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Life in the open air: The persistence of outdoor air treatment for pulmonary tuberculosis patients in America from the Industrial Revolution to the 1950s

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Life in the Open Air: The Persistence of Outdoor Air Treatment for Pulmonary Tuberculosis Patients in America from the Industrial Revolution to the 1950s

Tara Mastrangelo

A thesis submitted to the Graduate Faculty of JAMES MADISON UNIVERSITY

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mention.
Preface

I first became interested in tuberculosis treatment several years ago when my father and I drove past a marker for the old site of Catawba Sanatorium, in Catawba, Virginia. I was unfamiliar with the term “sanatorium” and my dad explained that it was a facility once used for treating tuberculosis patients. He also revealed that my great-grandfather had been a patient at another Virginia facility. From then on, I wanted to find out more about this disease and the historical ways Americans treated it.

As I read more and more about tuberculosis in general, the frequency with which I came across references to air was striking. Writers from a wide span of time periods alluded to exercising in the fresh air as a way to treat tuberculosis. Others discussed the curative effects of air in specific localities and the search for climates that would prove most beneficial for patients, a branch of medicine known as climatology. Sources also referred to obtaining as much fresh air as possible in patients’ own homes or in sanatoria. “Air” certainly seemed to be an important buzzword of treatment, especially in the late 19th and early 20th centuries.

Nearly all of the historical scholarship on tuberculosis at least mentions the use of air as treatment. Most authors mention it only briefly, but a few have delved more deeply. Historian Sheila M. Rothman’s *Living in the Shadow of Death* is one of the few books in the historiography that strongly emphasizes use of air as treatment. In exploring the history of tuberculosis as it was experienced by the patients, Rothman recognized the pervasiveness and popularity of climatology and sanatoria treatment during the 19th and early 20th centuries. It is not, however, the sole focus of her work by any means.
Katherine Ott’s *Fevered Lives* also extensively refers to sanatoria and changing climates as popular treatment options within the larger framework of her focus on disease and culture. To my knowledge, the only major historical work focusing solely on the use of outdoor air treatments for tuberculosis is an unpublished (and difficult to obtain) Massachusetts Institute of Technology thesis from 1927 by Robert Bruce Watson. In this thesis, the history of climatology is traced, an economic argument is offered, and the author optimistically questions the possibility of scientifically proving the efficacy of climatology.

Those who write about the history of tuberculosis generally discuss two distinct and opposing treatments: one that emphasizes a change in climate and one that requires air from any location in abundance. During the late 19th and early 20th centuries, physicians also saw these two ideas as radically different. My argument, however, relies on the fact that both forms of treatment utilized outdoor air. While one treatment option emphasized the quality and characteristics of air, the other emphasized quantity. Air, however, was the central focus of both methods. As outdoor air was of greatest importance to both of these options, which also shared similar origins and proponents as Chapter 4 will show, it seems logical to refer to them as two branches of a single treatment method: outdoor air treatment.

When looked at under the umbrella term of “outdoor air treatment,” the persistence of belief in the positive effects of air on tuberculosis patients is incredible and spans thousands of years. During the late 19th and early 20th centuries alone, massive changes occurred in nearly every area of life including government, politics, technology, culture, the American landscape, economics, and technology. There were also changes
that specifically affected the history of tuberculosis during this period. This work attempts to first show that throughout these tuberculosis-specific changes, the belief in outdoor air treatment continued until effective drug treatments made it obsolete. More provocatively, this thesis will also show that in every case, the public, physicians, manufacturers, and consumers appropriated the belief in outdoor air treatment to fit the changing circumstances. The adaptability of the theory allowed it to survive the changing times of the late 19th and early 20th centuries.

Chapter One provides necessary information on the biological processes of tuberculosis to enhance understanding of the disease. The history of the disease is briefly traced until the advent of effective drug treatments, and the early origins and long history of the use of air treatments prior to the late 19th century is established. Chapter Two explores cultural change. Outdoor air treatment is examined in light of theories explored by Katherine Ott and Clark Lawlor on the public’s popular perceptions towards tuberculosis. Changes in cultural attitudes towards the disease helped to accelerate the popularity of outdoor air treatment, rather than dismantle it. Chapter Three focuses on the role played by mass-manufacturing and increasing technology to market new air-related products and accessories to tuberculosis patients. These new outdoor air treatment products helped to democratize treatment. Chapter Four establishes the lack of consensus within the medical profession towards tuberculosis, while ascertaining that outdoor air treatment was adapted to a variety of medical theories. This chapter provides evidence that both options of outdoor air treatment lasted well into the 20th century, despite changes and advancements within the medical field.
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Abstract

This thesis explores the persistent use of outdoor air as a treatment for tuberculosis, particularly during the late 19th and early 20th centuries. The focus of my paper differs from other scholarly works on tuberculosis in that it assumes the connections between climatology and the sanatoria/home cure movements are strong enough to warrant combining them under the term “outdoor air treatment,” rather than categorizing them as two distinct methods. Based on this premise, my paper explores the ways in which outdoor air treatment outlasted many of the changes to society which occurred during the late 19th and early 20th centuries. Three changes that were specific to tuberculosis, and perhaps should have derailed the use of outdoor air therapy, are explored in separate chapters: the major shift in the public’s popular perceptions of the disease, the advent of new technology, and debates and changes within the medical field. This thesis argues that in each case outdoor air treatment continued to be utilized, but was adapted to fit changing circumstances. In these three cases, in fact, outdoor air therapy accelerated and broadened to allow more people to participate. Outdoor air treatments ceased to be prescribed only after the advent of modern day drugs in the 1950s, but some aspects of the treatment continue to be utilized or studied in modern times, indicating a truly remarkable ability of the method to be adapted to a variety of ideologies.
Chapter One

The History of Pulmonary Tuberculosis and Outdoor Air Treatment: From Ancient Times to Mid-Nineteenth Century

Pulmonary tuberculosis is a contagious disease spread through exposure to airborne bacteria. When a person infected with tuberculosis coughs, sneezes, or talks, droplets of moisture enter the air. Small droplets of moisture evaporate quickly and leave a dried bacteria core that can float in the air for hours. When inhaled, these droplet cores can lead to lung infection, and over time spread to other parts of the body.¹

In the great majority of people who are infected, resistance mechanisms are able to contain the disease in the lung. Tuberculosis bacilli enter the lung and grow into a “small local collection, like a cheesy boil.”² Macrophages, the “cellular defenders of the lung,” swallow the bacteria.³ Next, fibrosis, or a thickening of tissues, can occur to wall off any additional bacteria or abscesses created by the boil. If this is successful, then the person does not become ill and never even realizes they were infected. Physicians call this Primary Tuberculosis.⁴ About five to eight percent of those infected, however, will develop illness, or Post-primary Tuberculosis. Primary Tuberculosis can also turn into Post-primary Tuberculosis if the patient’s immunity is weakened for any reason, such as another illness, extreme stress, or aging. Physicians point to hereditary factors, age,

³ Daniel, Captain of Death, 111.
nourishment, and the state of an individual’s immune system to explain why some people are able to wall off the bacteria successfully and others are not.⁵

Post-primary tuberculosis occurs when the tuberculosis bacteria eat through the macrophages and “the continuing infection spills over into nearby small airways and forms more . . . tiny boils.”⁶ Once illness has begun, most patients experience similar symptoms: persistent cough, loss of appetite and weight loss, night sweats, malaise, breathlessness, chest pain, and fatigue. Some patients experience haemoptysis, or the coughing up of blood, which occurs when the infection eats through lung tissue into a small blood vessel. Eventually the lungs become scarred and essentially ruined. While this can be fatal in itself there are many more complications which can occur. When the bacteria eat through lung tissue and enter small blood vessels, it can cause the infection to spread. By traveling through the blood, “tuberculosis has the capacity to infect every internal organ, from liver to brain, from the fingertips to the delicate structures of our eyes.”⁷ These infections can cause the patient to experience a wide variety of severe symptoms, but it can also cause vital organs to shut down. In addition to causing complications by consuming tissue and opening up small blood vessels, tuberculosis can also eat through lung tissue into a major artery, causing the patient to experience fatal blood loss. Furthermore, inflammation of the lungs can result in fluid build-up, which could potentially drown a pulmonary tuberculosis patient. The severity of the disease can differ in patients for unknown reasons. Some patients have been known to die within

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⁵ Daniel, Captain of Death, 111-112.
⁷ Ryan, The Forgotten Plague, 23.
months of becoming ill, while others suffer with the disease their entire lives and end up dying of other causes.\(^8\)

Humans have been experiencing this disease since prehistoric times. Ancient skeletons as old as 5000 BCE, as well as Egyptian mummies from 4000 BCE, have been found with the bacteria in their spines. Furthermore, Egyptian art from around 3000 BCE appears to depict people with the characteristics of spinal tuberculosis.\(^9\) According to Thomas M. Daniel, M.D., it is reasonable to assume from this evidence that the ancient people of Egypt experienced spinal tuberculosis in significant numbers. Spinal tuberculosis tends to comprise only a small percentage of tuberculosis in general in a given population. Therefore, Dr. Daniel believes that “a high frequency of skeletal disease must mean an even higher frequency of lung disease.”\(^10\) Further evidence suggests that by 2500-1500 BCE, tuberculosis was well established in Europe, and around this same time, Indian and Chinese literature also described a disease with all the characteristics of pulmonary tuberculosis.\(^11\)

The writings of Hippocrates, born around 460 BCE, make it clear that the people of ancient Greece suffered from pulmonary tuberculosis as well. Hippocrates, thought to have been an itinerant physician, described his observations of pulmonary tuberculosis in detail. From these descriptions, it is evident that the people of Greece suffered in numbers

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\(^10\) Daniel, *Captain of Death*, 11.

great enough to warrant Hippocrates and his followers to study possible causes, establish
tools of diagnosis, and propose treatment methods.\footnote{12}

Art in the Americas between 300 BCE and 600 CE also seems to depict people
with characteristics of spinal tuberculosis. Furthermore, in eighth century Peru, the
mummified body of a young boy was found with tuberculosis of the lungs, liver, kidneys,
heart, and spine. It would appear that the southern and middle Americas were dealing
with tuberculosis before European contact. If not global, tuberculosis was at least far-
reaching during ancient and classical times.\footnote{13}

Documents from the Middle Ages indicate that there may have been a decline in
tuberculosis, but by the end of the period, Europeans were again familiar with the
disease. Tuberculosis peaked in Europe as a whole during the 17\textsuperscript{th} century. John Locke
estimated that in 1667, tuberculosis was responsible for 20 percent of all deaths in
London. In the 1780s in England, tuberculosis caused 1,120 deaths per year for every
100,000 living people. European colonists brought tuberculosis with them to North
America, where it later reached its peak in the 19th century. Although mortality rates in
America began to drop towards the end of the 19th century, tuberculosis remained high
on the list of top ten killers well into the twentieth century.\footnote{14}

By 1921, scientists had developed a semi-successful vaccine called BCG.
Moreover, with the advent of the antibiotic streptomycin in 1944, many of the active
cases could be treated. Unfortunately, those cases could still reactivate. By the 1950s,

\footnote{12} Robert Bruce Watson, “An Introduction to the History of Climate and Tuberculosis: A
Contribution to the History of Public Health and Climatology” (certificate thesis, Massachusetts Institute of
Technology, 1927), 43-51.
\footnote{13} Daniel, Captain of Death, 11-14.
\footnote{14} Daniel, Captain of Death, 23-30; “Leading Causes of Death, 1900-1998,” Center for Disease
scientists found that administering a variety of drugs in addition to streptomycin successfully, miraculously, and almost immediately cured most patients of tuberculosis with little likelihood of reactivation.¹⁵

Before the advent of the vaccine or antibiotics, there were very few options for treating tuberculosis. Risky surgeries, dangerous or completely ineffective patent medicines, high-calorie diets, milk, bed rest, and outdoor air were all used to combat tuberculosis before drug therapy was developed. According to some 19th century contemporaries, however, the use of climate or fresh air was of major importance in treating tuberculosis.¹⁶

Outdoor air therapy has a long history of use as a treatment for tuberculosis, but most secondary sources, and indeed even 19th century physicians, wrote about two fundamentally different treatments: outdoor air therapy and medical climatology. Medical climatology, in use since ancient times and lasting until the beginning of the 20th century, was the belief that certain climates and meteorological factors could affect tuberculosis in a patient. Medical climatology has been seen as being completely in opposition to the sanatoria movement/home cure movement, which increasingly supplanted climatology at the end of the 19th century and beginning of the 20th. The sanatoria movement emphasized rest, nutrition, and as much fresh, outdoor air as possible. The home cure method supported sanatoria, but also emphasized that people could “take the cure” in their own backyards, porches, or rooftop tents rather than a specific climate. Although not greatly recognized in the literature of the time, or in current major works on the history of tuberculosis, the common factor in all of these treatment options is the idea that

¹⁵ Pratt, Grange, and Williams, *Tuberculosis*, 3, 17.
¹⁶ See Watson, “An Introduction.”
fresh, outdoor air was beneficial for tuberculosis patients. The sanatoria/home cure movements would not likely have occurred without the precedent for outdoor air therapy in medical climatology. Therefore, it is reasonable to see both climatology and sanatoria/home cure movement as varieties of the same air treatment therapy.

