important because this sickroom, like so many others, was in a tenement on the East Side. Rogers focused on tenement residents, whom the corresponding article numbered at "perhaps four hundred thousand," both because the tenements were downwind from Hunter's Point and to expand the scope of the problem from one of middle-class sensibilities to an issue of public welfare. One-hundred-five middle-class citizens had petitioned the governor and eighty-nine had testified before the State Board's Committee on Effluvium Nuisances, but *Harper's Weekly* showed that the health of thousands more suffered.[35] Until these "foreign citizens…learn[ed] to protect themselves…by public meetings, petitions, elections, [and] votes," *Harper's Weekly* and its readers took up the duty of protecting "the welfare of the people" or "the common good."[36]

Rogers depicted the suffering tenement family through the tropes of domesticity. The sickroom, though sparsely furnished, appears clean and tidy. The father and child are also clean and respectably dressed; there are no signs of the inebriation or slovenliness that elsewhere marked the moral failures of the undeserving poor. In his

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[34] *Second Annual Report of the State Board of Health of New York*, (Albany: Weed, Parsons and Company, 1882), 341.
[35] Eugene Lawrence, "Hunter's Point and its Victims," *Harper's Weekly* 20 Aug 1881, pg. 566.
[36] *Ibid*.

article, Eugene Lawrence similarly described the laborers, poor, and immigrants of the tenements in terms of middle-class respectability. Lawrence praised tenement-dwellers' industriousness, evident both in the long hours they worked and the windows, "enlivened by flowers, birds, and the laughing faces of children."[37] These windows, so similar to those proscribed by domestic advice writers Catharine Beecher and Marion Harland, emphasized the innocent victimhood of the East Side residents, who suffered not for their own failures but because they could not control the air they breathed. In presenting a sanitized view of the sickroom to *Harper's Weekly*'s largely middle-class audience, few of whom would have ever entered a tenement, Rogers made the readers witness to the horrors perpetrated on innocent women and children by the offensive trades. Both Rogers and Lawrence, like Griscom before them, presented the poor health of the laboring classes as the result of conditions beyond their control; the inherent logic was that, if East Side residents could afford to live in an area unaffected by the stenches, they would certainly move. Economic constraints and manufacturers' deliberate disregard of Governor Cornell's proclamation conspired to sicken and kill the innocent poor.

Rogers and Nast, along with the authors for *Harper's Weekly*, consistently argued that the problematic stenches came from the industries at Hunter's Point and along Newtown Creek. As with many other reform issues that *Harper's Weekly* exposed, writers and artists presented the persistence of stenches as the result corruption and deliberate disregard for the public good. In this case, the governor was trying to do his duty, but corrupt and greedy businesses thwarted his efforts by ignoring the proclamation. *Daily Graphic*, writing from a slightly different vantage point, drew plumes of smoke and

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[37] *Ibid.*

stench arising not only from Hunter's Point, but also from Harlem Flats and slaughterhouses and abattoirs on the Upper West Side of Manhattan Island [Figure 4.6].[38] Odors beset Father Knickerbocker, from all sides. The accompanying text further elucidated the problem as it decried "amazingly careless and incompetent rulers," a charge that echoed Thomas Musgrave's 1878 allegations that the Board of Health sanctioned stench production within New York City.[39] The cartoon showed that a variety of industries were at fault for the ill health of New Yorkers. *The Daily Graphic*'s editors amended the cartoon to point out that city and state rulers, in failing to enforce their nuisance codes, health laws and proclamations, contributed to the poisonous atmosphere. The cartoon's contrast between ineffective patent medicines and effusive smoke signaled that palliatives would not improve the city's health. Instead, city leaders needed to strike at the source and enforce nuisance regulations.

Though *Daily Graphic* contributed only once to the graphic reform campaign, its cartoon is notable for showing that New York City also produced stenches and for indicting the failure of city leaders to enforce the law. The simultaneous presence and impotence of the law is another theme that runs through all of these images, from Nast's first illustration of the industry mocking the governor through the final cartoons published by *Harper's Weekly* in September 1881. When Rogers caricatured New York as a woman, he always presented her as armed. New York's power was her sword of law, but she so rarely wielded the sword that she often appeared powerless. When she

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[38] In response to pressure against small slaughterhouses by the city's health department, and in an effort to consolidate the lucrative business of slaughtering under the control of a select few, butchers and slaughterers joined together in founding three abattoirs by 1877. The abattoirs were well equipped for business, but had few provisions for handling tallow, offal and blood. See Duffy, *A History of Public Health in New York City, 1866-1966*, 128-132; and Pamela Young Lee, ed., *Meat, Modernity and the Rise of the Slaughterhouse* (Lebanon, NH: University of New Hampshire Press, 2008).

[39] "Pictures of the Day," *Daily Graphic* 23 Aug 1881. On Musgrave, see chapters 1 & 2.

first encountered the hags, the East River separated New York from the cauldron and rendered her powerless to strike. The cartoon mirrored how the East River, as political boundary between New York City and the neighboring counties of Kings and Queens, limited the jurisdiction of the Metropolitan Board of Health. Like the sword, the Metropolitan Board's power could not reach across the river. When the press revealed the miseries of the sickroom to New York, her sword dangled listlessly from her hand. It was impossible to use the law against the air of the sickroom.

On September 3rd, Rogers placed New York in her most desperate struggle yet, confronting the hags with her sword high above her head and ready to strike [Figure 4.7]. The hags here, separated from their cauldron, represent the stenches as much as the owners of the offensive trades. The stenches choke and physically restrain New York, so that she can neither strike nor protect the children clinging to her skirts. The power of the stenches is evident in the muscular arms of the hags, as they snatch fearful children, carry a dead child like a rag doll, and arrest the resistance of New York City. In this image, New York is doubly weak, unable to strike with the sword of law or even to do her feminine duty of protecting "her little ones." In the accompanying text, *Harper's Weekly* highlighted the precarious health of the city's youngest inhabitants: "Hard as it must be for those who are well and strong to breathe the air thus contaminated, it is sickness and death to the little ones, whose wan, gaunt features and emaciated forms move our sympathy, and demand our protecting care."[40] While it appeared that the stenches were winning in this power struggle, New York could not give up the fight and abandon her motherly duty.

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[40] "Can not New York Protect her Little Ones?" *Harper's Weekly* 3 September 1881, 603.

When the artists presented an embodied New York City, either in Father Knickerbocker or the allegorical woman, they both illustrated how individual bodies reacted to breathing stenches and argued that individual suffering was a citywide problem. As *Daily Graphic* readers saw Knickerbocker hold his aching head and try to quell nausea by rubbing his stomach, they witnessed the pain of the urban body, an aggregate of city dwellers sickened by the smells. In the pages of *Harper's Weekly*, where both Rogers and Nast depicted New York as a woman, New Yorkers' health struggles were even more poignant. Nast, like Rogers, showed the stenches of Hunter's Point strangling the woman and thereby checking her sword of law [Figure 4.8]. Strangulation was the ideal visualization of interrupted respiration, and emphasized both the victimization of New Yorkers, who struggled just to breathe, and the injustice of the situation. As a woman, New York City did not attack the industries unprovoked, but struggled against them in self-defense. In the muscular bodies of the hags, the omnipresent clouds of dark smoke, and the skeletal rendering of Death, the iconography of stench indicated the power and the pervasiveness of odiferous, poisonous air emanating from Hunter's Point.

For the final cover that *Harper's Weekly* dedicated to the smells of Hunter's Point, popular poet William Carleton contributed a city ballad about the problems of breathing urban air [Figure 4.9]. In "That Swamp of Death," Carleton gave voice to a poor laborer who bent a visiting minister's ear with an outpouring of grief and anger over the death a young girl. Rogers illustrated the poem with three vignettes, making the reader witness to the interaction between father and minister in a miserable tenement room, to the voluminous smoke and stench poured into the air by "that swamp of death,"

and to the idealized vision of childhood that had been lost. The juxtaposition of Carleton's verse with Roger's cartoons emphasized the now familiar themes of suffering, injustice, corruption and powerlessness.

Carleton penned his ballad as part of the campaign against the smells of Hunter's Point, and contemporary magazines recognized the odor-fighting point of Carleton's poem. *The Literary Review* saw the turn to poetry as a new tactic in reform: "Cartoons and editorials have been hurled in rapid succession at the Hunter's Point smells, and now we will see what effect poetry has in righting the wrongs of a community."[41] Contemporaries understood that the ballad was about stenches, even though Carleton spoke of "poisonous air" and "chimneys" rather than stenches or smells. The poem, like the graphic campaign in which it first appeared, tied smoke to stench, illness, and death, thereby giving smoke a negative connotation. As the grieving father explained his point of view, "'twas not God's mercy took her, but the selfishness of man," he joined the chorus of *Harper's Weekly* editors, authors and illustrators in condemning the owners of smoke and stench producing offensive trades for their callousness and greed.

Rogers illustrated the pathos of the father's grief in the depiction of the meeting between father and minister, which appeared next to stanzas wherein the father directly addressed the preacher. Midway down the page, Rogers sketched the outlines of factories and billowing smoke around lines about the selfishness of man and the poor girl's struggle to breathe:

> Why, she lay here, faint and gasping, moaning for a bit of air,
> Choked and strangled by the foul breath of the chimneys over there;
> For it climbed through every window, and it crept beneath the door,
> And I tried to bar against it, and she only choked the more.

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[41] "News and Notes," *The Literary World: A Monthly Review of Current Literature* 24 Sept 1881, pg. 329.

Due to its position on the page, smoke became the immediate context for the "foul breath" that killed the child. The second couplet, about the father's failed attempts to shut out the foul air, revealed the insidiousness of the poisoned atmosphere. The prevailing practice in sickrooms was to admit copious fresh air through opened windows and thus expel the fetid bodily exhalations that poisoned the air.[42] Urban life inverted this routine. In the industrial city, foul air invaded the sickroom from without and could not be eliminated. Sickness and death were inevitable.

The poem continued to reveal that not only was the poor laborer aware that the city's air was bad, but so too was his young daughter who whispered, "I am dying for a little breath of air." In Carleton's treatment, even "ignorant day worker[s]" and their children were cognizant that their environment was killing them. Fresh air was not a desire specific to the upper classes, but a universal necessity for good health. By placing fresh air knowledge in the mouths of the desperate poor, Carleton reiterated the importance of fresh air frequently articulated by health reformers, physicians, and authors of domestic advice. Carleton's narrator might not have read the same books as these reformers, but he both knew the problems of urban air and that better, fresher, more healthful airs existed a short distance away:

> If she'd gone out with the zephyrs, 't wouldn't have seemed so hard to me,
> Or among the cool fresh breezes that came rushing from the sea;
> But it's nothing less than murder when my darling's every breath
> Chokes and strangles with the poison from that cursed swamp of death.[43]

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[42] Will Carleton had previously expressed the importance of fresh air in verse, explaining it as "God's remedies" in 1873. W.M. Carleton, "Air and Light—A Doctor's Story," *The Sanitarian* 1:4 (July 1873), 167-168.

[43] Will Carleton, "That Swamp of Death: A City Ballad," *Harper's Weekly* 17 September 1881, cover.

Zephyrs and sea air were vastly preferable to "the poison from that cursed swamp of death," a poison that the poor laborer understood as both man-made and government-sanctioned. The inability of the Metropolitan Board of Health, the State Board of Health, or of the Governor to stop the emanations from Hunter's Point had both killed his child and left a bad taste in the poor man's mouth: "But there must be something treacherous in the steering of the law / *When we get a dose of poison with every breath we draw.*"[44]

Carleton's poem and its accompanying images reiterated and encapsulated the arguments of the graphic press's campaign against Brooklyn industries, a campaign that considered stenches as the chief 'poison' in New York City's air. The images of this 1881 campaign, by visualizing stenches as dark smoke, began the cultural work of shifting the public perception of smoke from good to bad. This perceptual shift was a matter of degrees and context, as connotations and meanings of smoke would continue to vacillate in the following decades.[45] Audiences in 1881 were ready to reconsider the meaning of smoke, not only because they shared concerns about foul odors and ill health, but also because of the previous decade's events. The economic and social tumult of the 1870s, including the Panic of 1873 and the Great Strikes of 1877, forced many Americans to question the underpinnings of their social order and the ways in which big industries dominated the United States.[46]

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[44] *Ibid*.
[45] For an overview of the vacillating meanings of smoke, see Stradling, *Smokestacks and Progressives*. Historian John W. Dower has made a similar argument about the constant availability of racial ideas for deployment, often through graphic images that emphasize particular connotations. Dower, *War without Mercy: Race & Power in the Pacific War* (New York: Pantheon Books, 1986).
[46] Nicholas Barreyre, "The Politics of Economic Crisis: The Panic of 1873, the End of Reconstruction, and the Realignment of American Politics," *Journal of the Gilded Age and Progressive Era* 10, no. 4 (Oct 2011), 403-423; Michael A. Bellesiles, *1877: America's Year of Living Violently* (New York: The New Press, 2010); David O. Stowell, ed., *The Great Strikes of 1877* (Chicago: University of Illinois Press, 2008); Samuel Rezneck, "Distress, Relief, and Discontent in the United States during the Depression of 1873-78," *Journal of Political Economy* 58, no. 6 (Dec 1950), 494-512; Heather Cox Richardson, *West*

After the 1881 campaign against Hunter's Point receded, replaced in the pages of the graphic press by an illustrations of public mourning for President Garfield, its images and poems took on new meaning. Smoke, rather than smell, became the central concern for air quality in the city. An example of this shift can be found in Chicago, where the Citizens' Association created a Committee for Smoke in 1879 and then disbanded its long-standing Committee on Stenches in the early 1880s.[47] Citizen reporting to health boards changed from stench complaints to observations of smoke color, density, and plume height. When Will Carleton republished "That Swamp of Death" in his collection *City Ballads* in 1885, he offered no context to place the swamp in Brooklyn, or note that death came from smelly air.[48] The very vagueness of the poem made it a powerful denunciation of urban conditions writ large, which fit with Carleton's career-long emphasis on the superiority of rural life.[49] The conceit of *City Ballads* was that its verses had been penned by two rural men, a young student and an old farmer, because "the great drama of metropolitan existence falls most forcibly upon those just from the clear streams and green meadows of the country."[50] Carleton wrote not only to emphasize the differences between city and country, but also with the goal of affecting readers' emotions: "It is the hope of the author that his book…will rouse your pity of pain, your

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*from Appomattox: The Reconstruction of America after the Civil War* (New Haven: Yale University Press, 2007), esp. 148-186; and Richard White, *Railroaded: The Transcontinentals and the Making of Modern America* (New York: W.W. Norton & Co., 2011).

[47] Christine Meisner Rosen, in searching for the origins of the anti-smoke crusades, has focused on the efforts of the Citizens' Association's Smoke Committee with no reference to the same association's earlier and concurrent work against stench. In *Shock Cities*, Harold Platt notes the Citizens' Association's concerns with foul odors, but considers these separately from their anti-smoke agitation and does not mention the Committee on Stench (whose records no longer exist beyond mention in the Association's Annual Reports). Rosen, "Chicago Businessmen"; Platt, *Shock Cities*, 247, 365-372.

[48] Carleton, *City Ballads* (New York: Harper & Brothers, 1885), 53-56.

[49] One can follow the conflict between city and rural life through Carleton's published collections, especially *Farm Legends* (1880), *Farm Festivals* (1881), *Farm Ballads* (1882), *City Ballads* (1885), *City Festivals* (1898), and *City Legends* (1900).

[50] Carleton, *City Ballads*, 9.

enjoyment of honest mirth, your hatred of sham and wrong, and your love and adoration of the Resolute and the Good, and their winsome child, the Beautiful."[51] Though removed from its original political context, Carleton's verses retained their reform agenda.

In this context, "That Swamp of Death" appeared as an account of what the old farmer had seen when travelling the city with a minister on his visits to the poor. The farmer was shocked by the degree of poverty before him: "For city trouble, any one will find, / Is more ingenious than the country kind."[52] In response, the farmer resolved both to help the poor himself and to publicize the extent of their need. When he returned home, the farmer told his wife of his determination to save children by bringing them out into the country, where they would have plenty of fresh air and wholesome food: "Go set the table, Mary, an' let the cloth be white! / The hungry city children are comin' here to-night; / The children from the city, with features pinched n' spare, / Are comin' here to get a breath of God's untainted air."[53] The farmer's scheme echoed that of the recently founded Fresh Air Fund in New York City or excursions for Boston's poor children to Lake Walden. These "fresh air charities" hoped to improve the health of the urban poor by bringing them out of the city to enjoy the fresh air, sunshine, and wholesome country environment.[54]

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[51] *Ibid*, 10.
[52] Carleton, *City Legends*, 48.
[53] Carleton, *City Legends*, 172. Carleton originally published this verse with the dedication "to the poor children's excursions." Carleton, "Let the Cloth Be White," *Harper's Weekly* 2 Sept 1882, cover.
[54] "Fresh air charities," with the explicit goal of taking poor children from the city and giving them the fresh air of the countryside—either on a day excursion or for an extended period of time—arose in the late 1870s and 1880s in the United States, and quickly flourished. The best known of these is the Fresh Air Fund, but variants existed in numerous cities and received frequent attention from the press. On the Fresh Air Fund, see Julia Guarneri, "Changing Strategies for Child Welfare, Enduring Beliefs about Childhood: The Fresh Air Fund, 1877-1926," *Journal of the Gilded Age and Progressive Era* 11, no. 1 (Jan 2012), 27-

Perhaps the greatest indication of the shift from stench to smoke is an 1889 cartoon by William A. Rogers [Figure 4.10]. "Father Knickerbocker and his Offensive Neighbor," which also appeared in *Harper's Weekly*, includes both Hunter's Point and poor laborers as its subject, though neither appear in the same guise as during 1881. Smell or stench is entirely absent; smoke here appears as smoke, which Rogers indicates by pairing the laborer's pipe with the skyline of smokestacks and through the caption, "Why don't yer be a man, an' try ter git used to the smoke?"[55] The brogue and the shillelagh both imply that the smoking man is an Irish laborer. This cartoon, in relation to Rogers' earlier illustrations of Hunter's Point, reveals three perceptual shifts: from smell to smoke as the concern with air quality, from health fears to questions of tolerance, and from poor laborers as victims of to poor laborers as responsible for industrial conditions.

These three perceptual shifts were interconnected, but have been obscured by the historical preoccupation with smoke. As anti-smoke crusaders emphasized smoke, they measured smoke density and took photographs to document the presence of smoke.[56] The charts and photographs became the immutable mobile that proved the existence of problematic smoke, even to those geographically removed from the industries.[57] Yet the

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70. On fresh air charities more broadly, see Walter Shepard Ufford, *Fresh Air Charity in the United States* (New York: Bonnell, Silver & Co., 1897).

[55] W.A. Rogers, "Father Knickerbocker and his Offensive Neighbor," *Harper's Weekly* 6 July 1889, pg. 548.

[56] Measurement technologies for smoke density in the late nineteenth century relied upon the sense of sight. Observers using the Ringelmann Chart, developed in Paris in the late 1890s, and the umbrascope, a tube with gray tinted glasses, used these devices to categorize the darkness of smoke. For more details, see Stradling, 72-73 and 217 n. 28.

[57] "Immutable mobile" is Bruno Latour's conceptualization of how local knowledge has to be translated into other forms for it to be understandable and useful to people outside of or beyond the locality in question. This translation is also a process of extracting information from its context. Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, MA: Harvard University Press, 1987), ch. 6.

anti-smoke crusades, in extracting smoke from its local context of malodors and filth, flattened the problem. When smoke was the main issue, reformers and regulators attacked smoke production to the exclusion of other industrial problems. As they worried about smoke from factories and household furnaces, those distant from the industries ignored the smell.

People forgot the power of the stenches to interrupt sleep. Americans also learned from proponents of germ theory that microbes, not miasmas, caused illness. Consequently, discussions of air pollution changed. The salient health concerns that had directed so much of the outcry against stench dissipated. Smoke threatened cleanliness and efficiency more than the human body.[58] In this altered understanding of air pollution, individual reactions against smoke, much like earlier campaigns against odors, required community consensus to establish that there was a problem. When individual reactions to the smoke were not widely shared, the individual's health did not suffer, but his comfort did. In 1889, Knickerbocker encounters smoke as a problem for his tolerance, not for his health—a problem emphasized by the Irish laborer as he decries Knickerbocker's masculinity: "why don't yer be a man, and try ter git used to the smoke?" When Rogers wanted to indicate that health was threatened, he had used traditionally weaker figures of women and children. Here, Rogers emphasized masculinity and class in the encounter between two men, a working class new immigrant and a distinguished descendant of the first settlers. The smoking Irishman roughly shoulders Knickerbocker and blows smoke into his face, invading both the physical and

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[58] This changed over time, as the particulates within smoke were increasingly understood in the twentieth century to hinder respiration, cause asthma and allergies, and otherwise harm the human body. See Gregg Mitman, *Breathing Space: How Allergies Shape Our Lives and Landscapes* (New Haven: Yale University Press, 2008), ch. 4.

air space of the neighbor. Father Knickerbocker sits up straight and plants himself firmly with both feet and cane, but his sideways glance and frown express his discomfort with his smoky neighbor's proximity. The cartoon makes it evident that New York intends to hold its position, but dislikes Brooklyn's smoke. The question is if New York can tolerate or "git used to" smoke which seemingly does not affect the city's health; Knickerbocker doesn't gasp or cough or hold his stomach as he had when encroaching odors affected his health.

Odors similarly were construed as questions of tolerance and disgust rather than of health. While this aspect of odor perception had also been present when odors were a health concern, the shift in emphasis and the contemporary development of bodily odor controls—including the first deodorants and synthetic perfumes—made individuals responsible for their stink.[59] Rogers indicates this by presenting the Irish worker, whom Rogers had visualized as a sympathetic figure eight years earlier, as both responsible for industrial smoke and active in pushing unsavory conditions into others' personal space through his very presence.