Outdoor air treatment may have begun in ancient Greece, around the seventh and sixth centuries BCE, with the asclepieion. Asclepieion were sacred temples erected in honor of Asclepius, a renowned medical physician who was elevated to the status of a god. People visited these temples to pray to Asclepius for relief from their illnesses. It has been posited that the priests and physicians residing at these temples also sought to restore sufferers’ health with outdoor air treatment. The asclepieia at Cos, the site of a major school of ancient Greek medicine, consisted of a large building with three walls and one open side, possible evidence that the patients received outdoor air treatment. The asclepieion of ancient Greece “were not mere places of worship but ‘veritable sanatoria,’” for isolating and treating the ill.\(^\text{17}\)

Hippocrates and Galen, both important to the history of outdoor air treatment, may have both studied at asclepieion sites. In Hippocrates’ descriptions of tuberculosis, he noted that seasons and locations affected the mortality rate from tuberculosis. In \textit{Airs, Waters, and Places}, Hippocrates warned against living in poorly ventilated valleys and places with hot winds. He asserted that such places produced people of ill health. Meanwhile, he noted that people in elevated regions with major differences between the seasons were “naturally of an enterprising and war-like disposition,” or healthy and stable communities.\(^\text{18}\) Later, Celsus (27 BCE-14 CE) recommended traveling to new climates to

improve health, and Pliny the Elder, alive during the first century AD, recommended air from wooded regions for tuberculosis patients. Galen (131-201 CE) also recommended elevated, mountainous regions for the consumptive patient.\textsuperscript{19}

Although physicians and the general public tried other methods, and some even gained popularity, outdoor air remained a major treatment option. Throughout the Middle Ages, the writings of Galen and Hippocrates were generally followed and rarely questioned. Then, during the 17\textsuperscript{th} century Scientific Revolution, men of science began to experiment with new ways of treating tuberculosis. Through personal experience and the observation of others, however, these men agreed with classic writers that climate and the outdoors were beneficial for consumptive\textsuperscript{20} patients. In fact, “the literature on the subject of climate in relation to tuberculosis increased, both in rate and extent.”\textsuperscript{21} Richard Morton, a prominent physician, advised exposure to fresh air, free from coal smoke, in 1637. Thomas Sydenham, in 1682, wrote about the efficacy of long horseback journeys as treatment for tuberculosis involving fresh air from any location. The prominent Enlightenment thinker John Locke was one of several who supported Sydenham’s hypothesis, due to the fact that Locke’s ill nephew returned from such a journey in good health. The popularity of Sydenham and his supporters caused horseback riding treatments to remain popular long afterwards as a way of obtaining fresh air and exercise. Likewise, word of mouth rumors of positive experiences and pleasant company at

\textsuperscript{19} Watson, “An Introduction,” 60-61, 79.
\textsuperscript{20} The general public at this time called the disease “consumption” rather than “tuberculosis”. “Consumption” referred to the way in which the body was “consumed” by the disease. The term “tuberculosis” has a more modern, medical, and scientific connotation, and was commonly used by physicians in the late nineteenth century. For the purposes of this thesis, “consumption” will be used when describing the disease before the acceptance of contagion and germs, and “tuberculosis” will be used to describe the disease afterwards.
\textsuperscript{21} Watson, “An Introduction,” 86.
mineral springs led to extending the popularity of spa resorts in Europe for the upper classes.\textsuperscript{22}

English settlers in colonial North America may have brought these beliefs in fresh air, horseback travel, and spring waters with them to the New World. In the early days, however, settlers either misdiagnosed tuberculosis or it occurred less frequently than in Europe. Colonists were therefore less concerned with treatments for the disease until the late 18th or early 19th centuries. In addition, it was not until the middle of the 18th century that roads and travel infrastructure began to improve in the colonies to allow for greater travel and a colonial elite was formed with the money and the time to travel for health or leisure.\textsuperscript{23}

In the colonies, a few spring water resorts opened in the late 18th century for the pleasure and health of the upper classes as roads and economics improved. These resorts grew in popularity over the first decades of the 19th century. Western Virginia had a large number of spring resorts, many within a short distance from each other, which were well known and popular. In fact, a traveler writing in 1839 estimated that “more than six thousand persons visited the various mineral springs of Western Virginia during the last summer months.”\textsuperscript{24} Visitors tended to spend entire summers on the move between each of the Virginia springs. Despite the facts that road conditions had improved and the Virginia springs were geographically close to each other, travel to each of the waters was difficult. One visitor wrote about travelling through the Virginia mountains by coach on

\begin{thebibliography}{99}
\bibitem{24} Mark Pencil, \textit{The White Sulphur Papers, or Life at the Springs of Western Virginia} (New York: Samuel Colman, 1839), ii.
\end{thebibliography}
winding roads with “acute angles” which led to “a fearful height.”\textsuperscript{25} Despite the inconvenience of mountain travel, people continued to visit from all over the east coast because the spring resorts were fashionable and more healthful than the epidemic-ridden eastern cities in summer time. Moreover, the general public, and some physicians, believed that the spring waters had healing properties that could cure many diseases, including consumption. Other physicians, however, emphasized the climate of the spa resorts, rather than the waters, for tuberculosis treatment. According to Dr. Robley Dunglison, the waters of the spas were not very important. He stated that if the waters were bottled and dispersed to the sick, they would do little to improve health. In his opinion, the climate, rather than the waters, was the beneficial aspect of spring spa resorts.\textsuperscript{26}

In addition to the popularity of spring spas, by the early 19th century physicians also advocated sea voyages and travel to warm climates. One late 18th century writer urged sea voyages for consumptive patients due to the fact that warm salt air opened the pores of the body “and the de-purated [sic] state of the sea air enables the lungs to fling off the phlogiston with which they are over-charged.”\textsuperscript{27} Sea air was thought to be perfectly pure and could therefore purify diseased lungs.

Others disagreed with this belief in the purification powers of sea air. Dunglison stated that “the good effects of a sea-voyage in phthisical cases are probably more dependent upon this equabiliy of temperature, and upon the impression made upon the

nervous system, than upon any saline impregnation of the air.” Rather than the purities of the air, Dunglison cited the warm and constant temperatures of a sea voyage. Rapidly changing temperatures and climate conditions were thought to be bad for a patient, and cold temperatures were thought to be irritating to ulcers in the lungs. Therefore, the warm sea air temperatures that he anticipated on a journey to Europe or the southern states of America would be useful for patients of consumption.

Sea voyages were a readily available option for men who could afford it in the nineteenth century. According to historian Sheila M. Rothman, by the early nineteenth century “ships sailed regularly from New England ports not only to Charleston, Savannah, and New Orleans but also to Cuba, the West Indies, and St. Croix. On very short notice, an invalid could book passage and head south.” Some consumptive patients even opted to become sailors, rather than embark on a single voyage, and helped to further the word-of-mouth tales about the efficacy of outdoor air therapy. These men “took the medical dictum about travel for health to its farthest limits, wrote extensively about their experiences, and helped to pattern the curative regiments of invalids.”

Travel to warm climates was also a major feature of air treatment up until the mid to late nineteenth century. For example, in 1844, Dunglison stated, “It is on those predisposed to consumption that a warm climate acts most beneficially.” Health resorts in European locales such as Madeira were popular destinations for Americans. By the

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28 Dunglison, *Human Health*, 156.
30 Women traveled long distances less frequently than men for their health at this time. It was not unheard of for women to embark on a sea voyage, but it was less common due to the idea that women were bound to the home and a separation could worsen their condition. The spring resorts, as fashionable vacation destinations much closer to home, did receive a large number of women. See Rothman, *Living in the Shadow of Death*, 23.
1840s a small number of eastern men were also heading into the American West in hopes of improving their health in the warm climates. As with the spring sites and European resorts, many people traveled west because of the rumors and positive accounts published by previous travelers. In fact, a tall tale circulated at one time that told of a man in California who was hundreds of years old because the climate was too healthful and restorative for him to die. Many people also believed that western Native Americans and fur traders were extraordinarily healthy and free from consumption. At least one early 19th century writer attributed this healthfulness to their outdoor lifestyles. Some of the first men who went west for health joined hunting and trapping expeditions in order to receive the benefits of an open-air lifestyle. Like earlier prescriptions for outdoor tuberculosis treatment, going west required horseback travel and sleeping in the outdoors. Women and children in search of health could also obtain the perceived benefits of the western climate if their families decided to make a permanent move west to Oregon, California, and Colorado. Traveling for months in covered wagon caravans allowed them to live the outdoor lifestyle before they settled permanently in the new climate. These travelers, too, wrote accounts of their positive experiences in seeking health and furthered the belief in medical climatology.34

By the mid-19th century, tuberculosis and outdoor air treatment had been part of the human experience for thousands of years. Asclepieion and the writings of Hippocrates and Galen indicate that the belief in both forms of outdoor air therapy may have existed for over two thousand years by this time. The disease and outdoor air forms of treatment were entwined in the culture and social fabric of American life by the mid-19th century, and became more so with the passage of time.

Chapter Two
From Consumption to Tuberculosis: The Public’s Changing Perspectives

In the late 19th century, the way in which society viewed tuberculosis changed drastically due to an increase in medical knowledge. This shift did not result in a change in beliefs towards air treatment. The change in popular perspectives towards the disease, however, did expand the ways in which outdoor air treatment was experienced through the athletic movement and sanatoria/home cure movement, making it more accessible to a wider range of people.¹

According to historian Katherine Ott and writer Clark Lawlor, white, upper-class society viewed consumption in an almost positive light, despite high mortality rates in the late 19th century. Ott stated, “consumption set the standard for white middle-class beauty in the mid-19th century.”² Pallor, flushed cheeks, and lean bodies, all symptoms of consumption, were considered to be desirable and beautiful in women of the time.³ In fact, one female author, Abba Goold Woolson, stated in 1873 that good health was only acceptable in “washerwomen and amazons.”⁴ It is debatable whether consumption influenced this fashion or if the fashion just happened to fit the look of consumption, thereby giving it a positive association for women. Either way, it was a well-known correlation, which was made evident in William Sweetser’s 1836 Treatise on

²Ott, Fevered Lives, 13.
⁴Abba Goold Woolson, Woman in American Society (Boston: Roberts Bros., 1873), 136, quoted in Lawlor, Consumption and Literature, 166.
Consumption which stated that the “deathlike paleness [of consumption] is often seen alternating with a glowing hectic flush. Such complexions are generally esteemed handsome.” Mid-19th century painters, such as Dante Gabriel Rossetti, especially encouraged this look. These painters often portrayed thin women who were very pale with flushed cheeks, heavy lidded eyes, and languid postures. Some of the most popular models for these works, such as Elizabeth Siddal, were actually consumptive.

In addition to the paintings of consumptive-looking women, literary heroines of the day were also described as having the consumptive look and served to push the trend further. Female literary figures took on a spiritual component that resulted in another association for consumptive females; not only did consumption bring an increase in beauty, but also in spirituality. It was commonly held that the long-suffering nature of the disease led women, already thought to be the moral authority of the household during this era, to spend time contemplating the afterlife and preparing for its arrival. Consumptive women, especially in literature, were often portrayed as possessing a spiritual wisdom from their closeness with death and the afterlife. A common example is Eva, from Uncle Tom’s Cabin, who tried to prepare her father for her imminent death and gave a death bed speech on the Christian immoralities of slavery. These scenes were not uncommon in Victorian literature.

Consumption greatly weakened female bodies and delicacy and languidness became a stylish way for women to behave. This behavior conformed to society’s

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5 William Sweetser, Treatise on Consumption (Boston: T.H. Carter, 1836), 36, 60, quoted in Rothman, Living in the Shadow of Death, 16.
7 Lawlor, Consumption and Literature, 162-170; Ott, Fevered Lives, 14-16.
longstanding expectation that women be the weaker sex in both body and mind.\textsuperscript{8}

Consumption forced women to comply with the style of delicacy in appearance and behavior, while those who were not consumptive strove to imitate the look by unnatural means. According to Lawlor, “A disease which beautifies one physically as well as spiritually will be popular indeed. . . . Little wonder that many women tried to give themselves the consumptive look, even if they were perfectly well, by drinking vinegar and tight-lacing [of corsets].”\textsuperscript{9} In an article remarking on the perfect, white complexions of women during the late 19\textsuperscript{th} century, one author mentions “delicacy at that time was in fashion and was acquired at any price, even by the consumption of a diet composed of chalk, slate-pencils, and arsenic.”\textsuperscript{10}

Delicate features and weakness are not traits typically associated with manliness but consumptive men, too, were glorified in the late 19\textsuperscript{th} century. When consumption’s ravages left them physically weak and emasculated, they could still protect their manhood through bravery in the face of death and the superior intelligence that was believed to be correlated with consumption. The prevailing medical belief during the Enlightenment stated that intelligence was related to sensitive nerves, which had the increased likelihood of burning out quickly and resulting in disease. Over time, this correlation was strengthened as some of the greatest minds of the 19\textsuperscript{th} century fell victim to consumption: poet John Keats in 1821, composer Frederic Chopin in 1849, and the

\textsuperscript{8} For a discussion on American beliefs of female weakness and their origins, see Anthony Fletcher, \textit{Gender, Sex, and Subordination in England 1500-1800} (New Haven: Yale University Press, 1995), particularly pages xvii, 33-43, 60-68, and 83-92.

\textsuperscript{9} Lawlor, \textit{Consumption and Literature}, 166. Some women believed that drinking vinegar would cause weight loss.

Bronte family\textsuperscript{11} just to name a few. It was widely believed that creative types simply used up their genius and strength too quickly, making them subject to consumption.\textsuperscript{12}

The poets and painters themselves also fed into the belief of a correlation between consumption and intelligence. Poets and writers often wrote of their experience with illness, and dramatized and romanticized the gifts of creativity and genius that they believed came directly from the disease. Their first-hand experiences with death and their use of it as subject matter piqued the public’s desire for works by consumptive genii. Furthermore, the likelihood that an early death could occur at any moment increased the sales of work by consumptives. Although consumption was a deadly and emasculating disease, a man could be theoretically “reimbursed” with increased creativity and intelligence. Although men were not supposed to appear weak and frail generally, it was “the look” for poets and writers seeking legitimacy.\textsuperscript{13}

As previously mentioned, health resorts, or sanitariums,\textsuperscript{14} were developed at natural springs, in coastal cities, and in a variety of climates believed to be beneficial. By mid-century, some patients even permanently relocated to the American West, warm climates abroad, or high altitudes in order to receive the alleged benefits of a new climate. It is perhaps not surprising that during the period when consumption was

\textsuperscript{11} Charlotte authored \textit{Jane Eyre} (1847), Emily wrote \textit{Wuthering Heights} (1847), and \textit{The Tenant of Wildfell Hall} (1848) was Anne’s work. All three novelists, along with their artistic brother Branwell, also wrote poetry. Ann and Emily both died within a couple of years after publishing the aforementioned novels, along with Branwell. Charlotte died a few years later in 1855. All four deaths were believed to be from consumption.


\textsuperscript{13} Lawlor, \textit{Consumption and Literature}, 113, 115-116, 133-152

\textsuperscript{14} Sanitariums were resorts that catered to invalids suffering from a variety of diseases, while sanatoria were long-term tuberculosis-specific care facilities where fresh air, diet, rest, and light exercise were part of the daily routine and treatment.
romanticized, the spring resorts and warm climates abroad were not only places of
treatment for a wide variety of diseases, but also popular destinations for high society.¹⁵

In 1882, scientist Robert Koch discovered *Mycobacterium tuberculosis*, the
bacteria that causes the disease. Koch’s discovery indicated that consumption was spread
through contagion. Previously, there had been many theories as to what caused
consumption but few had believed that the disease was contagious in nature. In the
aftermath of the discovery, many physicians and scientists began further experiments to
learn more about the bacillus and attempt to discover a cure. The increased involvement
of the medical and scientific world slowly caused “consumption” and the romanticizing
of the disease to be replaced with “tuberculosis” and medical jargon. Furthermore, after
initial skepticism, physicians and the general public accepted that tuberculosis was a
contagious disease, passed among humans. Many believed at this time that tuberculosis
mixed with household dust and was spread through the movements of these particles.¹⁶
The contagious nature of tuberculosis and its association with household dirt gave it a
highly negative connotation. With these new associations, the middle and upper classes
sought to distance themselves from this disease and found scapegoats in the large
immigrant community. Consumption, long associated with middle- and upper-class
beauty, spirituality, intelligence and creativity, was replaced by tuberculosis, associated
with infectious immigrants, unsanitary conditions, and filth.¹⁷

¹⁶ In actuality, tuberculosis bacteria mixed with dust is too heavy to float in the air and will settle to the ground.
This enormous shift in thinking towards tuberculosis came at a time when government was becoming more responsive and involved in the daily lives of Americans and progressive causes gained momentum. Tuberculosis became a Progressive Era cause, especially with its new associations with the lower class and unsanitary conditions. Government and voluntary measures emerged to combat the disease. The National Association for the Study and Prevention of Tuberculosis (NASPT) was formed in 1904. In 1908 alone, the National Tuberculosis Association (NTA) was founded, Virginia reorganized its State Board of Health to deal with tuberculosis and appropriated money to go towards state sanatoria, and Wisconsin formed an Anti-Tuberculosis Association, which raised $8,000 within weeks of its inception to support tuberculosis awareness. Soon, these associations built local clinics and dispensaries to serve those who did not have access to sanatoriums. Tuberculosis classes were created for nurses. Many states adopted legislation that prohibited spitting in public places, some as early as the late 1890s.\(^{18}\) By 1911, there were “four hundred and thirty-five distinct associations devoted to the prevention of tuberculosis in the United States.”\(^{19}\) For the first time, America’s government and private citizens mobilized against tuberculosis.

Public education was a major goal for these associations. They believed it was important to inform the public on how to prevent tuberculosis, how it was spread, what the symptoms were and to encourage them to get checked by a physician. They believed an aware and healthy public could greatly cut down the number of cases. To this end,


NASPT created a traveling educational display, the “American Tuberculosis Exhibit”, which in 1906 toured the country, sponsored lecturers, and taught hygienic measures for cutting down on contagion. Most other educational programs were the responsibility of local chapters of tuberculosis prevention leagues until 1928, when the National Tuberculosis Association revamped their education campaign, making it a nation-wide venture. The NTA provided publicity manuals to local health officials, organized public talks, created film reels, put up billboards, and ran newspaper announcements for their education program. They distributed $25,000 worth of free posters and printed material to associated state organizations that year alone.20

Visual images played an important role in public education and fundraising for tuberculosis prevention organizations. Many of the National Tuberculosis Association posters, given for free or purchased by the state, encouraged the public to buy Christmas Seals, or special stamps featuring a holiday image that could be affixed to Christmas cards, paychecks, restaurant menus, and dance cards. Together, the Red Cross and the National Tuberculosis Association created and distributed new seals each year to state tuberculosis associations for resale. The proceeds from these sales went to research, sanatorium building, visiting nurses, dispensaries, the purchase of educational material, and a host of other possibilities. In addition to the tuberculosis awareness posters created by the NTA, the New Deal’s Works Progress Administration also financed the creation and distribution of public health awareness posters, which included tuberculosis-oriented

posters. Despite all of these efforts, tuberculosis continued to be a major threat and a cure remained elusive.\textsuperscript{21}

The shift in perspective, along with the education campaigns, ensured that people no longer wanted to be associated with tuberculosis or its symptoms. Those who fell ill were stigmatized due to the change towards negative perceptions of tuberculosis. People who remained healthy no longer wished to look ill, as it would no longer provide associations with feminine delicacy, spirituality, or poetic creativity.

Outdoor air treatment in the form of sanitariums and spas had been tied to the romanticization of the disease, but after the switch from romanticized consumption to stigmatized tuberculosis, outdoor air treatment remained. Ott briefly mentions that sporty young women and the “Gibson Girl” style became fashionable during the late 19th century as the shift occurred; however, she does not explore the associations between tuberculosis and the increasingly fashionable health movements, particularly the Athletics Movement.\textsuperscript{22} The popularity of the Athletics Movement was important for the successful adaption of outdoor air treatment in the new cultural environment.

The 1860s mark the beginnings of the Athletics Movement. More options for exercise in the form of sports and games became available, but they were mainly geared towards men. Learning to swim was encouraged, although most men had not yet acquired the skill by this time. Croquet was imported from Britain in the 1860s. Amateur baseball leagues were also established in the 1860s, and America had a national league


\textsuperscript{22}Ott, \textit{Fevered Lives}, 70-71. Around the same time as the Athletics Movement, Webster Edgerly (1852-1926) began a health movement known as Ralstonism. Like the treatments for tuberculosis, this health movement focused on diet, exercise, fresh air, and sunlight, in addition to the more radical aspects of his movement. Ralstonism, the Athletics Movement, climatology, sanatoria care, and other health proponents did not exist in a vacuum, but were likely mutual influencing.
by the 1870s. The 1870s and 1880s saw the beginnings of American football and lawn tennis. Golf reemerged as a popular sport during this time as well. YMCAs and private gymnasiums were built and utilized new methods of strength training in the form of increasingly popular resistance apparatuses. These devices utilized adjustable pulleys while others were merely rubber cords attached by hook to a door frame. Gymnasiums and private individuals also installed weight lifting machines. All of these activities reflected a significant increase in athletics.

Women did not fully participate during the early decades of the Athletics Movement, although some sports did become fashionable for ladies. Women participated in croquet and lawn tennis, which became acceptable games in the upper and middle classes. Swimming was encouraged for women; however, it was noted in an 1868 article, “a female swimmer is almost as rare as a mermaid”. The article goes on to ask, “is it possible that some fastidious notion of delicacy has prevented the fairer sex from acquiring the art of keeping themselves afloat in the water?” This “notion of delicacy,” promoted by the glorification of consumption, may be part of the reason why women did not fully participate in the explosion of athletics, including swimming, until the mid-1880s and 1890s.

Just after Koch’s discovery of the tuberculosis bacillus, and right at the beginning of the shift away from the romantic view of consumption, women became markedly more involved in athletics and exercise. The popularity of lawn tennis for women increased. According to one 1886 writer,

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formerly, when a party of young ladies might be seen setting off for a summer resort, it was considered a sufficient equipment for the season’s amusements if each went armed with a new novel. Now each has the new novel, but is also equipped with a tennis racket…the game has made its way everywhere; you see a tennis net beside every country seat or good sized suburban house.26

Early Sears, Roebuck, & Company catalogs sold a wide variety of nets, rackets, and tennis balls, making the game more accessible to people of a variety of classes.27 Just four years after Koch’s discovery, a noticeable change had already occurred among young ladies. Whereas before they were content to lounge and read, they now sought active amusement in the form of lawn tennis.

In addition to the increase in the popularity of lawn tennis, other activities were taken up by fashionable ladies. Women helped to revive colonial children’s games, such as grace hoops28 and battledore and shuttlecock.29 New games, some based off existing games, provided more options for female participation. Imperial croquet combined billiards and croquet. Badminton was based loosely on battledore and shuttlecock and lawn tennis. Other sports and games open to women by the late 1880s and 1890s were archery, pitchette,30 and indoor and outdoor bowling. Some women even participated in resistance strength training. The 1897 Sears, Roebuck & Company catalog sold Goodyear Round Rubber Health Pulls for both men and women, which could be attached to the wall by hooks for resistance.31

28 Players hold a wooden stick in each hand. They then toss, by using the sticks, a wooden hoop to other players who catch the hoop with their own pair of sticks.
29 Very similar to badminton, except played without the high net.
30 Players toss rings onto an upright board with numbered pegs.
Cycling was a major phenomenon for women in the late 1880s and 1890s. In the mid-1880s, Women were at first encouraged to ride the tricycle, a three-wheeled apparatus thought to be safer and more lady-like than bicycles. In 1886, Harper’s Bazaar could claim that “scores of American women” would be taking tricycle trips that summer and “gain a hitherto undreamed of amount of health, strength, and pleasure.” By 1890, however, the tricycle was considered “a grandmother’s machine . . . when compared with the bicycle for lightness and speed.” Bicycles for women were sold in Sears, Roebuck & Company catalogs and just as many bicycles for ladies were available as for gentlemen, indicating the equal degree in which women participated in cycling. Bicycles provided women with yet another source of exercise, but also with revolutionary newfound freedom.

This new level of involvement in exercise and athletics correlates with the changing cultural constructions of tuberculosis. Women were still considered far more delicate in comparison to men, but in the 1880s and 1890s, it was no longer socially fashionable to be absolutely fragile and lethargic. Magazines such as Godey’s Lady’s Book and Harper’s Bazaar openly acknowledged this increase in female athleticism and its shift away from the sickly females of the past. An article entitled “The Evolution of the Athletic Girl” written in 1897 stated,

the heroines of the romantic school of literature were described as pale, limp, and colorless creatures, who fainted or gave way to hysterics on the slightest provocation . . . the present generation of young women are fine

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34 Israel, 1897 Sears Roebuck Catalogue, 611-615.
types of physical beauty; they are straight of limb, fleet of foot, clear of complexion, dauntless and equal to any emergency.35

This statement makes it clear that the consumptive look and behavior was outmoded by the 1890s, and a more healthful look and energetic attitude was considered attractive.