The social implications of the changing meanings of smell were profound. Whereas odors had indicated one's labor or place of residence earlier in the century, now

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[59] On concerns about bodily odor before germ theory, see scattered references in Hoy, *Chasing Dirt;* Emily Cockayne, *Hubbub: Filth, Noise and Stench in England, 1600-1770* (New Haven: Yale University Press, 2007); and Kathleen Brown, *Foul Bodies: Cleanliness in Early America* (New Haven: Yale University Press, 2009). In the Early Modern period, the body was naturally disgusting until cleansed, a point made by both Cockayne and Brown. Cockayne and Brown tie the concern with bodily odors to the cultivation of gentility, as their sources come largely from advice books and the writings of elites. Yet references to body odor are only a small portion of these works; the paucity of such commentary, especially in studies of cleanliness and the body, stands in stark contrast to the emphasis on bodily cleanliness in the "new public health" of the Progressive Era. See, for example, Daniel Burnstein, *Next to Godliness: Confronting Dirt and Despair in the Progressive Era* (Urbana: University of Illinois Press, 2006); Marilyn T. Williams, *Washing "The Great Unwashed": Public Baths in Urban America, 1840-1920* (Columbus: Ohio University Press, 1991); Nancy Tomes, *Gospel of Germs*; and Hoy, *Chasing Dirt*, esp. 106-108.

distasteful bodily and environmental odors were a moral failing.[60] In the 1840s, John Hoskins Griscom understood the musty odor of cellar dwellers as a marker of their poverty and a consequence of substandard living quarters in New York City. Similarly, when Franc Wilkie encountered Chicago's Court-House Ghost in the 1870s, he identified the stranger's stench with the man's labor and location in the city. Neither Griscom nor Wilkie judged people for the odors they carried; bodily odor was a fact of urban life and labor. But at the end of the century, the odors one carried in clothes, hair and skin were intolerable. Though laborers could not control the smells of the industries they worked in, when these men and women carried the odors of their work through the city, they encountered people who blamed them for their smell. Upton Sinclair emphasized the effect of personal odor in his expose of Chicago's slaughterhouse conditions, *The Jungle*. Jurgis, the main character, learned the olfactory hierarchy of labor in the stockyards upon his arrival in Chicago, and that fertilizer factories were at the bottom rung because of their overpowering stench. When Jurgis sank to this laboring low, his odor not only marked his existence at the bottom of stockyard society, but placed him below even the bums and tramps of wider Chicago society. During a night in prison, where "the air was fetid with their [homeless wanderers'] breath,…some of them smelled Jurgis and called down the torments of hell upon him…"[61] Though Jurgis had no control over the odor from his labor, beyond refusing employment in the fertilizer factory, even Chicago's indigent thought Jurgis stunk and held him responsible for his body's stench.

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[60] Stanley K. Schultz refers to early sanitarian efforts, including those of Griscom, as "moral environmentalism" to indicate that the first sanitarians thought that environmental conditions caused moral virtue or depravity. By the end of the century, this relationship was reversed so that observers thought that immoral people created foul, stinking environments. Schultz, *Constructing Urban Culture: American Cities and City Planning, 1800-1920* (Philadelphia: Temple University Press, 1989), 112-114.
[61] Upton Sinclair, *The Jungle* (Ann Arbor: Borders Classics, 2006), 150.

If tramps and bums reacted negatively to Jurgis based on his odor, the responses of Chicago's middle classes and elites were even worse. Perceptions of odors as threatening to health dissipated at the same time that cities were growing and stratifying socioeconomically through the development of streetcar suburbs.[62] As a result, elites like Father Knickerbocker and even middle class residents did not regularly experience the odors of industrial labor or immigrant neighborhoods. When social elites did enter these neighborhoods, they found the local odors completely shocking. The visceral reaction of disgust, coupled with an increased perception of individual fault for body odor and environmental filth, affected even the most well-meaning of reformers. For example, when Baptist missionary Viva Dyers began her work in Chicago's "Black Hole," a mixed immigrant neighborhood near the Chicago River and railroad stations, odors constantly overwhelmed her charitable impulses: "An unwholesome odor came up from all around, and I wondered how people could live in such an atmosphere; but worst by far was the sin in which they were breathing out an existence."[63] Dyers, viewing the lower classes through a religious lens, frequently equated foul odors with sin and hoped that by spreading the Christian gospel, she might teach the recipients of her mission to clean their souls and their bodies. For Dyer, the persistence of odors indicated the continued need for her mission.

Many elites thought that the residents of these areas did not realize the smell. In 1893, a *New York Times* reporter visited the pushcart markets of the Lower East Side and

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[62] Kenneth Jackson, *Crabgrass Frontier: The Suburbanization of the United States* (New York: Oxford University Press, 1985), esp. 103-124; David Schuyler, *The New Urban Landscape: The Redefinition of City Form in Nineteenth-Century America* (Baltimore: The Johns Hopkins University Press, 1986), esp. 149-166.

[63] Viva H. Dyers, *The Black Hole, or the Missionary Experience of a Girl in the Slums of Chicago, 1891-1892* (Chicago: privately published, 1893), 23.

observed many practices that he considered filthy but that the locals seemingly did not notice. He thought that Romanians at a fish cart "did [not] notice the horrible stench that came from the putrid fish." When he turned his attention to a nearby cheese cart, the reporter "received such a shock from the powerful odor thrown out that he almost had a spasm. Phew! How that cheese did smell." Observing the eager customers who plunged their fingers into the cheese for a taste, the author was disgusted at their eager consumption of "a reeking mass of rottenness." The reporter concluded that the entire neighborhood was "the eyesore of New York," and that the dirt and the stench made it impossible for anyone else to live there. The author concluded that the immigrants of the Lower East Side inherently did not know cleanliness and could not be improved because "they do not want to be." Rather than realize that the city neglected these streets and allowed the garbage to accumulate, contributing heavily to the stench, the author used his experiences of fetor, filth and disgust to reify his ethnocentric beliefs about the inferiority of new immigrants.[64]

Jane Addams brought similar attitudes with her into settlement house work. In *Twenty Years at Hull House*, Addams described the people she intended to help as having "little initiative" and being "densely ignorant of civic duties," traits that Addams saw reflected in the "inexpressively dirty" streets of foul neighborhoods.[65] Among the many lessons she hoped to teach were the lessons of cleanliness that would reduce personal odors. Addams and her associate Mary McDowell, better known as "Garbage Lady," worked with the residents near the stockyards in municipal housekeeping campaigns and

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[64] "East Side Street Vendors," *New York Times* 30 Jul 1893, pg. 17.
[65] Jane Addams, *Twenty Years at Hull-House: With Autobiographical Notes* (New York: The Macmillan Company, 1911), 98-99.

pressured Chicago's government to stop dumping garbage and clean up Packingtown.[66] Even as they pursued these sanitation efforts, Addams and McDowell reinforced widely held ideas that Packingtown residents did not notice the stench of their neighborhood. In refuting a lawyer who said that, "people in that part of town [Packingtown] are generally not sensitive," McDowell disagreed with his message but not its underlying logic.[67] Instead of rejecting the idea that Packingtown's residents, a mixture of Eastern Europeans and African Americans, were insensitive to odors and filth, McDowell claimed that the settlement house education was changing these people and "the standard is growing higher every day."[68] McDowell and Addams presented themselves as changing the lower classes' inherent

The notion that those who smelled did not know, notice, or care for their body odors was ingrained in the period's ideas of ethnic and racial difference, wherein supposedly lower peoples appeared as dirty, filthy, and smelly.[69] When the residents of neglected neighborhoods were able to speak for themselves, they proclaimed a

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[66] On McDowell's campaign against garbage, see Sylvia Hood Washington, *Packing Them In: An Archaeology of Environmental Racism in Chicago, 1865-1954* (Lanham, MD: Lexington Books, 2005), esp. ch. 3 and 4; and David Naguib Pellow, *Garbage Wars: The Struggle for Environmental Justice in Chicago* (Cambridge, MA: The MIT Press, 2002), ch. 2.

[67] McDowell, qtd. in Pellow, *Garbage Wars*, 21.

[68] Ibid.

[69] These notions applied not only to the new immigrants and African Americans who lived on the Lower East Side and in Packingtown, but also to Cubans and Filipinos whom the United States government intended to "lift up," and Asian migrants on the West Coast. Scattered references to body odor and ideas of racial, ethnic and class difference, often embedded in discussions of cleanliness and health, can be found in: Connie Y. Chiang, "Monterey-by-the-Smell: Odors and Social Conflict on the California Coastline," *Pacific Historical Review* 73(2): 182-214; Constance Classen, "The Odor of the Other: Olfactory Symbolism and Cultural Categories," *Ethos* 20, no. 2 (Jun 1992), 133-166; Classen, David Howes, and Anthony Synnott, *Aroma: The Cultural History of Smell* (London: Routledge, 1994), esp. 165-172; Hoganson, *Fighting for American Manhood*, ch. 8; Alan M. Kraut, *Silent Travelers: Germs, Genes, and the "Immigrant Menace"* (Baltimore: The Johns Hopkins University Press, 1994), chs. 6 & 9; Nayan Shah, *Contagious Divides: Epidemics and Race in San Francisco's Chinatown* (Berkeley: University of California Press, 2001); Mark M. Smith, *How Race is Made: Slavery, Segregation and the Senses* (Chapel Hill: The University of North Carolina Press, 2006); and Synnott, *The Body Social: Symbolism, Self and Society* (London: Routledge, 1993), esp. 195-202.

cognizance of the stench and ascribed different meanings to the smell.[70] At Hunter's Point, an "old timer" inverted the new lessons of germ theory and told a *Harper's Weekly* reporter that "what smell there is now is healthful. I believe myself that it keeps off the malaria."[71] As this man understood, the smell was so strong that germs could not survive in it, though he recalled a time when the odors were even stronger and made him ill. For those who worked in the slaughterhouses and attendant industries, the smell meant money and employment. The women who joined Addams and McDowell in fighting garbage dumps and demanding cleaner streets understood the smell as a health threat. For Algie Martin Simons, the socialist journalist who wrote a pamphlet on Packingtown for visitors to Chicago's World's Fair in 1893, "the horrible, penetrating stench that pervades everything" was capitalism itself.[72] Simons understood that the local conditions of Packingtown caused the stench that others ascribed to the negligence and innate filthiness of ignorant immigrants and laborers. For any who purchased this five-cent pamphlet, Simons outlined the ills of capitalism and the dangers of the stench, directing readers' attention to the aspects of the Stock Yards that tour guides glossed: "Does [the guide] tell about the poison-infested air and general surroundings which makes the slightest scratch a menace to life through blood poisoning, as local infection of wounds is commonly termed?"[73] Simons knew that guides overlooked those things, just as many

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[70] I should note that the working classes rarely had the opportunity to voice their opinions, as to do so required access to members of the middle class or to governments run by the upper classes, and would jeopardize their employment. According to socialist reformer A.M. Simons, Packingtown residents hesitated to sign a petition asking the health department to fight the smoke nuisance, lest he lose his livelihood. A.M. Simons, *Packingtown*, Pocket Library of Socialism No. 4 (Chicago: Charles H. Kerr & Company, undated), 18. Such employee pressure and self-interest in retaining employment also explains petitions from residents of Hunter's Point and Newtown Creek neighborhoods in the 1870s and '80s, testifying that the odors did not cause illness.

[71] Henry Smith Williams, MD, "Unwholesome Environs of Brooklyn," *Harper's Weekly* 4 Aug 1894, 726.

[72] Simons, *Packingtown*, 8.

[73] Ibid, 12.

Chicagoans were able to overlook conditions at the Stockyards until a southern wind blew the stench Northward and "the health commissioner becomes suddenly and deeply interested in the welfare, not of the thousands of laborers who live and eat and drink and sleep in its very midst, but of the few wealthy individuals residing from three to ten miles away."[74] The very growth of Chicago, like that of New York City and of Boston, hid the environmental conditions of industrial and working class neighborhoods from the middle and upper classes, who then could forget that the city's factories created the stench of the lower classes.

The turn to defining air pollution as smoke was the product of a particular moment wherein the sense of sight trumped smell because of a flourishing graphic press in New York City, a growing belief in germ theory, and the need for tangible evidence in the court of nuisance law. The effects of this moment long outlasted its causes, as the cultural meanings of odors shifted to condemn, rather than argue for the protection of, people who inhaled and absorbed the worst of the stenches. Though environmental smells were deployed to discriminate against the lowest classes, already living on the economic and social margins of the city, lay understandings of the connection between foul odors and ill health persisted among these people as they fought for sanitary services and environmental justice in the Progressive Era. The fight grew more difficult because smoke and stench had been divorced—smoke became air pollution and stench became mere nuisance—and because, as cities grew and suburbanized, these environmental problems were increasingly experienced only by the lower classes rather than by whole communities. The struggle against smells continued into the twentieth and twenty-first

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[74] Ibid, 9.

centuries, but would require new and different cultural work to define air pollution through the nose as well as the eye.