Others were also aware of the shift as it was happening and documented it. An 1890 article claimed that many women “still follow the traditions of delicacy and helplessness” but that women increasingly have come to believe that “weakness, unless inherited, is sin”.36 An 1893 article entitled “The Girl of our Day” stated, “It is a matter of congratulation that the typical American girl has left behind her . . . the delicacy of constitution and of appearance on which she once prided herself.”37 These articles indicate that people were quite aware of this dramatic shift from delicate and weak, to athletic and healthy women as it was happening. This lends credibility to the idea that it was a conscious and purposeful shift. The need to look healthy and avoid stigmatization of a public who now feared the consumptive look, likely led many women to display their good health through sports, games, and exercise. The Athletics Movement provided men, and especially women, with a way of exhibiting their healthfulness. Increased participation also helped to push the athleticism movement forward.

More important than the role popular perceptions of tuberculosis played in the Athletics Movement, was the fact that most of the sports and games that

became increasingly popular for men and women were outdoor sports. Outdoor sports likely became important because both exercise and fresh air were believed to be necessary for general health. One article announced that exercise in the open air filled the lungs with fresh air, oxygenated the blood, and gave “life and sparkle where its effects are visible.” Other articles on new outdoor activities described the ancient Greeks as having been the models of health and attributed that health in part to their “life in the open air.” An 1897 article in Godey’s Lady’s Book asserted, “the love for open-air sports is already bearing fruit” because young ladies were found to be much healthier than previously. In the ladies’ magazines of the period, at least, health, exercise, and fresh air were very much intertwined. In fact, a 1901 article wrote that indoor sports were problematic because they did not provide exposure to fresh air. Basketball, “which has not often the open-air surroundings in its favor,” became a popular sport for college men and women in the early nineteenth century, but because it was played indoors it was seen as having a disadvantage.

Those who participated in the new athletics would have likely been healthy, but that does not seem to have diminished the importance of outdoor air. The benefits of outdoor air were becoming increasingly recognized not only as a cure for those with tuberculosis, but also as a preventative for those who wished to avoid falling ill. In 1903, one writer announced,

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The methods of [sanatoria] are not ‘specific’ for tuberculosis; they are simply the methods of living which produce and maintain general health, and which all who wish to improve their vitality should adopt . . . The hale and hard-working Mayor of Toledo habitually sleeps out-of-doors. Whole families that I know in California and Colorado do likewise and maintain an enviable level of good health.42

Similarly, a 1917 pamphlet on open-air treatment also urged healthy people to spend time outdoors for health. The pamphlet stated, “Everyone who wishes to avoid consumption should have [fresh air] and should have it in abundance night and day.”43 Although it is difficult to estimate the extent to which healthy people were participating in outdoor life, the above evidence seems to suggest that some people did use the principles of out-door treatment as a preventative for illness.

The upper and middle class held onto their beliefs in the benefit of outdoor air, even as they strove for general health. Through the Athletics Movement, they were able to distance themselves from those who appeared ill, as well as display the virtues of outdoor air treatment. The treatment was easily adapted for the purposes of those who were already healthy.

For those who did contract tuberculosis, many continued to believe that outdoor air therapy could act as a cure. Although a major shift in culture occurred when the general public ceased to romanticize tuberculosis in the 1880s and 1890s, the shift did not lead to new treatment forms. Patients continued to utilize the same outdoor air therapies and physicians continued to recommend them.

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43 *Sleeping and Sitting in the Open Air* (New York: National Association for the Study and Prevention of Tuberculosis, 1917), 4.
The movement of invalids into the American West actually increased around the same time that popular perceptions towards tuberculosis changed. Although it began in the 1840s, greater ease of railroad transportation allowed westward migration to accelerate. Town brochures, guidebooks, and even railroad advertisements all urged invalids to go west and benefit from the climate. Southern California, in particular, became a popular destination in the 1880s and 1890s. Many of the town promoters were tuberculosis patients themselves and their goal was to advertise the “communities, resorts, hotels and boardinghouses . . . all hoping to attract invalids, especially consumptives.” California had the added benefit of being able to provide outdoor jobs for invalids, such as tending citrus fruit orchards, which allowed workers to spend all their time in the open air. Other western destinations continued to remain popular with patients. In fact, “by 1900 fully one-quarter of the migrants to California and one-third of the newcomers to Colorado had come in search of health.” The cultural and societal changes towards tuberculosis did not stop the westward migration of invalids.

Sea-voyages also remained a popular option for tuberculosis patients during and after the shift in popular perceptions towards the disease in the 1880s. In his 1887 book, The Climatic Treatment of Consumption; A Contribution to Medical Climatology, James A. Lindsay mentioned that sea-voyages, along with mountain and inland resorts, were popular. Likewise, in 1894, Charles Theodore Williams devoted sixteen pages of his book, Aero-Therapeutics or the Treatment

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45 Rothman, Living in the Shadow, 146-147.
46 Rothman, Living in the Shadow, 131-132.
of Lung Diseases by Climate, to sea voyages. Williams did have some reservations based on factors he believed could be potentially fatal for a patient, such as a lack of suitable shipboard accommodations,stuffy cabins, and voyages that passed through areas that were oppressively hot. In the end, however, Williams stated that, for some unknown reason, “sea air seems to promote a healing process” within the diseased lung.\textsuperscript{47} Despite the continued approval of some physicians for sea-voyages, over time they were increasingly replaced by mountainous and inland destinations, possibly due to some of the concerns of Williams and others. Although sea voyages may have declined in popularity, the public and physicians turned to other areas consistent with medical climatology. Therefore, a great change did not take place, nor did it occur because of the change in popular perceptions. Medical climatology remained strong regardless of a decrease in sea voyage popularity. Additionally, the very existence of these works on medical climatology by Lindsay, Williams, and many others, published during or after the shift in popular perceptions, is also evidence that air therapy continued to be a major treatment option for tuberculosis patients.

New forms of air therapy, such as the sanatorium and the home cure methods, began just before the 1880s shift in the disease culture and accelerated afterwards. Sanatoria were specialized medical facilities for tuberculosis patients that required a commitment from the patient to stay as long as necessary and to work hard to improve in health. In 1859, Hermann Brehmer opened the first sanatorium, located in present-day Germany. He emphasized outdoor exercise and

\textsuperscript{47}James Alexander Lindsay, \textit{The Climatic Treatment of Consumption; A Contribution to Medical Climatology} (1887; repr., General Books, 2009), 21-22; Charles Theodore Williams, \textit{Aero-Therapeutics or the Treatment of Lung Diseases by Climate} (1894; repr., Kessinger Publishing, 2010), 85.
diet, while Peter Detweiller, a patient and student of Brehmer who went on to create his own establishment in Germany, emphasized rest, diet, and outdoor life. Brehmer and Detweiller’s theories were popular and formed the basis for sanatoria in America.  

Diet, rest, and light exercise were important factors of the sanatoria method of treatment. These activities, however, occurred in the open air as much as possible, making sanatoria treatment an extension of air therapy. Frederick Rufenacht Walters, writing on sanatoria in 1902, even defined sanatoria in terms of its use of air. He stated that sanatoria were “establishments for the open-air treatment of . . . consumption.” The same author also insisted that specific climate and geographical factors were important, although not necessary, in treating tuberculosis. He stated that sanatoria should be built in areas with pure air, natural protection from “cold or stormy winds”, “well-drained soil”, and weather that was suitable for outdoor life. This indicates that medical climatology was not entirely out of use, and overlapped with the creation of the new forms of air treatment.

In 1885, Edward Livingston Trudeau established the first major sanatorium in America in the Adirondacks and modeled it after the German sanatoria, with special diets and emphasis on life in pure, fresh air. The

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50 Well-drained soil was necessary so that stagnant water would not pool in the area and potentially cause additional illness. Some also believed that plant matter in the soil could result in dangerous miasmas in the air, which could cause or worsen tuberculosis.
Adirondacks had been a popular destination before Trudeau’s arrival among hunters and fishers for much of the early 19th century. Then, in 1869, Reverend William Henry Harrison Murray published a guidebook, *Adventures in the Wilderness, or camp-life in the Adirondacks*, which caused the area to become a popular travel destination during the spring and summer of that year. By fall, however, the popularity had worn off for the general public due to primitive accommodations and increasing prices, but those interested in camping, fishing, and hunting continued to visit the area. Dr. Trudeau had enjoyed a trip to the Adirondacks and decided to return later in life when a variety of climates and cures failed to treat his tuberculosis. The air in the Adirondacks was considered quite pure and free of the dust and dirt of the cities, but American doctors still generally prescribed the warm climates of health resorts and spring spas in treating tuberculosis patients at the time. Trudeau did not expect that the pure air of the Adirondacks would cure him and he was prepared to die in the place that he had enjoyed visiting earlier in life. Instead, Trudeau gained weight and his strength returned. Eventually, he decided to remain in the Adirondacks in hopes that it would continue to improve his health, and in 1875, he brought his family out as well. Other physicians, who were friends with Trudeau and aware of his improvement in the Adirondacks, began sending their own patients to the area.52

In 1882, Trudeau read an article on Hermann Brehmer’s success with tuberculosis in his mountain sanatoria. Trudeau was enthusiastic about Brehmer’s theories and began to raise money for his own sanatorium in Saranac Lake, New York. In 1885, Dr. Alfred

Loomis of New York, a supporter, sent two sisters to Trudeau’s Adirondack Cottage Sanatorium to be his first patients. By 1902, Trudeau’s sanatorium had become a village in its own right and could treat up to 94 patients. There were 22 buildings grouped around a main structure that held the dining room, offices, kitchen, and other common areas. Most of the other buildings were one-story cottages for the patients, built to maximize the amount of air ventilation a patient would receive. Patients were also required to live outdoors as much as possible, even during snow and freezing weather.  

Several factors led to Trudeau’s popularity and by extension, the popularity of the sanitoria treatment of tuberculosis. First, Trudeau quickly became recognized as a major tuberculosis expert. He set up his own laboratory and conducted experiments for which he published papers. After Robert Koch identified the tuberculosis bacillus under a microscope, Trudeau received training in how to stain the bacteria as well, and in 1885 became the first person in North America to cultivate the tubercle bacillus in his lab. Although Trudeau was isolated in the Adirondacks, many physicians were aware of his work and theories through his published papers, which helped to spread his ideas and make his sanatorium popular. Second, Trudeau had many patients who were also physicians. Those physicians who improved at the sanatorium went home and urged their own patients to seek treatment with rest, nutritious diet, and life in the outdoor air.  

Third, Trudeau’s sanatorium truly appeared to help some patients. One source stated that after an average of ten years following treatment, “20 to 25 per cent, [sic] are apparently cured, and in 20 to 35 per cent, more the disease is more or less permanently arrested.”