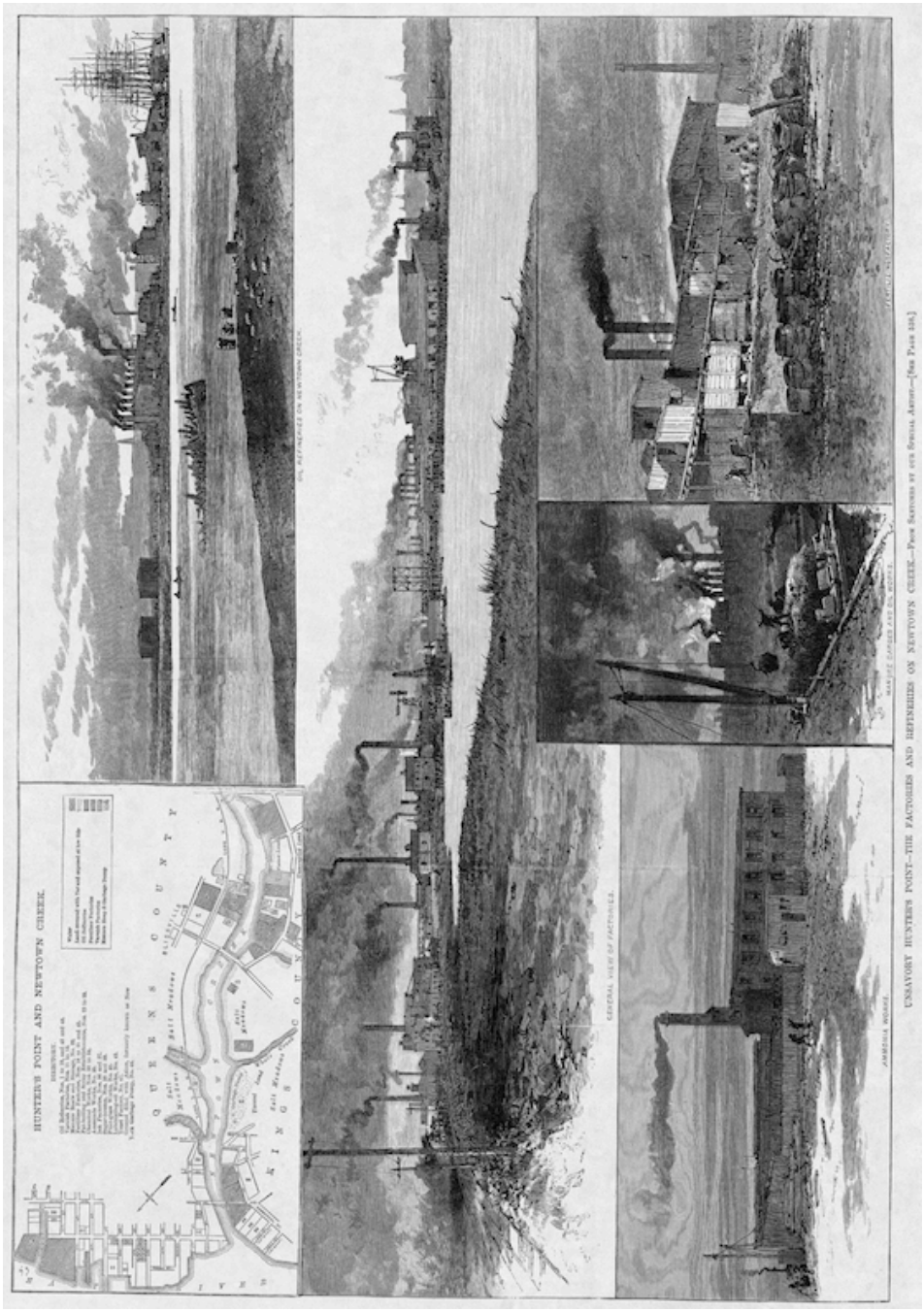



Figure 4.1. "Unsavory Hunter's Point—The Factories and Industries of Newtown Creek," *Harper's Weekly*, 6 Aug 1881, pg. 536-7.

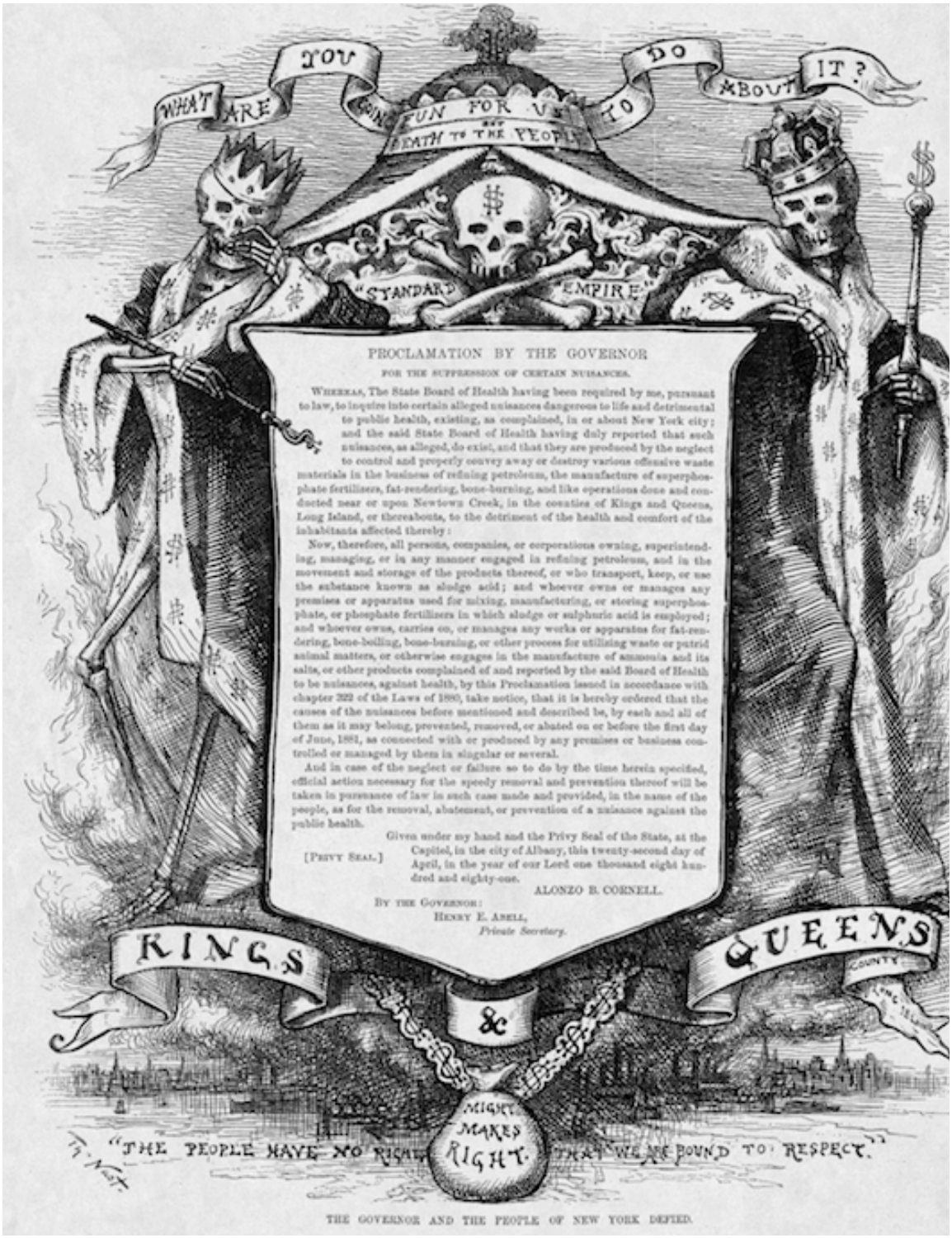
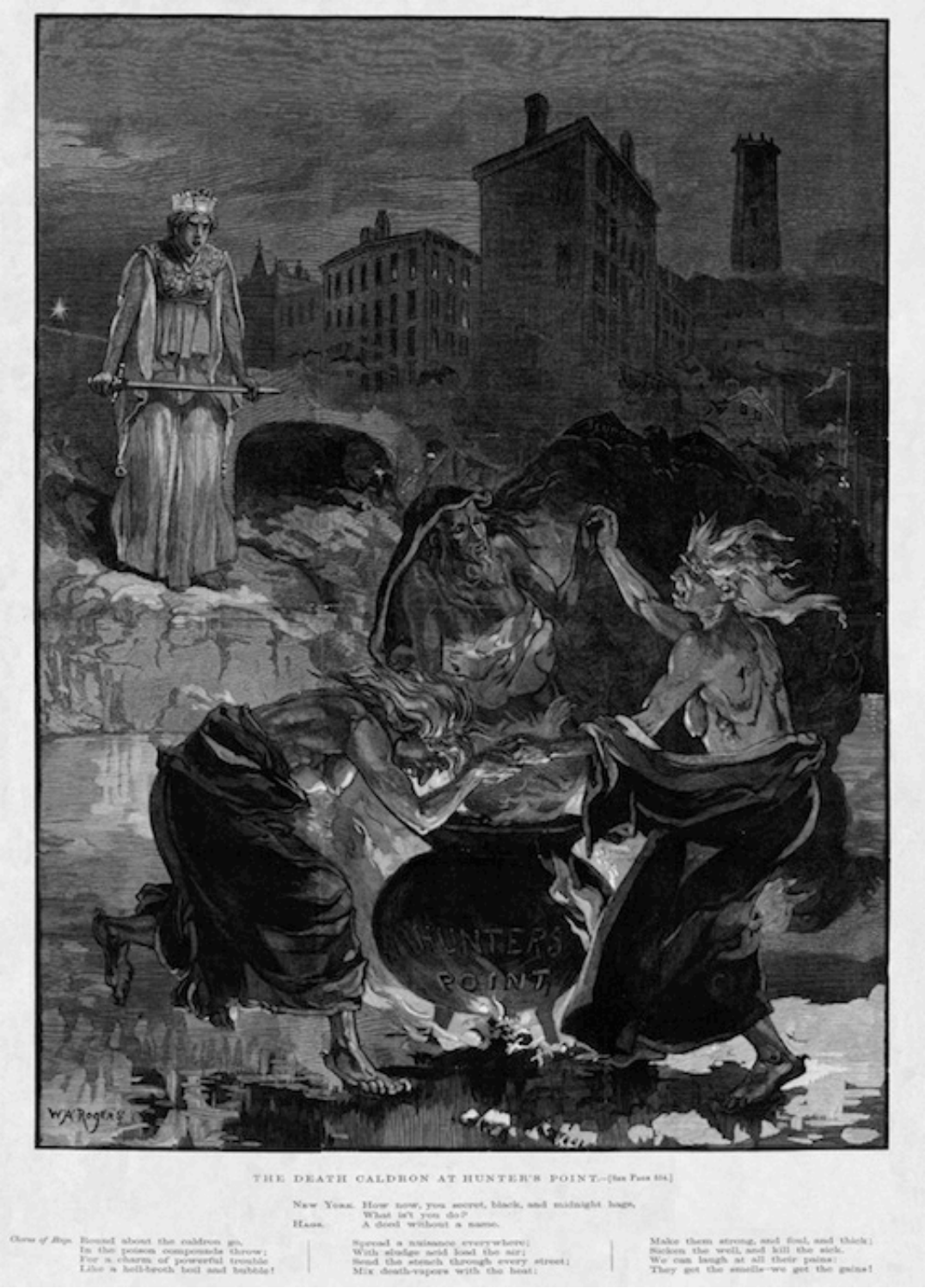



Figure 4.2. Thomas Nast, "The Governor and the People of New York Defied," *Harper's Weekly*, 13 Aug 1881, cover.