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53 Taylor, Saranac, 63, 74-75; Walters, Sanatoria for Consumptives, 52.
54 Daniel, Captain of Death, 184; Taylor, Saranac, 98.
meaning the disease has ceased its progression.\textsuperscript{55} Taken together, these statistics indicate that between 40 and 55 percent of patients benefitted from treatment. A public desperate for a cure would certainly have been willing to try a form of treatment believed to offer nearly a 50 percent chance of improvement.\textsuperscript{56} Just as it did with the invalid migration west and the popularity of specific climates, the stories of success which spread through word of mouth also likely inflated the public’s perceptions of the efficacy of sanatoria.\textsuperscript{57}

Trudeau’s popularity and apparent success with patients led to the sanatoria movement in America, which institutionalized the principles of outdoor air treatment. Frederick Walters, writing on sanatoria in 1902, gave specific construction and furnishing recommendations for sanatoria. He stated that “purity of air is of paramount importance” in choosing a location for building.\textsuperscript{58} Inside the structures, Walters recommended “every part should be extremely well and independently ventilated.”\textsuperscript{59} Ventilation not only allowed patients to have fresh air while indoors, but also flushed out any “bad air” that might develop from dust, coal, and the patient’s breathing. This “bad air” could irritate patients’ lungs and cause illness in the staff. Heavy curtains, carpets, bed hangings, mats, and unnecessary ornament of any kind were discouraged because they collected dust. Patient’s rooms, according to Walters, should have special shutters which would let in air but block out rain, and should be sheltered, but open to the sunshine.\textsuperscript{60} According to Walters, “sunlight and fresh air are most efficient disinfectants.”\textsuperscript{61}

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\textsuperscript{55} Walters, \textit{Sanatoria for Consumptives}, 53.  \\
\textsuperscript{56} Modern research indicates that people will improve on their own, without medical intervention, at about the same rate as people improved at sanatoria.  \\
\textsuperscript{57} Taylor, \textit{Saranac}, 130.  \\
\textsuperscript{58} Walters, \textit{Sanatoria for Consumptives}, 14.  \\
\textsuperscript{59} Walters, \textit{Sanatoria for Consumptives}, 18.  \\
\textsuperscript{60} Walters, \textit{Sanatoria for Consumptives}, 18-22.  \\
\textsuperscript{61} Walters, \textit{Sanatoria for Consumptives}, 22. 
\end{flushleft}
physicians at the time, eventually became concrete criteria for sanatoria. A 1921 Public Health Report on sanatorium planning sought to ensure that the facilities complied with the beliefs in outdoor air therapy. The report stated that the dormitories “should include outdoor sleeping facilities for every patient” in addition to porches and other areas for daytime rest and exercise in the outdoors.\(^{62}\) Moreover, most sanatoria made fresh air a mandatory part of treatment. Although many sanatoria emphasized rest as the key to treatment, rest occurred “in bed in the fresh air on a porch, or in a well ventilated room.”\(^{63}\) Some sanatoria may have stressed the importance of rest above all else, but rest had to be taken outdoors in the fresh air. In fact, as late as 1941, two Virginia sanatoria required patients to remain outdoors for much of the day. The Catawba Sanatorium and the Blue Ridge Sanatorium’s Rules and Information for Patients handbooks both stated,

> All patients must remain in the open air, except (1) during meals, (2) when performing their necessary toilet and (3) from supper to bedtime. Fresh air is one of the main factors in the treatment of tuberculosis. One cannot get too much of it, and night air is as beneficial as day air.\(^{64}\)

Failure to follow these rules could result in a patient being sent home.\(^{65}\)

The sanatoria’s extreme devotion to outdoor air therapy, through ventilated buildings and required rest and exercise in the fresh air, may have led to the home cure method of treatment. The home cure method of treatment emphasized that for those with ill health, fresh air from any climate or geographical location was better than no fresh air at all. This logic allowed sanatoria to be built in any climate, although the mountains and


\(^{63}\) Emphasis original to the document. Catawba Sanatorium, Rules and Information for Patients (Richmond: State Board of Health, 1941), 4.

\(^{64}\) Catawba Sanatorium, Rules and Information for Patients (Richmond: State Board of Health, 1941), 8; Blue Ridge Sanatorium, Rules and Information for Patients (Richmond: State Board of Health, 1941), 7.

\(^{65}\) Catawba Sanatorium, Rules and Information, 14.
the sites of old spring resorts, with their connections to medical climatology, continued to be popular sites for building sanatoria. 66

The home climate method of treatment was also convenient in that it allowed even greater participation in air therapy. Prior to this development, physicians urged patients to travel for their health. This travel could include leaving the country or trekking far into the American West. Some women did visit resorts abroad or the springs at home, but many women also stayed home in order to care for their children and keep their homes running. 67 In order to procure comfortable travel and accommodations, a significant amount of money would also be necessary for both men and women. Additionally, some tuberculosis patients were simply too ill to travel, and therefore too ill for the prevailing treatments. With the home cure movement’s emphasis on obtaining fresh air from one’s own home climate, the poor, the violently ill, and more women were able to participate. They could do so by applying to a local sanatorium for treatment, or by obtaining as much rest in the fresh air as possible in their own homes.

Fresh air therapy remained the primary form of treatment for tuberculosis patients throughout the 19th century. After the 1880s, the outdoor air method of treatment persisted despite great changes in the public’s popular perceptions and attitudes towards tuberculosis. In fact, outdoor air treatment seems to have accelerated after this shift as healthy men and women embraced outdoor sports and exercise for prevention, allowing it to adapt to the new cultural attitudes towards the disease. Meanwhile, for those who did contract the disease, the development of the sanatoria and home cure movements

66 In Virginia and West Virginia, in particular, sanatoria were built on the sites of the many old spring resorts. Catawba Sanatorium, for example, was built at the once popular site of Roanoke Red Sulphur Springs.
67 Rothman, Living in the Shadow of Death, 77.
overlapped and expanded on the principles of climatology so that fresh air of any location was believed to be beneficial. This allowed more invalids to participate in outdoor air tuberculosis treatment. The trend toward increasing use of air as treatment, as well as the ability of outdoor air treatment to adapt and outlast major changes in society, can also be seen in the sale of air therapy devices for home use.
Chapter Three

The Role of Manufacturing and Outdoor Air Treatment Accessories

The late 19th to early 20th century was a time rife with significant changes in American society. Industrialization changed the way people worked, lived, consumed, traveled and communicated. New technologies and mass-produced items changed the look of the home and city, and affected the nature of daily activities. Out of this time of intense transformation, new electrical and medical technology became available. Some physicians and manufacturers decided to use the new advancements in manufacturing and electricity to continue old methods of tuberculosis treatment. Instead of using the new advancements to innovate and create new treatments, manufacturers produced electrically powered devices and non-electrical outdoor air treatment accessories. The electrical devices mimicked the benefits of outdoor air, while the non-electrical accessories allowed for greater comfort while participating in the treatment at home, and indicated a high participation in the home cure movement.

In the late 19th century, a few physicians experimented with electrotherapy devices, such as the violet ray machine, to give their patients minor pain relief. Around the turn of the century, however, non-medical companies, already interested in electrical forms of healing, seized upon the idea of a violet ray machine and, like much of the patent medicine at the time, began manufacturing and marketing these devices as cure-alls for personal use in the home.¹ By 1921, the EMF Electrical Yearbook listed over twenty different manufacturers of the violet ray device, including Bleadon-Dun Co., Chas

A. Branston, Contra-Pole, Master, and Renulife.² The Violetta, by Bleadon-Dun
Company of Chicago, is useful as a representative violet ray model, due to its patent for a
tuberculosis treatment attachment, possible appearance in the Sears, Roebuck &
Company catalog, and prevalence of surviving devices, product guides, and
advertisements. The violet ray electrotherapy machine, specifically the Bleadon-Dun
Company Violetta, is an example of the continuation of the public’s belief in air therapy
through new technology and goods.

² Frank H. Bernhard, ed., EMF Electrical Yearbook (Chicago: Electrical Trade Publishing
Company, 1921), 791.
shapes, sizes, and quality, but all were small enough for one person to carry with ease. Purple satin generally covered the interior. In some models, the top right corner of the case housed the electrical current generator box. The high-end models even featured marble ornamentation on the box. On top of the generator were switches for adjusting the frequency of electrical current. Two cords also emerged from the generator. One cord ended in a two-prong plug for attaching to batteries or plugging into wall outlets. The other cord attached the generator to a long cylindrical handle, which had its own compartment in the case for storage. Inside the handle were high frequency coils for conducting the current. Hard rubber or plastic covered the outside of the handle, which was typically around 7.75 inches long and 1.75 inches in diameter. The end of the handle furthest from the cord tapered to a point and featured a socket for inserting assorted glass tubes fitted with electrodes.\(^3\) When the machine was plugged into an outlet or battery and a frequency chosen, a bluish purple glow emanated from the glass tube. The tubes “buzzed and crackled . . . tingled and warmed the skin.”\(^4\)

Manufacturers and advertisers of violet ray machines like the Violetta attributed the purple color that lit up the glass bulbs to the healing “violet rays” produced by electrical current. In actuality, the “violet rays” were the result of ionized air in a vacuum.\(^5\) When a consumer placed the glass tube on the skin, or inside the body, the machine’s “violet rays” were purported to massage and stimulate the body’s cells.

According to Bleadon-Dun Company, this cellular massage

\(^5\) Young, The Medical Messiahs, 244. Currently, some believe that these machines have benefit in clearing up acne and other skin problems because they dehydrate the skin. They also may help with minor pain relief for sprains and other injuries, but they remain alternative medicine.

promoted general health, making the user less susceptible to disease and better equipped to recover from existing illness. 6 Advertisements and promotional pamphlets for the Violettta also listed 86 specific ailments that the device could treat, including insomnia, digestive distress, tuberculosis, deafness, sore throat, boils, alcohol addiction, obesity, asthma, sexually transmitted diseases, and epilepsy, just to name a few. 7 The Violettta even claimed to improve the appearance of hair and skin, as well as increase energy, expanding its appeal to generally healthy people.

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6 *Violet Rays*, 3-5.

7 *Violet Rays*, 47-49; Young, *Medical Messiahs*, 244.
Each problem or malady required a specific frequency of electrical current, and some required specialized glass tube attachments, which were frequently sold separately from the basic model. For example, attachment number three, a glass tube in the shape of a comb, was raked through the hair by the consumer to treat dandruff, balding or limp hair. Other glass attachments included a two-pronged piece for spinal treatments, a semi-circular piece fitted for the outside of the throat, long and thin tubes with angles perfected for reaching inside noses, ears, and throats, and specialized vaginal and anal tubes.\(^8\)

The most complex attachment available was for the treatment of tuberculosis and other respiratory ailments. According to Bleadon-Dun Company, the Violetta Ozone Generator attachment, patented in April 1921, could treat or even cure tuberculosis. Ozone generators and other devices for increasing oxygen were not new to the public. In the 1880s, there “were more than thirty vaporizers and atomizers on the market aimed at increasing the lung capacity and oxygen absorption of consumptive patients.”\(^9\) The Electropoise, a device that attached to the ankle and claimed to flood the body with oxygen, had also been advertised since 1892. Bleadon-Dun Company’s model, however, combined the healing effects of the violet ray machine with their ozone generator, making it all the more attractive.\(^{10}\)

The company sold the ozone generator separately, but it was also sometimes included in the more expensive sets. The ozone generator consisted of a glass piece that plugged into the socket of the device handle like the other glass tubes available for purchase. It had a long, glass shell encasing a cylindrical vacuum tube. At the bottom of the shell, a glass nipple attached to a rubber hose and rubber compression bulb. At the top

\(^{8}\) Violet Rays, 39-40, 47-49.
\(^{9}\) de la Pena, The Body Electric, 122-123.
\(^{10}\) de la Pena, The Body Electric, 122-123.
of the shell, a glass neck extended upwards into a circular glass bulb. Two stems led upwards from this bulb. One stem was for pouring pine-scented medicated liquids directly in the bulb. The other stem attached a glass, two-pronged nostril piece to the bulb.\textsuperscript{11}


The ozone generator was handled differently than other tube accessories. Instead of holding the handle and placing the electrode on or near the skin to receive the benefits of the violet rays, the patient laid the handle horizontally on a table. The generator

\textsuperscript{11} Mechanisms inside the glass bulb are not mentioned above because they just served the purpose of ensuring that liquid did not pass into the vacuum tube below.
featured an L shaped neck which curved the rest of the tube upwards. The attachment ended in the two prongs which were inserted into the patient’s nostrils for the purpose of directly inhaling the generated ozone. With one hand, the patient steadied the handle while the other hand worked the attached rubber compression pump.\textsuperscript{12}

The device generated ozone by passing a high frequency electric current through the cylindrical vacuum tube encased in the glass shell. The hand-operated rubber compression bulb pumped air into the shell where the electric currents emitting from the vacuum tube charged the air molecules and created ozone. The rubber pump also accomplished the task of pumping the ozone into the glass bulb containing medicated liquids. The ozone then became saturated with the liquid, passed upwards into the glass stem, and out of the nostril pieces to be inhaled by the patient.\textsuperscript{13}

Ozone, as concentrated air, was believed to be as beneficial as outdoor air. The Ozone Generator extended the home cure movement as it allowed patients to receive “fresh air” in the comfort of their own homes without having to live out of doors.\textsuperscript{14} Moreover, since the Violetta had to be given time to cool off, treatments were short in comparison to spending each day outside. A treatment could be taken and the consumer could go about their day at work in an office or factory, or tending their home indoors, while outdoor life made going to work or taking care of the home nearly impossible. Outdoor life also required a patient to suffer through temperature extremes and blowing rain and snow. Indoors, the Violetta was far more appealing with its “pleasant,

\begin{footnotes}
\item[14] The ozone produced by the Violetta could be considered a pollutant in modern times. Ozone is sometimes used as an industrial disinfectant today, giving some credibility to the product’s ability to destroy bacteria. It is, however, considered to be a respiratory irritant if directly inhaled, even in small amounts.
\end{footnotes}
stimulating effect wherever applied” and “refreshing sense of warmth and exhilaration.”

When using the ozone generator attachment in particular, the efficacy of the ozone, which “permeates every cell in the lungs, destroying the inflamed tissues” and “reminds one of a trip to the pine woods” certainly would have appealed to many suffering from tuberculosis. Moreover, Bleadon-Dun also sought to extend their appeal and win the confidence of consumers by including positive testimonials from journals and newspaper articles, doctor recommendations, and the general public in their advertisements.