THE DEATH CALDRON AT HUNTER'S POINT.—[See Page 604.]

New York. How now, you secret, black, and midnight hags,
What is't you do?
Hags. A deed without a name.

*Chorus of Hags.* Round about the caldron go,
In the poison compounds throw;
For a charm of powerful trouble
Like a hell-broth boil and bubble!

Spread a nuisance everywhere;
With sludge acid load the air;
Send the stench through every street;
Mix death-vapors with the heat:

Make them strong, and foul, and thick;
Sicken the well, and kill the sick.
We can laugh at all their pains:
They get the smells—we get the gains!

Figure 4.3. W.A. Rogers, "The Death Caldron at Hunter's Point," *Harper's Weekly*, 13 Aug 1881, pg. 552-553.

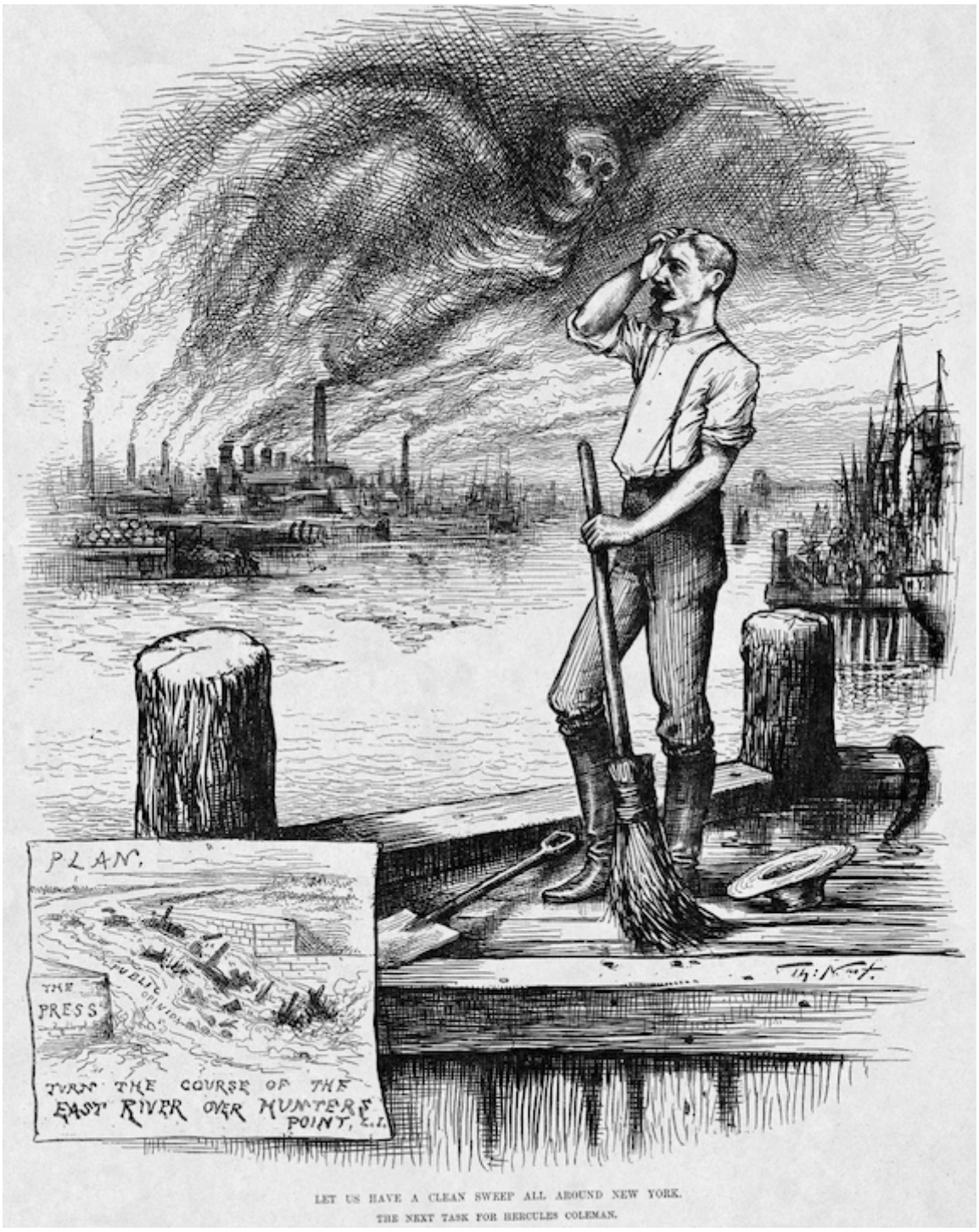



Figure 4.4. Thomas Nast, "Let Us Have a Clean Sweep All Around New York. The Next Task for Hercules Coleman," *Harper's Weekly*, 20 Aug 1881, cover.

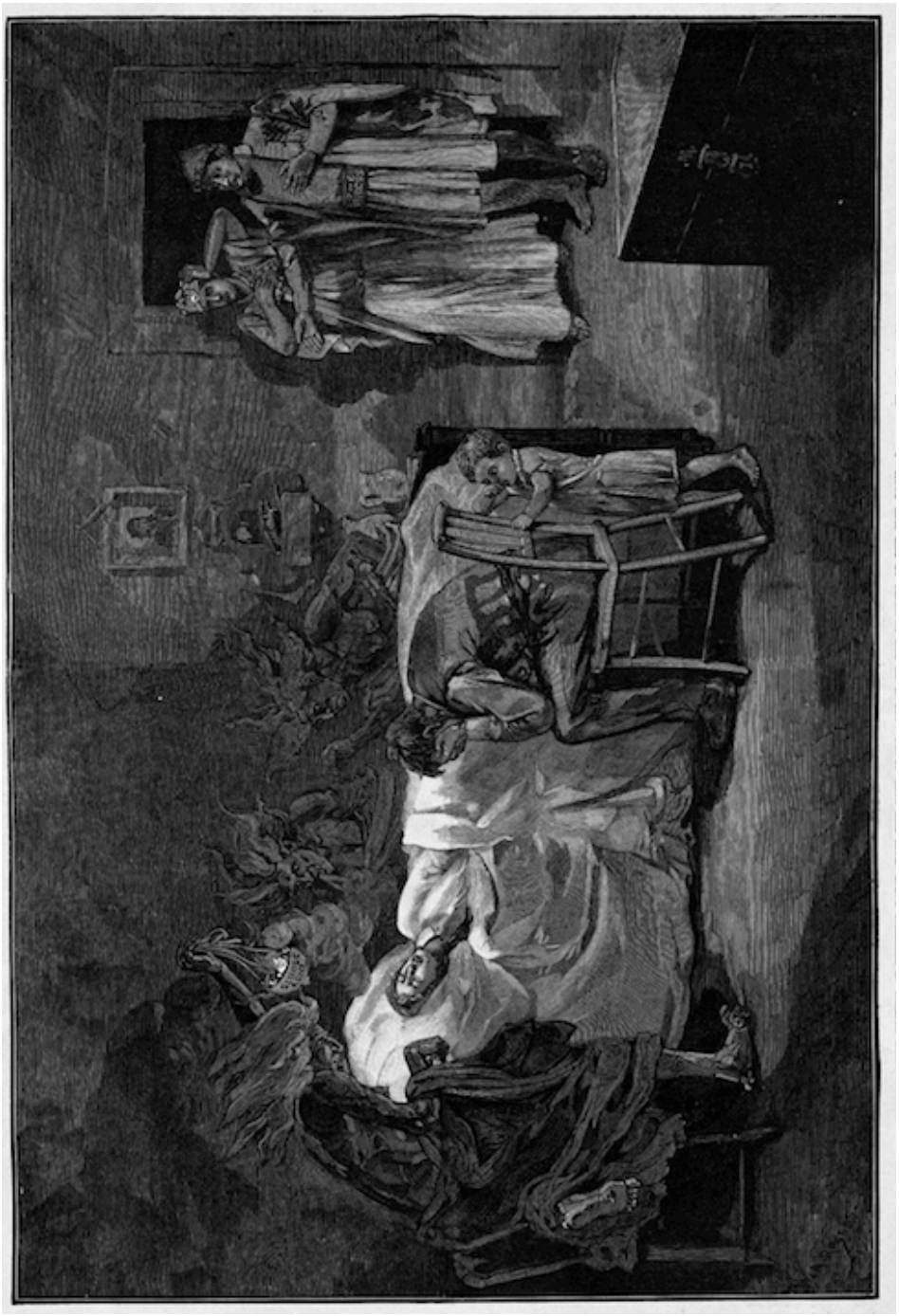


Figure 4.5. W.A. Rogers, "The Victims of Hunter's Point--How the Foul Odors Aggravate the Miseries of the Sick Room," *Harper's Weekly*, 20 Aug 1881, pg. 565.

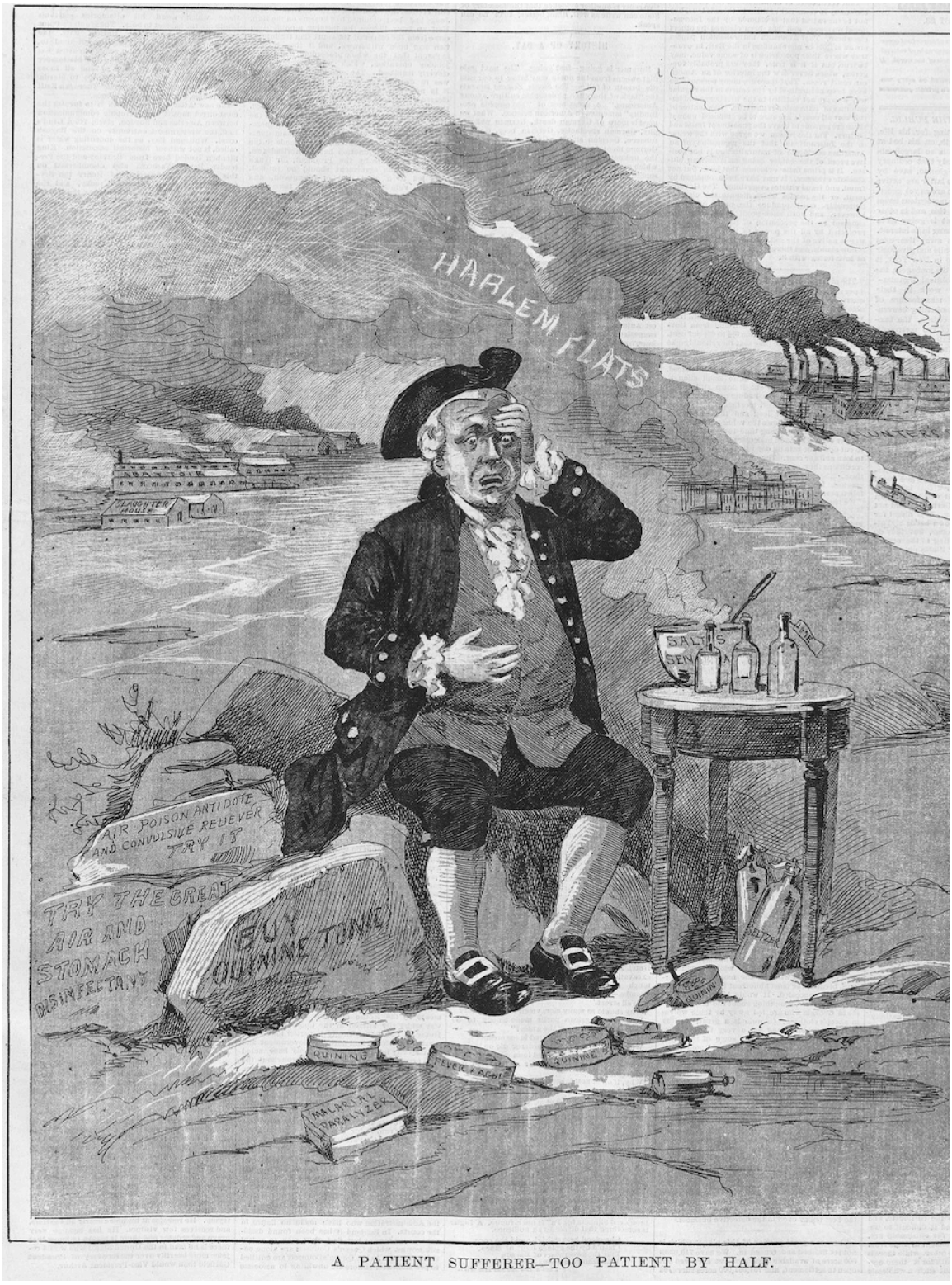
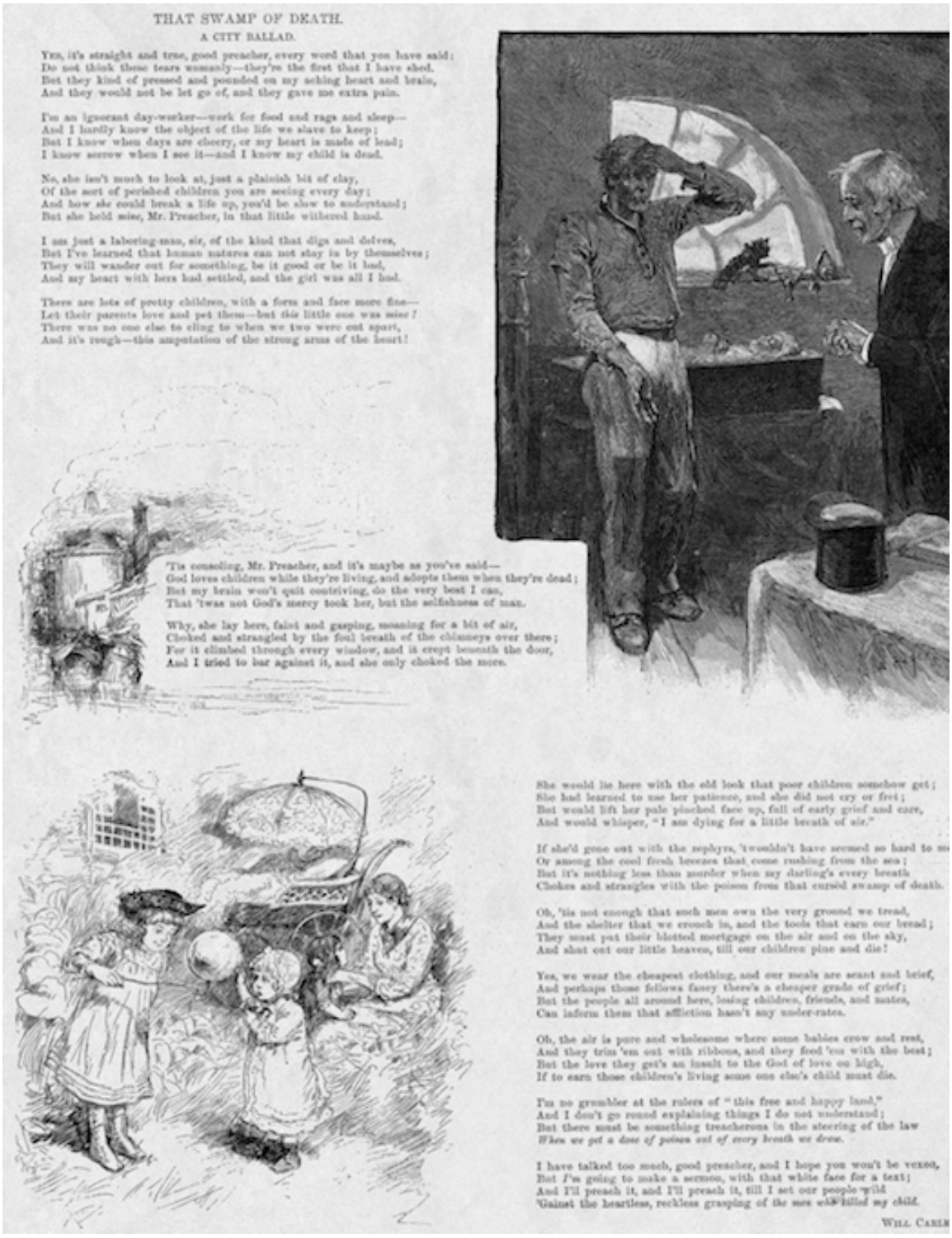



Figure 4.6. "A Patient Sufferer--Too Patient by Half," *Daily Graphic* 23 Aug 1881, cover.


Figure 4.7. W.A. Rogers, "Can not New York Protect her Little Ones?" *Harper's Weekly*, 3 Sept 1881, cover.


Figure 4.8. Thomas Nast, "Strike Oil (Hunter's Point)," *Harper's Weekly*, 10 Sept 1881, pg. 623.



THAT SWAMP OF DEATH.

A CITY BALLAD.

YES, it's straight and true, good preacher, every word that you have said;
Do not think these tears unmanly—they're the first that I have shed.
But they kind of pressed and pounded on my aching heart and brain,
And they would not be let go of, and they gave me extra pain.

I'm an ignorant day-worker—work for food and rags and sleep—
And I hardly know the object of the life we slave to keep;
But I know when days are cheery, or my heart is made of lead;
I know sorrow when I see it—and I know my child is dead.

No, she isn't much to look at, just a plainish bit of clay,
Of the sort of perished children you are seeing every day;
And how she could break a life up, you'd be slow to understand;
But she held *mine*, Mr. Preacher, in that little withered hand.

I am just a laboring-man, sir, of the kind that digs and delves,
But I've learned that human natures can not stay in by themselves;
They will wander out for something, be it good or be it bad,
And my heart with hers had settled, and the girl was all I had.

There are lots of pretty children, with a form and face more fine—
Let their parents love and pet them—but *this* little one was *mine!*
There was no one else to cling to when we two were cut apart,
And it's rough—this amputation of the strong arms of the heart!

'Tis consoling, Mr. Preacher, and it's maybe as you've said—
God loves children while they're living, and adopts them when they're dead;
But my brain won't quit contriving, do the very best I can,
That 'twas not God's mercy took her, but the selfishness of man.

Why, she lay here, faint and gasping, moaning for a bit of air,
Choked and strangled by the foul breath of the chimneys over there;
For it climbed through every window, and it crept beneath the door,
And I tried to bar against it, and she only choked the more.

She would lie here with the old look that poor children somehow get;
She had learned to use her patience, and she did not cry or fret;
But would lift her pale pinched face up, full of early grief and care,
And would whisper, "I am dying for a little breath of air."

If she'd gone out with the zephyrs, 'twouldn't have seemed so hard to m
Or among the cool fresh breezes that come rushing from the sea;
But it's nothing less than murder when my darling's every breath
Chokes and strangles with the poison from that cursèd swamp of death.

Oh, 'tis not enough that such men own the very ground we tread,
And the shelter that we crouch in, and the tools that earn our bread;
They must put their blotted mortgage on the air and on the sky,
And shut out our little heaven, till our children pine and die!

Yes, we wear the cheapest clothing, and our meals are scant and brief,
And perhaps those fellows fancy there's a cheaper grade of grief;
But the people all around here, losing children, friends, and mates,
Can inform them that affliction hasn't any under-rates.

Oh, the air is pure and wholesome where some babies grow and rest,
And they trim 'em out with ribbons, and they feed 'em with the best;
But the love they get's an insult to the God of love on high,
If to earn those children's living some one else's child must die.

I'm no grumbler at the rulers of "this free and happy land,"
And I don't go round explaining things I do not understand;
But there must be something treacherous in the steering of the law
*When we get a dose of poison out of every breath we draw.*

I have talked too much, good preacher, and I hope you won't be vexed,
But *I'm* going to make a sermon, with that white face for a text;
And I'll preach it, and I'll preach it, till I set our people wild
'Gainst the heartless, reckless grasping of the men who killed *my child.*

WILL CARLE

Figure 4.9. Will Carleton, "That Swamp of Death," illus. W.A. Rogers, *Harper's Weekly*,
17 Sept 1881, cover.

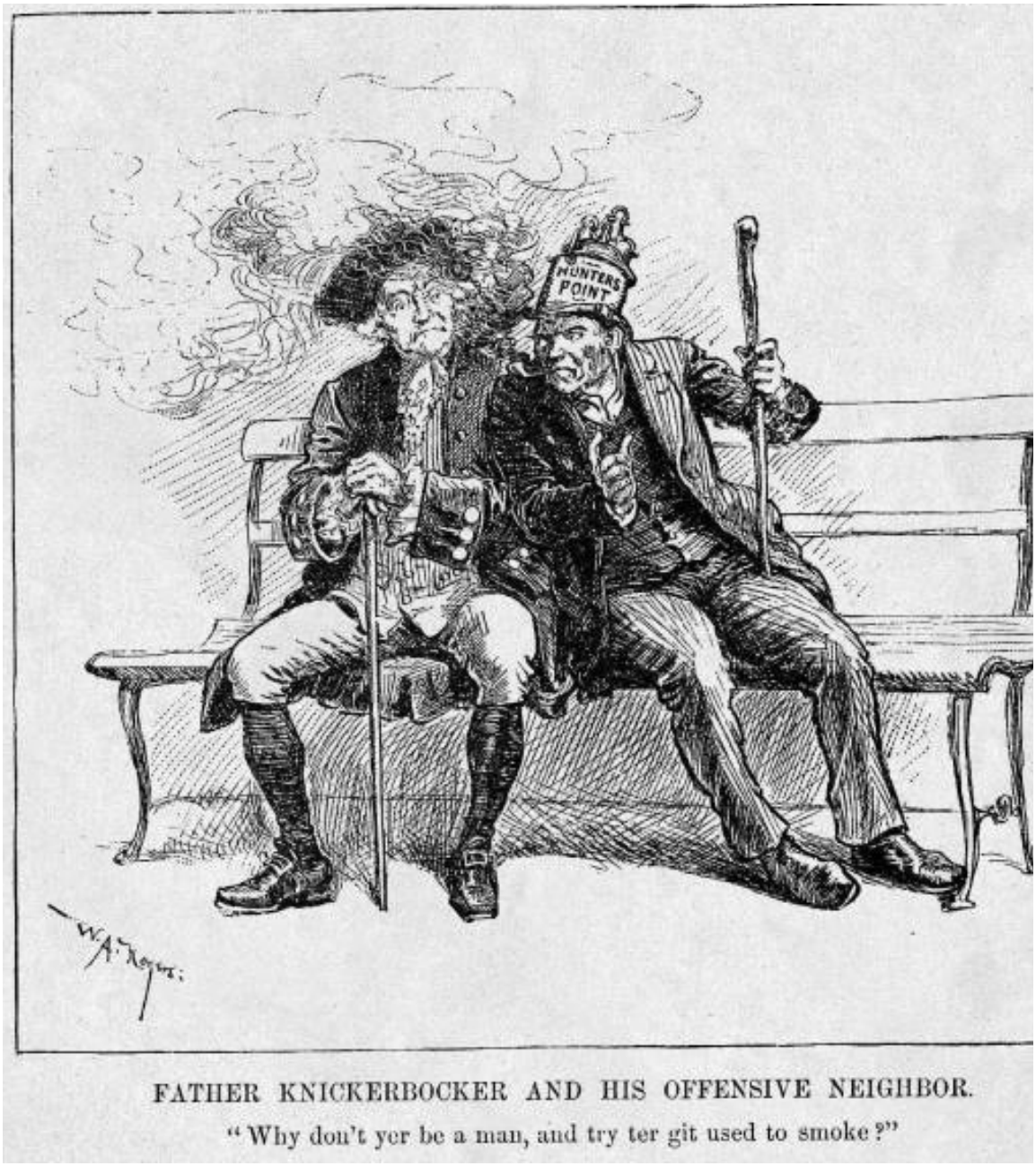



Figure 4.10. W.A. Rogers, "Father Knickerbocker and his Offensive Neighbor," *Harper's Weekly*, 6 Jul 1889, pg. 548.