The Violetta and other violet ray electrotherapy machines enjoyed the most popularity between 1910 and the 1930s. At this time, the public was becoming increasingly accustomed to the changes machinery and electricity brought to their daily lives, according to literary historian Herbert L. Sussman. Machinery had changed the visible world and landscapes of America through new devices, factories, railroad tracks, macadam roads, tenement housing, automobiles, transportation stations, and warehouses. In the late 19th century, cities utilized electric lights, which allowed shops and entertainment to stay open after dark. These same shops had illuminated displays in the windows to entice customers. The homes of the wealthy were wired for electricity and the telephone. At the 1893 Chicago World’s Columbian Exposition, many rural fair visitors were introduced to electricity for the first time. Furthermore, poets, like Rudyard Kipling and W.E. Henley, began to write about the “beauty of the machine.” These factors came together to familiarize the public with electrical devices. To people at

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15 Violet Rays, 22. Bleadon-Dun claimed that this testimonial was a reprint from an article in the Chicago Journal.
16 Violet Rays, 41.
20 Sussman, Victorians and the Machine, 7-10 and 209.
the time, it seemed logical that electricity could improve the human body, just as it improved their daily lives. This thinking led physicians to originally experiment with violet rays, and later allowed manufacturers to be able to exploit this machine-loving, unsuspecting public.\(^\text{21}\) The Violetta would also not have been a possibility without the public’s familiarity with electricity and machinery. According to writer Carolyn Thomas de la Pena, the familiarity gained by the 1910s helped the public to feel comfortable with electricity and new technology. Without this comfort, it was unlikely they would have been willing to place the Violetta on, and sometimes inside, their bodies.\(^\text{22}\)

Although the public was comfortable with industrial technologies by the time the Violetta entered the consumer market, they did not quite understand how the new technology worked. Bleadon-Dun Company’s informational pamphlet for the Violetta informed potential customers that electricity “is a mysterious, magical power that is being developed in some new way each year.”\(^\text{23}\) The company went on to say “the great medicinal value of Violet Rays cannot be explained. We know that they are healing and that is all.”\(^\text{24}\) These statements show the extent to which electricity was misunderstood.

The development of factories and mass manufacturing allowed these products to be sold for private home use. The Sears, Roebuck & Company catalog made the violet ray machine available to people all over the country. Three models were available including one entitled “The Ozone Generator Set.” Although “Violetta” and “Bleadon-Dun” were not mentioned, the model pictured and described in the catalog is precisely the same as the Ozone Generator patented by Bleadon-Dun six years earlier. This may

\(^{22}\) de la Pena, *The Body Electric*, introduction.
\(^{23}\) *Violet Rays*, 3.
\(^{24}\) *Violet Rays*, 54.
have been the Bleadon-Dun model or another similar company, as many competitors did not bother to adhere to patents or file their own for their designs.25 This set included the Ozone Generator device, liquid inhalant, and other attachments for $18.75 (roughly $232.00 by 2009 standards).26 Basic sets without the ozone generator attachment were less expensive at $7.95 (about $98 in 2009) and could still be used by a tuberculosis patient to improve their overall health and appetite. Although the Sears, Roebuck & Company catalog referred to the Ozone Generator set as “popular”, it is unknown how many they actually sold. The very presence of these machines in a mail-order catalog, however, indicates that there was a widespread demand for the item, despite the relatively high price. Furthermore, historian Carolyn Thomas de la Pena claims that people were “lining up” to purchase electrical medical devices like the Violetta because of their ability to be used privately in the home.27

Manufacturers in the early 20th century also mass-produced other, non-electrical items to make it easier and more comfortable to participate in fresh air treatment from home. These items, too, are evidence of the continuation of the use of outdoor air treatment among the public, despite technological advancements, as well as the adaption of beliefs by the manufacturers and producers.

According to one pamphlet on the home cure treatment, “a comfortable reclining chair is a necessary part of the equipment needed for taking the outdoor cure for tuberculosis.”28 The “cure chair” was developed in order to ensure comfortable and

25 Jeff Behary, e-mail message to author, January 6, 2011.
sanitary rest while outdoors. Peter Dettweiler first utilized the chair at his sanatorium outside Frankfurt, Germany in the earliest days of the movement, and it later spread to America. The cure chair could be any reclining chair used for resting outdoors, or a chair specially manufactured for that purpose. At the famous Trudeau Sanatorium at Saranac Lake, New York, one patient by the name of Leonard T. Davidson described spending “practically all of his time in ‘the cure chair’, as the long reclining couch is called”, even during temperatures of twenty and thirty degrees below freezing.

Although a variety of angled couches and seats were manufactured, the long reclining couch with an adjustable back was the most common form of cure chair. It consisted of a cane, metal, or hardwood frame with armrests on each side for comfort. The cushion extended from the foot of the couch up to the top of the backrest. It was common to cover the cushions in canvas or another easily cleaned material due to the constant coughing and contamination from sputum and exposure to outdoor dust and weather.

Cure chairs could be obtained at reasonable prices for use at sanatoria or in the home. In 1911, Directions for Living and Sleeping in the Open Air, by Thomas Spees Carrington, stated that canvas chairs with wooden frames could be purchased for $1.00 ($23 in 2009) and cane chairs with lounging extensions could be bought for $2.50 ($58 in 2009). The use of hammocks was also depicted in guidebooks for living outdoors.

Sears, Roebuck & Company produced a hammock they advertised as “an excellent thing

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31 Margaret Campbell, “From Cure Chair to Chaise Lounge: Medical Treatment and the Form of the Modern Recliner,” Journal of Design History 12, No. 4 (1999): 331.
32 Campbell, “Cure Chair,” 330.
33 Thomas Spees Carrington, Directions for Living and Sleeping in the Open Air (New York: National Association for the Study and Prevention of Tuberculosis, 1911), 23.
34 Sleeping and Sitting in the Open Air, 12.
for invalids.” The hammock was covered in canvas and featured armrests that could be repositioned to change the lounging position. This hammock retailed for $1.48 in 1908 (worth $35 in 2009).\(^\text{35}\)

Window tents, another accessory item for the home cure, were a relatively affordable way to obtain fresh air in a tenement house or other situation in which sleeping outside was impossible or impractical. The purpose of window tents were to expose the consumer’s head to the outdoor air coming in through the open window, while protecting the rest of the body, as well as the rest of the room, from cold breezes. Window tents were designed specifically for the tuberculosis patient, but according to a 1914 book by Dr. Carrington, *Fresh Air and How to Use It*, even healthy people used these tents for the purpose of obtaining fresh air.\(^\text{36}\) By 1917, there were many available models on the market, “ranging from five to six dollars up to about fifteen dollars” (worth from $83 to $250 in 2009.)\(^\text{37}\) Window tents required a bed or cot to be arranged so that the bed was against the wall and the person’s head was parallel to the window. A frame and cover


\(^{37}\)Sleeping and Sitting in the Open Air, 18.
then fit to the window or bed frame, enclosing the open window and the person’s head and shoulders in a tent-like structure. Manufacturers produced two types of window tents. Awning style window tents looked as if a typical outdoor window awning was placed inside and lengthened. These window tents typically attached to the window and were operated like a regular awning. They sometimes were made of heavy canvas or flannel, and could be tucked around a person’s body or under the bedding.

Box style window tents were typically smaller and only covered the bottom part of an open window. They rested on the bed rather than attached to the window. Some styles had screens or flaps to protect a person’s face from a direct, cold breeze. Other styles had a piece similar to a small awning that projected outside of the window and protected the person from blowing rain or snow. The outside awning piece also prevented others from seeing into the window tent and watching as a person slept.\textsuperscript{38}

\textsuperscript{38}Carrington, \textit{Fresh Air and How to Use It}, 27-37.
There were more expensive additions to a home that could be made for the purposes of obtaining fresh air while remaining sheltered. Detachable sleeping balconies, according to *Sleeping and Sitting in the Open Air*, were “easy to make or buy a number of different kinds.” These balconies were attached outside a building over a window, which was then used as the entrance. The pamphlet listed six different manufacturers, who could provide customers with detachable sleeping balconies ranging from a few dollars up to $100 (worth over $1,600 in 2009). Permanent sleeping porches, balconies, or covered patios could be homemade or bought and added onto a home at greater expense. A surprisingly wide-variety of tent and shack styles were also available for purchase. Smaller tents, shacks, and lean-tos were especially convenient in that they could be erected on city roof tops or roof projections. Tents, shacks and lean-tos could be cheaply homemade from wood and canvas, or purchased from a manufacturer.

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39 *Sleeping and Sitting in the Open Air*, 12.
40 *Sleeping and Sitting in the Open Air*, 12-15; Carrington, *Fresh Air and How to Use It*, 119-164.
Example of a detachable sleeping balcony from *Sleeping and Sitting in the Open Air* (New York: National Association for the Study and Prevention of Tuberculosis, 1917), 9.

A tent pitched on a rooftop projection in an urban setting. from Thomas Spees Carrington, *Fresh Air and How to Use It* (New York: The National Association for the Study and Prevention of Tuberculosis, 1914), 121.
After the medical community established drugs for the treatment of tuberculosis in the 1950s, the demand for these products likely diminished for invalids. Those manufacturers who had been making window tents, portable and permanent household additions, and other outdoor equipment could have easily continued to make similar products. Instead of marketing their products to invalids, tent and outdoor accessory manufacturers could still sell their products to campers and outdoorsmen. Manufacturers and builders of sleeping porches, patios, and balconies perhaps continued their business, as the permanent items became popular features of architecture in many areas of the United States.\textsuperscript{41} The manufacturers of violet ray devices, however, did not always have the option of adjusting their target advertising demographic in order to stay in business after the development of drug treatments.

Many of the violet ray manufacturers were under attack long before drug treatments were established. Beginning around 1905, the Associated Advertising Clubs of America encouraged companies not to engage in fraudulent forms of advertising. They argued that it corrupted the public’s trust in advertisement in general and was an unfair form of competition. At this time, however, there was nothing in place officially to prevent fraudulent advertising unless it was done through the mail. The Post Master could use his discretion in charging a company with postal fraud, but as long as they did not advertise through the mail a company would likely face no legal action.\textsuperscript{42}

In 1914, Progressive Era politicians formed the Federal Trade Commission (FTC) to prevent monopolies. The FTC agreed with the Associated Advertising Clubs of

\textsuperscript{41} Katherine Ott, \textit{Fevered Lives} (Cambridge, MA: Harvard University Press, 1996), 90. While Ott discusses the “medical marketplace” in her book, she mentions it within the context of the culture of an invalid lifestyle, rather than in the context of outdoor air therapy.

\textsuperscript{42} Young, \textit{Medical Messiahs}, 66-87.
America that fraudulent advertising was unfair to competitors who were truthful in their advertisements. In 1915 the FTC began issuing cease and desist orders to companies accused of unfair competition through fraudulent advertising. These companies often simply moved their headquarters or changed company names in order to stay in business.\(^{43}\)

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\(^{43}\) Young, *Medical Messiahs*, 74; Jeff Behary, e-mail message to author, January 6, 2011.
In 1930, the FTC issued many cease and desist orders and filed a number of complaints, one of which was against Bleadon-Dun Company. The complaint read,

That respondent, some-times trading as “The Vi-Tex Co.,” engaged in manufacture and sale of electric generators designated “Violetta” for use in the treatment of diseases, circulates false and misleading statements regarding regular price of appliance, free goods given therewith, and its efficacy as a curative for some 86 ailments, thereby deceiving purchasing public into erroneous belief that respondent’s product possesses curative properties in common with those possessed by the true violet-ray machine, and that a special, reduced price is being quoted.44

Bleadon-Dun Company apparently deceived the public with regard to pricing and free attachments and goods they claimed would be available. Interestingly, the complaint also stated that a real, beneficial violet ray existed, but that Bleadon-Dun’s Violetta was not one such machine. The Violetta could not cure or treat the 86 ailments listed in its pamphlet. Although the Federal Trade Commission originally sought to protect fair competition, by the 1930s they appear to be concerned with the rights of consumers as well.

By the late 1940s and 1950s, the Food and Drug Administration (FDA) also became involved with these devices and lawsuits against the fraudulent advertising practices of these companies led to fines, destruction of devices, and forced closures. For example, the 1954 case of U.S. v. Master Appliances, Inc. resulted in a fine of $2,000 plus costs (over $16,000 in 2009) when the company pled guilty for misbranding. Their violet ray device “would not provide an adequate and effective treatment” for any of the

conditions the company listed. Bledon-Dun Company and others, “simply branched out across the country so that portions of the companies remained under different names” in order to remain in business despite lawsuits and complaints. Eventually, however, the FDA and lawsuits were successful in forcing the companies to close or manufacture new products. Some of the violet ray companies went on to produce leak detectors for testing vacuum tubes, such as Electro-Technic Products, Inc. Interestingly, these leak detectors look quite similar to the Violetta and continue to require an assortment of electrode attachment accessories for testing different surfaces. It would not be until the second half of the 20th century that most states adopted clear laws against fraudulent advertising.

Electrotherapy machines, while they still exist as alternative beauty and medical aids, are no longer allowed to be sold as “violet ray” cure-all machines in the United States.

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46 Jeff Behary, e-mail message to author, January 6, 2011
During the early 20th century, consumers purchased manufactured goods that served as accessories for the home cure and sanatoria movements. New technologies in electricity -- in the case of violet ray devices -- and manufacturing allowed consumers to continue the old method of outdoor air treatment with greater ease. The Violetta allowed the outdoor air therapy premise to come indoors with its ozone generator and pine-scented liquid inhalant. Lean-tos, shacks, basic balconies and other items could be cheaply homemade for sheltering patients living in the outdoors, and allowed people of all economic levels to participate in treatment; staying home was much cheaper than a trip abroad. The fact that manufacturers were also selling them ready-made or in pre-fabricated parts, however, further indicates that there was a market for these products and a pool of people willing to put money into the new accoutrements of the home cure movement. New technology and manufacturing adopted the principles of outdoor air treatment for their consumers in making these products. These product, in turn, helped to accelerate the belief in and use of air treatment for tuberculosis during the early 20th century by democratizing the treatment.
Chapter Four

The Medical Field: Physician’s Debates and Increasing Knowledge

During the zenith of outdoor air treatment, the late 19\textsuperscript{th} and early 20\textsuperscript{th} centuries, little consensus existed within the medical field concerning tuberculosis. There were many theories for what could cause or predispose a person to contract tuberculosis. Likewise, there were many options for outdoor treatments. Those who prescribed a form of outdoor air therapy like climate change did not always agree on which locales were the most beneficial or what aspect of the air would improve a patient’s condition. After the 1880s, considerable debate existed within the profession between climatologists and those who believed any fresh air would be beneficial; both outdoor air options remained viable until the advent of effective drug treatments. In addition to this lack of consensus surrounding tuberculosis, its causes, and its treatment, the medical profession as a whole also experienced changes as it began to emphasize professionalism and training. Still, the lack of consensus and changes in the medical profession did not derail the idea that outdoor air could cure or improve tuberculosis.

Throughout the 19\textsuperscript{th} and early 20\textsuperscript{th} centuries, there were many overlapping theories of what caused tuberculosis. In the early half of the 19\textsuperscript{th} century, belief in the “humours” continued to linger although they had begun to lose credibility as early as the 17\textsuperscript{th} century. The idea of the four humors was attributed to Hippocrates in the 5\textsuperscript{th} century BC, who also developed the ideas of outdoor air therapy, diet, and sanitation for consumptives. The humoural theory centered on the idea that there were four fluids of the body: yellow bile, black bile, blood, and phlegm. These fluids circulated in the body
“much like water in pipes” and affected personality, physiognomy, mood, and health.¹
Some people were believed to have personalities and physiognomies that made them more susceptible to developing disease. Humours could also shift in quantity and cause disease “according to what one ate and drank, to where one lived, and to climate and season.”² To restore health, balance of the humours also had to be restored. Although increasing knowledge and new theories replaced the four humors, the idea of balancing the body in order to maintain health persisted.³

In 1770, John Brown wrote *Elementa Medicinae*, in which he developed the idea that overstimulation and under-stimulation of the body or nerves could result in consumption. Overstimulation through hard physical work, intellectual efforts, or intense emotions could deplete energy to the point of dangerous exhaustion and then consumption. Likewise, under-stimulation and languor led to a dangerous “depression of the body’s systems,” which could also cause illness.⁴ This theory based on over- or under-stimulation of passions and energy “had not detached the old humoural idea that consumption was a function of the individual’s personality, and that one’s ‘habit’ (personality, physiology, and lifestyle) determined one’s disease.”⁵ As with humours, lifestyle and personality could affect the balance of energy and cause illness. Just as physicians worked to balance a patient’s humours, physicians who believed in this theory of causation also had to work to balance energy. Some physicians in the early half of the 19th century did so through bloodletting, purging, or rest for their over-stimulated.

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² Arikha, *Passions and Tempers*, xviii.
⁵ Lawlor, *Consumption and Literature*, 177.
patients, while under-stimulated individuals could be treated with fresh air, opium, or exercise.⁶

Physicians continued to believe in outdoor air treatments well into the late 19th century, and continued to prescribe fresh air as a way to balance their over- or under-stimulated patients. James Alexander Lindsay, writing in 1887, stated, “everything which tends to lower and impair vitality may operate as a predisposing cause [of consumption]. Excessive physical or mental work, worry and disappointment, alcoholic or other undue indulgence, deprivation of sunlight, improper alimentation, imperfect sanitation . . . climatic treatment leaves few, if any of them unmodified.”⁷ Lindsay believed that overstimulation, but also lack of proper food, sunlight, or sanitation could lead to depletion of the body’s “vitality” and therefore make consumption more likely. The concept of overstimulation was still present, but was expanded to include factors that weakened immunity. Regardless, like some earlier physicians, Lindsay believed that outdoor air could have a positive effect on balancing an individual’s health.

Although Lindsay believed that overstimulation and depleting forces could bring on consumption, he also adhered to a common belief that heredity played a role as well. Before Koch’s discovery of the tubercle bacillus, many people believed that consumption was not contagious, but was inherited. This theory helped to explain the frequency of entire families succumbing to the disease. Some physicians believed that consumption itself was inherited while others, especially after Koch’s discovery, continued to believe that a predisposition to the disease could be inherited, making one more susceptible to the

⁶ Lawlor, Consumption and Literature, 114-115.
Lindsay, writing after Koch’s discovery, believed that an individual could inherit a predisposition to bronchitis or pneumonia, which inflamed the lungs. An imperfect healing from the inflammations, according to Lindsay, could become the “starting point” of consumption. He went on to say that the “hereditary factor in consumption remains a powerful one.”

Lindsay believed that outdoor life in a healthful climate was the solution to preventing and treating hereditary cases. He stated, “climatic treatment plays a leading part in the prophylactic measures which are often adopted with such happy results.”

A very popular belief during the late 19th and early 20th century was that indoor and outdoor pollutants could cause or predispose a person to tuberculosis. It was believed that indoor and outdoor pollutants could also worsen the condition of existing patients.

Both forms of pollutants, and their affects on health, could be addressed with open air.

Outdoor pollutants could include smoke, dust, or emanations from stagnant water or soil. Different physicians and writers emphasized different pollutants. In 1844, Dr. Robley Dunglison stated that some outdoor areas were “loaded with emanations from animal and vegetable substances in a state of decomposition,” which could irritate lungs.

In 1880, Williams Samuel Wilson wrote that ocean air was free from carbon, dust, organic, and inorganic “impurities” that existed on land and led to consumption. The supposed purity of ocean air made it a preferable retreat, in Wilson’s opinion, for those seeking to avoid outdoor pollutants and illness.

Frederick Walters, writing in 1902, recommended that sanatoria locations be “free from dust and smoke and the

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9 Lindsay, The Climatic Treatment of Consumption, 8.
10 Lindsay, The Climatic Treatment of Consumption, 9.
11 Frederick Walters, Sanatoria for Consumptives; A Critical and Detailed Description, Together with an Exposition of the Open-air or Hygienic Treatment of Phthisis (Swan Sonnenschein, 1902), 13.
impurities which are inseparable from a dense population” as these impurities led to coughing and irritated air ways.\textsuperscript{14} He further recommended locations with “dry, warm, well-drained soil” to prevent stagnant water and decomposition of plant matter, which led to lowered vitality and growth of the bacteria.\textsuperscript{15} The best way to avoid outdoor pollutants was to move to less polluted areas.

Indoor pollutants could include gas from lighting or coal burning, dust, or even exhaled air. Robley Dunglison warned that these indoor pollutants led to disease.\textsuperscript{16} Lindsay emphasized dust from manufacturing, factory work, or other indoor occupations. He wrote that workers involved in occupations that produced dust or other indoor pollutants, such as cotton manufactures, were much more susceptible to consumption than others.\textsuperscript{17} Even at the late date of 1914, well after Koch’s discovery of the bacillus and the acknowledgement that tuberculosis was spread through contagion, the belief that pollutants were a predisposing factor continued. Guy Hinsdale, in his book \textit{Atmospheric Air in Relation to Tuberculosis}, wrote,

\begin{quote}
The dwelling, the bedroom, the workshop, the office, the church, the schoolroom, the theatre, the modern subway are one and all dangerous in proportion, as their atmosphere is composed of dead or rebreathed [sic] air. Not only is tuberculosis favored by unhygienic surroundings and vitiated atmosphere in particular, but no other agent, not excepting alcohol and bad food, so surely undermines the constitution and renders it unable to resist disease. Air that has once been breathed, ought not to be breathed again. Out of doors the danger is minimized.\textsuperscript{18}
\end{quote}

Like writers from the 19\textsuperscript{th} century, Hinsdale believed that indoor and outdoor pollutants could predispose a person to illness, tuberculosis in particular. Unlike most of the other

\begin{itemize}
\item \textsuperscript{14} Walters, \textit{Sanatoria for Consumptives}, 7.
\item \textsuperscript{15} Walters, \textit{Sanatoria for Consumptives}, 7.
\item \textsuperscript{16} Dunglison, \textit{Human Health}, 63.
\item \textsuperscript{17} Lindsay, \textit{The Climatic Treatment of Consumption}, 7.
\item \textsuperscript{18} Guy Hinsdale, \textit{Atmospheric Air in Relation to Tuberculosis (with 93 plates)}, (Washington: Smithsonian Institution, 1914), 108.
\end{itemize}
authors, who did not know about the discovery of the bacteria or did not yet understand it, Hinsdale modernized this belief by also linking unhygienic and polluted air with the growth of the tuberculosis bacteria. Staying in the open air or ventilating buildings was the best way to mitigate the effects of indoor pollution.\(^{19}\)

After Koch’s 1882 discovery of the germ that causes tuberculosis, “germ theory” became increasingly popular. Germ theory refers to the belief that microorganisms cause disease. In the case of tuberculosis, the discovery of the bacteria indicated that it was being spread through contagion rather than humoural imbalance, overstimulation and depletion of vital energy, inheritance, or pollutants and “bad air”. Due to the magnitude of Koch’s discovery, it would be logical to assume that a major shift in beliefs concerning cause and treatment of tuberculosis would have occurred, but such an assumption would be incorrect. In fact, many physicians and researchers simply combined germ theory with their pre-existing beliefs, allowing those previous beliefs to persist.

Physicians who believed that hereditary factors or overstimulation of the nerves and vital energies led to consumption could easily co-opt germ theory. They argued that those factors weakened a person’s immunity, causing them to be more susceptible to the bacteria. Those who had previously believed that pollutants caused or predisposed a person to consumption could now easily include the bacteria among other indoor pollutants. It was commonly held that bacteria floated endlessly around in a fine dust, which could be inhaled or ingested. This was particularly true of air indoors. In an 1890 pamphlet, Dr. Stephen Smith Burt stated that tuberculosis germs thrived in unhygienic, or

\(^{19}\) Hinsdale, *Atmospheric Air in Relation to Tuberculosis*, 108.
dusty and crowded, situations. He further warned that those who led indoor, sedentary lives sat in bacteria all day and greatly risked their health.\(^{20}\)

As time went on and germ theory became increasingly predominant over previous theories, many medical experts continued to prescribe outdoor air therapy as a deterrent to the spread of the bacteria. Physicians pointed to a variety of reasons why outdoor air therapy helped to prevent tuberculosis. Some physicians, like Dr. Burt, believed that living an outdoor life was a more hygienic lifestyle in general. Living outdoors prevented tuberculosis and helped to cure existing disease because “keeping the cells of the body in sound condition starves the germs.”\(^{21}\) Others believed that seeking outdoor air treatment in cold environments was best. In 1888, Dr. Charles Denison stated, “the effects of cold in destroying germ life, especially the life of the bacillus of tubercle is a most important consideration.”\(^{22}\) Similarly, Dr. Charles Theodore Williams argued that cold in general was probably able to “retard and prevent the multiplication of pathogenic organisms”.\(^{23}\) Moreover, fresh air was thought to dilute the bacteria. The indoors could be ventilated in order to clear out the tuberculosis bacillus and the outdoors were considered by some to be safer in general. An outdoor lifestyle could then keep tuberculosis away or help to cure it by strengthening the body and resistance, destroying the bacteria, or diluting the bacteria.

Regardless of which theory of causation they believed in, physicians continued to recommend outdoor air treatment. The treatment was flexible enough to be adapted by


\(^{21}\) Burt, *Pulmonary Consumption*, 7.