# Conclusion.

## "Those Smells Again"

## The Search for Fresh Air Continues

On February 5, 2009, New York City Mayor Michael Bloomberg called a last minute press conference. For nearly three and a half years, New Yorkers had sporadically smelled maple syrup in their city streets and homes, and hypothesized about what caused the scent. Early concerns about bioterrorism gave way to conspiracy theories about chemicals used by the sanitation department. Concerns about the scent entered popular culture. On NBC's television program *30 Rock*, three characters realized that they all smelt maple syrup, though they were scattered between the Upper East Side and New Jersey. On the phone, Jack assured Liz that she needn't worry: "It's probably just a strange wind pattern coming over those factories in Staten Island where food flavors are made. I don't think it's northrax." Liz immediately seized upon the dismissed possibility of northrax, which Jack explained was "a chemical agent we sold to the Saudis in the 1980s that smells exactly like maple syrup." After a pregnant pause in

which no one died, all characters agreed that the smell could not be northrax and returned to their usual activities.[1]

Bloomberg hoped to end these conjectures with the official answer to the maple syrup mystery. Since the first maple syrup incident in 2005, the Office of Emergency Management (OEM) and Department of Environmental Protection (DEP) had been investigating the odor. These experts took air samples and declared that the smell was nonthreatening. Despite the assurances, citizens continued to react to the smell with a mixture of curiosity and fear, so air experts sought a definitive answer to the question of the odor's origins. Starting in 2009, calls to the city's 311 call center triggered a new protocol. Instead of merely assuring concerned citizens that the smell was safe and they could go about their usual activities, operators now rerouted syrup smell reports to the OEM and DEP. These agencies used citizen calls to map the ephemeral smell's locations in relation to atmospheric conditions of temperature, humidity, wind trajectory and velocity.[2] By mapping this data, city officials were able to trace the mystery fragrance to a flavor factory in New Jersey [Figure 5.1]. Mayor Bloomberg presented the map as evidence in his explanation that Frutarom processed the seeds of fenugreek, an herb "sometimes used to produce maple syrup flavoring."[3]

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[1] Jen Chung, "As Seen on TV: The Maple Syrup Smell on 30 Rock," *Gothamist,* 16 Nov 2007, http://gothamist.com/2007/11/16/as_seen_on_tv_t.php (accessed 8 Mar 2012).

[2] It is unclear why mapping the smell—a practice that newsblog *Gothamist* initiated during the first maple syrup incidents in 2005 by imposing images of Aunt Jemima syrup on an interactive google map [Figure 5.2]—was a solution so long in coming. For an overview of the OEM's mapping protocol and other information that 311 calls might reveal to city bureaucrats and residents, see Steven Johnson, "What a Hundred Million Calls to 311 Reveal about New York, *Wired* (1 Nov 2010), http://www.wired.com/magazine/2010/11/ff_311_new_york/all/1 (accessed 14 Feb 2012).

[3] John Matson, "Mystery of NYC Maple Syrup Smell Solved!" *Scientific American News Blog*, 5 Feb 2009, http://www.scientificamerican.com/blog/post.cfm?id=mystery-of-nyc-maple-syrup-smell-so-2009-02-05#comments (accessed 14 Feb 2012).

Mayor Bloomberg celebrated the work of "OEM and DEP smelling sleuths" who, like the smell detectives of Charles Frederick Chandler's day, turned citizen complaints into a usable dataset.[4] Though knowledge about environment and health had changed considerably since John Hoskins Griscom championed the importance of fresh air in the 1840s, questions about unfamiliar odors and the methods used to answer these questions remained strikingly similar over a century and a half. Although the exact smells of the past are lost to us, beliefs about the healthfulness of fresh air and dangers of odors are quite familiar, as are practices and technologies for coping with these issues. The preceding chapters are not tales from an exotic past, but the foundations of our current troubled relationship with the air we breathe. What follows are examples of continuities with past practices and beliefs, as well as some thoughts on what has changed.

The science of smell is still largely a mystery. While biologists believe they have located the olfactory receptors and documented their connection to the amygdala, which explains why odors instantly trigger emotions and memories, chemists remain unable to predict odor—an inability that results in the perfume industry spending millions on research each year.[5] Physicians are largely unable to treat asnomia, the loss of the sense of smell, which can result from a physical shock or aging.[6] Experts still go into the field to smell odors, and while they now carry instruments, these devices remain reliant upon the human nose. The Nasal Ranger, a field olfactometer, is a "sniffing mask" used by

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[4] Mayor Michael R. Bloomberg qtd. in "Mayor Bloomberg Reveals Sources of Mysterious but Harmless Maple Syrup Odors," PR-059-09, 5 Feb 2009. http://www.nyc.gov/portal/site/nycgov/menuitem.c0935b9a57bb4ef3daf2f1c701c789a0/index.jsp?pageID=mayor_press_release&catID=1194&doc_name=http%3A%2F%2Fwww.nyc.gov%2Fhtml%2Fom%2Fhtml%2F2009a%2Fpr059-09.html&cc=unused1978&rc=1194&ndi=1 (accessed 14 Feb 2012).

[5] Chandler Burr, *The Emperor of Scent: A True Story of Perfume and Obsession* (New York: Random House, 2004).

[6] Bonnie Blodgett, *Remembering Smell: A Memoir of Losing—And Discovering—The Primal Sense* (New York: Houghton Mifflin Harcourt Publishing Company, 2010).

trained experts to measure the strength of an odor. The user fits the Nasal Ranger over her nose and uses a dial to dilute the air until the odor is imperceptible. As explained by Pamela Dalton, a cognitive psychologist who uses the Nasal Ranger in her work as an expert consultant for industrial hog farms in Missouri, "the human nose is still the very best way" to identify odors.[7] Samuel Goldschmidt would still have the skills needed for a smell detective.

Dalton's experiences as an expert consultant in swine odor nuisance cases testify to the continuing belief that odors can and should be controlled. The search for odor control appears throughout American culture, sometimes taking concrete form as with the roadside signs in Omaha, NE, that say, "To Report Manure Spills or Odor, Call 444-4919."[8] In Delaware, residents told me about an "official nose" who responds to citizen complaints about odors and determines if chemicals are escaping from local industries. The need for experts and odor hotlines also reveals that the search for odor control is ongoing. People have not yet achieved mastery over environmental odors, especially those that emanate from the industries that nineteenth-century Americans knew as the offensive trades.

In addition to official smell detectives and the municipal collection of odor complaints, numerous commonalities in practice reveal that the search for fresh air is ongoing, even though the fear of carbonic acid gas in respired air has fallen out of fashion. For example, while working on this project, I've lived with a series of housemates who, upon the first blush of spring's warmth, insist upon opening all of the

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[7] Pamela Dalton, personal conversation with author, 29 Feb 2012. See also Dalton, et al., "A Multi-year Field Olfactometry Study Near a Concentrated Animal Fielding Operation," *Journal of the Air & Waste Management* 61 (Dec 2011), 1398-1408.

[8] Sign qtd. in Timothy Pachirat, *Every Twelve Seconds: Industrialized Slaughter and the Politics of Sight* (New Haven: Yale University Press, 2011), 3.

windows and doors to "air" the apartment. Fragrances also continue to play a part in household odor management, though flowers are no longer required. Consumers can choose from a nearly endless variety of candle and air freshener scents for the home or the car, those portions of the atmosphere that twenty-first century Americans have walled off for their own use. Commercials reinforce the notion that women should place these artificial fragrances in specific places to keep foul odors at bay. Bathrooms, kitchens, trashcans, toilets and high traffic areas (like the entryway) are prime examples not only of places where one should combat foul odors today, but also of places whose scents worried nineteenth-century women.

Just as odor was an important part of cleaning rituals in the nineteenth century, smells remain central to perceptions of cleanliness today. Whereas potpourris functioned ancillary to cleaning agents, today's commercial cleansers often include fragrances. Cleanliness is verified through both the senses of sight and smell, and the odors included in household cleansers thus have to match ideas of clean smells. Ideas about what odors are "clean" have a historical trajectory, as they were passed from generation to generation along with cleaning practices and recipes for potpourri. The fragrances of household cleaners appeal to this history by replicating the "good" scents long associated with cleanliness and health, such as those of fresh air, rain and flowers.[9]

The effectiveness of odors in establishing ideas of cleanliness has been nicely encapsulated in Febreze's most recent advertising campaign, wherein blindfolded women

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[9] Sociologists Lydia Martens and Sue Scott have argued that because cleaning is a ritual practice, new cleaning products must fit in to the traditional modes in order for consumers to consider adopted them for household use. The safety of the home is a key concern in these decisions, and the emotive power of odors has been key in conveying the safety of chemical cleansers. Martens and Scott, "Under the Kitchen Surface: Domestic Products and Conflicting Constructions of Home," *Home Cultures* 3, no. 1 (2006): 39-62.

enter a room that has all the visible markers of filth but has been treated with Febreze. Trusting their sense of smell, these women articulate their impressions of the space, which they imagine as airy, envisioning "wispy white curtains," beach breezes, and lilac bushes. When they remove their blindfolds and see the squalor in which they are sitting, participants are uniformly stunned. The message that Proctor and Gamble hopes to impart is that by using Febreze, you can "breathe happy," but the commercials also underscore a different, older point; on their own, good smells do not cleanliness make.[10]

Daily practices around odors show continued belief in the ability of humans to control the air they breathe. On a small level, many of these practices have been successful: Febreze clearly controls foul odors, and the iconic Little Trees have kept stenches at bay in billions of vehicles.[11] In the nineteenth century, potpourris and windowboxes similarly controlled the air of the home, making living spaces into relatively safe havens from cities' aerial threats. The fresh air women once found in open windows now comes in a can.

On larger scales, however, people have failed to control odors in a way that satisfies everyone or creates a sense of safety. Industrial odors, such those that released by slaughtering and oil refining in the nineteenth century and today, repeatedly raise concerns about health and safety. The EPA's definition of odors as including both smells and hazardous air pollutants should give pause to those who laugh at the maple syrup smell, consider the smell of industry to be the smell of money, or claim that local

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[10] A helpful overview of this advertising campaign and the motivations behind it appears in, Andrew Adam Newman, "Diving into Reeking Squalor to Test an Air Freshener," *New York Times* 30 June 2011.
[11] Interestingly, Little Trees air fresheners remain nearly identical to their 1954 patent—a patent filed by chemist Julius Samann, applying his knowledge of Alpine tree aromas to a local milkman's desire to quell the stench of spoiled milk in his vehicle. Hilary Greenbaum and Dana Rubinstein, "Who Made Those Little Trees Air Fresheners?" *New York Times* 2 Mar 2012.

populations are unaffected by odors because these populations, often minority and working classes, do not constantly complain.[12] The continued existence of monitoring practices and smell sleuths indicates that wide scale odor control is a constant struggle, both against the odors and against the social relations of complaint and expertise that nineteenth century governments instituted. Chandler's Boards of Health protected scientists' authority from disingenuous sanitarians in the late nineteenth century, but the institutionalization of a formal system of complaint has since undermined and devalued local knowledge of environmental hazards. In many respects, the search for fresh air goes on.

Despite these many continuities, reform efforts and the evolution of cities have changed urban smellscapes. The smells of rendering animals, decomposing garbage and sludge acid no longer dominate Manhattan's air, as the industries that created these odors have been increasingly regulated and excluded from the city. Whiffs of each still elicit disgust, but are now ephemeral rather than omnipresent. In recent olfactory maps published by *New York Times* and *New York Magazine*, the smells of different neighborhoods are a source of amusement more than concern. In August 2009, illustrator Jason Logan drew his smell map of Manhattan in summertime, sniffing his way from the Cloisters down to Battery Park City. The interactive map invited readers to move their virtual noses along Logan's route as they read a catalog of the odors he encountered in each neighborhood. In Murray Hill, the neighborhood that suffered from and fought

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[12] Noga Morag-Levine has argued that the perpetual mobilization required to demonstrate that an odor is a nuisance emphasizes individual complaints as atypical, thereby undermining the power of complaint. By setting such a high bar of consistent and coincidental complaint for establishing a nuisance claim in order to enter protracted legal hearings, both nuisance law and local pollution regulation boards have discouraged afflicted populations from registering their problems with the air. Morag-Levine, *Chasing the Wind: Regulating Air Pollution in the Common Law State* (Princeton: Princeton University Press, 2003), 124-178.

against the sludge acid odor in the 1870s and 1880s, Logan recorded only the innocuous smells of "Watermelon; hair salon; doughnut; pizza; sesame seeds."[13] In contrast, when *New York Magazine* contributor Molly Young went in search of "the smelliest block in New York," she and her smell expert companions found nothing pleasant. Perfume critic Chandler Burr balked at the stench, shaking his head and proclaiming the smell "Unbelievable. Absolutely unbelievable." When pressed to the identify the odor, Burr said only, "I have absolutely no idea." Odor perception expert Avery Gilbert immediately honed in on visual cues of the block's chicken production and told Young that the ammonia smell of a chicken farm "can bring tears to your eyes."[14]

New York's olfactory geography had changed drastically since Olfactorious recorded the stenches that guided his daily movements through the city. Though the city is cleaner than in Olfactorious's time, bad odors still mark places worth avoiding. Yet the odor maps only apply to a moment, as even New York City's well-known smells of urine, cigarettes, sweat and coffee puff up and vanish without warning. Chandler Burr neatly summed up the reality and the ephemerality of odors when he offered his impressions of Stanton between Bowery and Christie for a mapping project: "*Ohhhhhhh.* Urine. Holy God. Urine, urine. Urine, urine. Flowers. Smell that? Now it's gone."[15]

Like Burr, nineteenth-century urban dwellers knew that smells were fleeting, and that it was possible to change the air. Through reform efforts and regulation, city dwellers changed olfactory geography if not the odors themselves. City smells changed even though odors also remained. Measuring that change was tricky. In 1894, a reporter

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[13] Jason Logan, "Scents and the City," *New York Times*, 29 Aug 2009.
[14] Molly Young, "The Smelliest Block in New York," *New York Magazine* 19 Jun 2011.
[15] Emphasis in original. Chandler Burr qtd. by Rachel Baker, "An Olfactory Tour of Manhattan," *New York Magazine* 19 Jun 2011.

from *Harper's Weekly* revisited Newtown Creek. Dr. Henry Smith Williams was quickly overcome by the stench, but a local scoffed at the outsider's discomfort. This old-timer told Williams, "You should have been here two or three years ago, when the fumes used to blacken houses two and three miles away over in Brooklyn. Then there *was* a smell."[16]

[16] Emphasis in original. Henry Smith Williams, MD, "Unwholesome Environs of Brooklyn," *Harper's Weekly* 4 Aug 1894, 726.

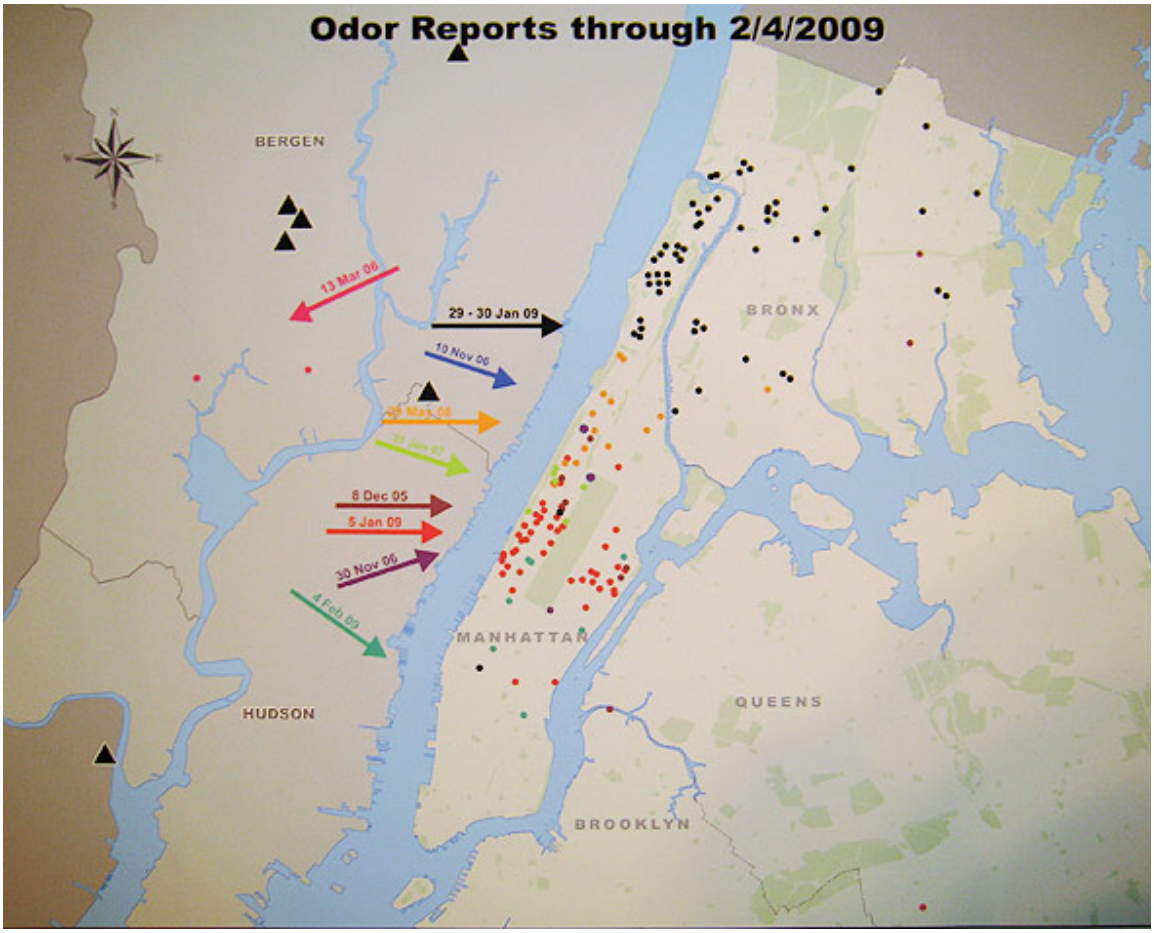


Figure 5.1. The map that Mayor Bloomberg presented at his press conference correlated citizen reports of the maple syrup smell with wind trajectories to trace the odor back to Fruitarom flavor factory in New Jersey.

Source: Jen Chung, "Map of the Day: NYC's Official Maple Syrup 'Odor Reports,'" *Gothamist* 5 Feb 2009 http://gothamist.com/2009/02/05/map_of_the_day_nycs_maple_syrup_odo.php#photo-1 (accessed 18 Apr 2012)

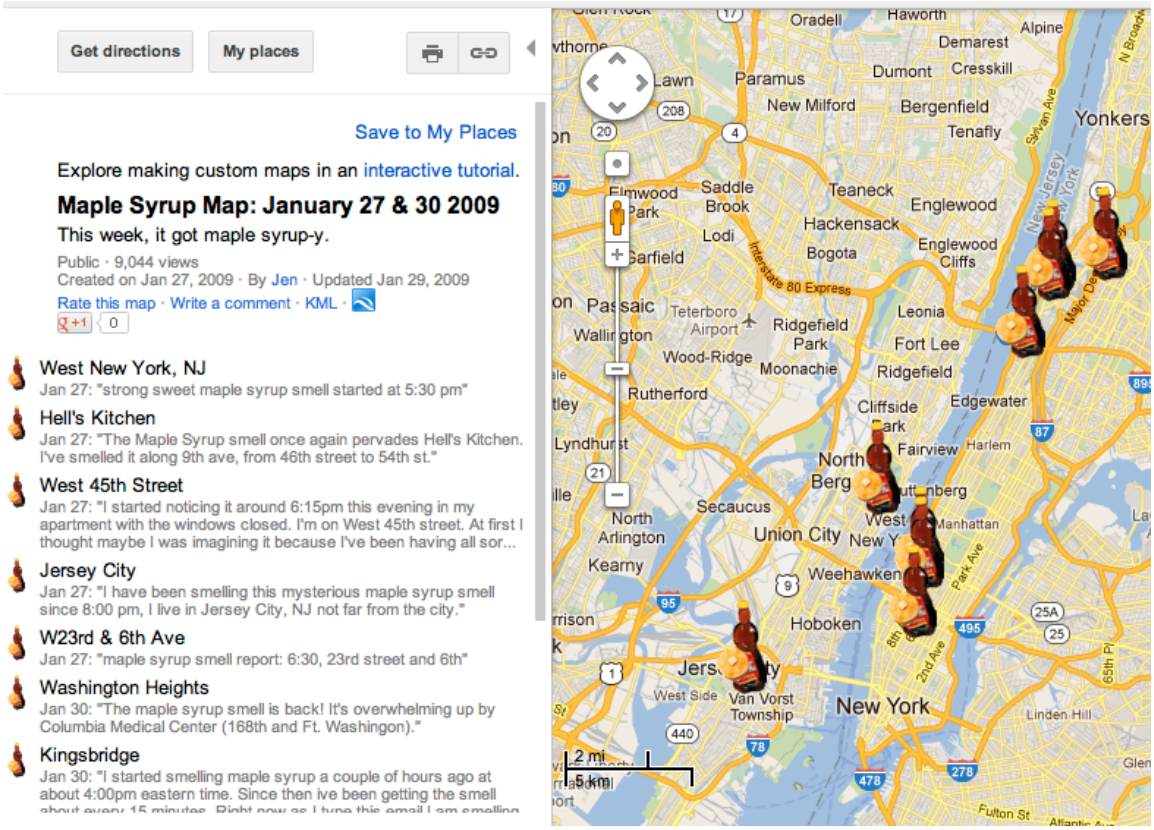


Figure 5.2. Internet newsblog *Gothamist* began plotting the odor's locations in December 2005, long before Bloomberg's "smell sleuths" decided to turn to mapping. *Gothamist*'s maple syrup map was an interactive endeavor, wherein the individual icons of maple syrup bottles with pancakes hyperlinked to citizen's descriptions of the odor and the location where they noticed the smell.

Source: Jen Chung (*Gothamist*), "Maple Syrup Map: January 27 & 30," *Google Maps* 30 Jan 2009 http://maps.google.com/maps/ms?ie=UTF8&hl=en&msa=0&msid=107366841591102881041.0004617f978267692b09e&ll=40.807573,-73.970947&spn=0.207891,0.343323&z=11&source=embed (accessed 18 Apr 2012).