\(^{22}\) Charles Denison, *The Preferable Climate for Consumption, or the comparative importance of different climatic attributes in the arrest of chronic pulmonary disease* (Denver: Collier and Cleaveland Lithographing Company, 1888), 6-7.

\(^{23}\) Charles Theodore Williams, *Aero-Therapeutics or the Treatment of Lung Disease by Climate* (London: Macmillan and Company, 1894), 71.
each theory, allowing the treatment to survive the lack of consensus in the medical field. Patent medicines, inhalations and suppositories of chemicals, bed rest, change in diet, surgeries, injections of air to manually collapse lungs, pharmacological drugs, and any combination of the above have all been used in the past 150 years, but few have seen the prevalence or persistence of outdoor air for tuberculosis. Even within the outdoor air treatment category, however, frequent debates occurred among professionals.

Climatologists disagreed about which temperatures, altitudes, humidity levels, and locations were best for patients. Terms such as “dry”, “warm”, “cool”, and “moist” are all relative and subjective terms, which served to add confusion to the debates among physicians. In general, many physicians in the early half of the 19th century preferred to send their patients to warmer climates, especially during the winter. They believed that harsh winters would be too dangerous for tuberculosis patients, and they commonly cited Madeira and a variety of other warm locales for treatment.24 By the second half of the 19th century, however, a wide variety of locations had proponents in the medical field. Physicians debated the merit of places such as Colorado, the Adirondacks, Algeria, Australia, South Africa, Southern California, and Switzerland. Some physicians recommend “dry” climates while others emphasized “moist” locations. Dr. J.P. Crozer Griffith preferred locations with sunshine and dry air so that patients could enjoy the fresh air in a variety of temperatures without becoming cold or damp.25 Walters, on the other hand, recognized that cold, “moist still air is soothing to irritable air passages.”26

26 Walters, Sanatoria for Consumptives, 7-8.
Alfred Haviland, writing in 1903, referred to a British study conducted years earlier, which showed that more deaths of tuberculosis patients occurred in months when the air was drier. Haviland preferred warm moist air, as he believed dry air sucked out the natural warmth and moisture of the lungs and led to irritation.  

There was also considerable discussion over the value of elevated climates in treating tuberculosis during the late 19th and early 20th centuries. Some physicians debated the purity of elevated air, the effect of elevations on oxygen-intake and the lungs, or the associations between elevations and active out-of-doors lifestyles, depending on their beliefs. Dr. Charles Denison mentioned all three of these options. He preferred mountainous climates because the thin air required patients to breathe more frequently, and expand their lungs. According to Dr. Denison, this led to a cleaning out of “morbid products” and chest congestion. At the same time, he also referred to the purity of mountain air, and specifically the abundant sunshine of Colorado, which encouraged outdoor living.

Some physicians decided to take no sides in the debate on the best locations or conditions for tuberculosis treatment. These physicians stated that no single climate was correct for all patients. For example, William P. Huggard believed that different ages, stages of disease, levels of tolerance for warm or cold, and overall vitality affected where a person should be sent for climate treatment. Although Dr. J.P. Crozer Griffith favored

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28 Denison, “The Preferable Climate for Consumption”, 9, 10-12.
some climates over others, he too acknowledged that different climates worked better depending on the patient’s individual situation.²⁹

Arguments also occurred as to whether climates should be changed at all or whether outdoor living in any location would suffice. It appears that physicians noticed that some patients were improved or cured at home or in local sanatoria, even in the worst of environments. While acknowledging this possibility, some continued to prescribe a change in climate, while others became active in the sanatoria and home cure movements. Dr. Burton mentioned that people were known to recover even in places like New York City.³⁰ In 1890, Lawrence F. Flick broke with many of his contemporaries when he stated that “out-door life is of the greatest importance, but it does not seem to make much difference where that out-door life is obtained.”³¹ Walters, likewise, stated that “it is fresh air and medical supervision rather than a fine climate which are needed for success,” although he recommended locations with specific attributes for sanatoria.³²

Around the same time, the 1901 American Climatological Association meeting showcased the dissention within the climatology field. Of the seven papers presented at this meeting, three were in support of home or sanatoria treatment, two focused on specific climates, and two compared the climate change and home/sanatoria treatment options. One of the papers in support of the home cure method pointed out that all climates had at one point been believed to be the best climate for tuberculosis patients; therefore, none must be better than the others. Moreover, the paper pointed to the many disadvantages of travel, such as lack of money, travel weariness, homesickness, time, and

³⁰ Burt, Pulmonary Consumption, 13.
³¹ Lawrence F. Flick, The Treatment of Tuberculosis (1890), 11-12.
³² Walters, Sanatoria for Consumptives, 7-8.
lack of suitable accommodations, which could actually make a patient worse. A paper in favor of climate stated that if home treatment worked so well, then applying the same routine of medical supervision, nutritious diet, and exercise and rest in the outdoors should work even in better in an efficacious climate. During the discussion of these papers, those who favored climate were generally those in charge of health resorts in locations like Colorado and California, while some who favored the home cure movement and sanatoria were in charge of running local facilities for patients.  

The debate continued in 1905 at the first meeting of the National Association for the Study and Prevention of Tuberculosis, which included many of the same climatologists involved with the American Climatological Association. The debates centered on a report to be published, which favored the climate treatment. In the end, the report was published despite the contentions. In 1908, however, the Sixth International Congress on Tuberculosis showed that times were changing when sanatoria building was encouraged and emphasized at the expense of climatology. The emphasis on home cure and sanatoria gradually took over. By 1914, Hinsdale stated that the search for one specific climate for tuberculosis treatment, “a search lasting for nearly two thousand years, is apparently at an end.” Hinsdale, not entirely convinced of the effectiveness of home/sanatoria treatment, mentioned that it was more a matter of “expediency to have such sanatoria” for each state. This statement perhaps indicates that Progressive-era governments felt pressure to provide local facilities for tuberculosis care, while at the same time they conveniently segregated some of the sick from the rest of the population.

Although the sanatoria and home cure movement accelerated, climatology did not entirely die out. Interestingly, some sanatoria were built at sites that were originally used as climate change destinations, such as the Adirondacks, Colorado Springs, or on the sites of old spring resorts, which indicate a mixing of the two ideas. Writers also continued to debate the value of specific climates and climate change throughout the teens and twenties. As late as 1927, Robert Bruce Watson wrote an entire thesis on the history of climate treatment, with the intent of exploring the value of climatology and contributing to the on-going debate.37

Although the physicians at the time saw the home cure/sanatoria movement and the climate cure option as two very different and conflicting paths, they were highly intermixed. During this period, those who acknowledged the efficacy of sanatoria and home cure methods were also climatologists in some cases. Furthermore, without thousands of years of climatology to lead the way in advocating outdoor life and pure air, sanatoria and home cure supporters would have had no reason to suspect that fresh air was a necessary part of treatment. There were certainly strong continuities in personnel and ideas between both of these treatments.

A definite lack of consensus existed among physicians with regards to causation, why outdoor air was beneficial, which locations were best and why, as well as debates within the outdoor air category between climatologists and home cure/sanatoria supporters. Despite these debates and differences, both options for outdoor air treatment continued well into the 19th century.

In addition to surviving the various inconsistencies and beliefs among physicians, outdoor air treatment also survived the changing world of medicine and many major

37 See Watson, “An Introduction” in its entirety.
medical advancements. Around the mid-nineteenth century, professionalization and medical education became increasingly important. Throughout much of the 19th century, doctors received training through reading books, apprenticeships, or at proprietary schools, but a major step towards professionalization occurred in 1847, when a young doctor named Nathan Smith Davis founded the American Medical Association (AMA). The AMA promoted professional standards and formal education for medical doctors. At the very first meeting, 250 state delegates decided on a code of medical ethics and set up national standards for the MD degree. By the last quarter of the century, the shift to formal university training was well underway and with it came new technical terms, new instruments, specialization, and new techniques of observation, measurement, and data collection.\(^{38}\)

Outdoor air treatment, beginning centuries before the shift towards professionalization and lasting over a century after the establishment of the AMA, obviously did not suffer from the influx of young professionals bent on precision and scientific standards. In fact, physicians used the new techniques to bolster their claims concerning outdoor air, again highlighting the tendency of physicians to adapt the flexible treatment. According to one author, “the status of medicine itself as an institution had risen; now a respected profession, it had the authority of genuine scientific progress to back up its claims. . . .”\(^{39}\) Believers of outdoor air sought scientifically sound ways to prove that specific climates and locations were better than others. Using the new emphasis on measurement and data collection, physicians gathered meteorological

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\(^{39}\) Lawlor, *Consumption and Literature*, 189.
information for a given site and compared it to other locations. Due to the lack of consensus among physicians as to what aspects of climate were preferable, these charts did not actually help to prove anything, but they likely lent credibility to the physician’s claims.

Laboratories and research became increasingly important aspects of the medical field. E.L. Trudeau, the founder of the Adirondack Cottage Sanitarium, built his own laboratory, where he repeated Koch’s experiments with the newly found bacillus and helped to confirm them. In the mid-1880s, Trudeau also conducted a well-known experiment, which linked laboratory work, germ theory, and outdoor air therapy. Trudeau inoculated five rabbits with tuberculosis and confined them in a small, dark and damp space with little food. He found that these rabbits all had full-blown tuberculosis and four died after a few months. He inoculated a second set of rabbits and set them free on a lake island. After several months, four of these rabbits were found to be very active and healthy, while one had died. Trudeau placed a third group of rabbits in a small, moist space without inoculating them. All five of these rabbits were living after four months. The results of this experiment showed that bacteria were necessary for developing the disease. More importantly, however, the experiment seemed to illustrate that outdoor air was also an important factor in hindering disease development. Four out of five of the rabbits allowed to run free remained healthy, while all of the rabbits in the poor environment developed active tuberculosis, and four died. It appeared that a favorable environment in the open air could boost resistance to the disease or at least arrest

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40 A few examples of works with charts and measurements of this kind include S. Edwin Solly, A Handbook of Medical Climatology: Embodying its Principles and Therapeutic Application with Scientific Data of the Chief Health Resorts of the World (New York: Lea Brothers & Co., 1897); and Charles Theodore Williams, Aero-Therapeutics or the Treatment of Lung Diseases by Climate (1894; repr., Kessinger Publishing, 2010).
development, while poor conditions devoid of fresh air could lead to a rapid advancement of illness. Trudeau’s experiment strongly linked germ theory with outdoor air treatment and likely influenced other physicians. Moreover, the experiment utilized a scientific approach and laboratory work, lending it additional credibility.\textsuperscript{41}

Much of the other laboratory work which took place at this time focused on finding a true cure for tuberculosis. Although outdoor air therapy and sanatoria facilities seemed to help patients, many continued to die despite treatment, just as one of Trudeau’s rabbits died in spite of being in the open air. Once Koch isolated and identified the bacillus, university-owned laboratories and pharmaceutical companies were hopeful that a medicinal combination existed that could destroy the bacteria without destroying the patient. Medicines that worked for other diseases did not appear to kill the bacillus. Sulfonamides, discovered in the 1930s, and penicillin, found in the 1940s, could both kill a variety of bacteria, but the tuberculosis bacillus was not one of them.\textsuperscript{42}

In 1943, Albert Schatz, a Rutgers University graduate student studying under bacteriology expert Selman Waksman, isolated bacteria in a manured field and named it streptomycin. In the lab, it was found to kill the tubercle bacillus. By 1944, Merck and Company pharmaceuticals had refined the strain and produced it in the form of injections. An experiment conducted by Corwin Hinshaw and William H. Feldman in 1945 showed that the injections miraculously cured a variety of tuberculosis cases. Researchers were soon disappointed, however, when they found that patients who seemed to be cured by the drug were relapsing at a rate of about 10 percent. Some patients carried a few genetically mutated bacilli resistant to streptomycin. Although the drug killed most of the

\textsuperscript{42} Thomas M. Daniel, Captain of Death: The Story of Tuberculosis (Rochester, NY: University of Rochester Press, 1997), 203-204.
bacilli, the streptomycin-resistant bacilli could continue the infection. The logical answer, then, was to treat tuberculosis with a variety of drugs to ensure that all bacilli were killed. Several laboratories began searching for more antibiotics capable of killing the tuberculosis bacteria. Several promising starts became dead ends because of their toxicity. Meanwhile, as researchers strove to find pharmacological solutions in their laboratories, sanatoria and home cure treatments remained officially endorsed by physicians, state governments, and anti-tuberculosis associations.43

Finally, pharmaceutical companies Bayer, Hoffman-La Roche, and Squibb independently re-discovered isoniazid, a strong, non-toxic, and inexpensive drug. After testing the drug on patients in 1952, it was found that within two or three months, the sputum of most patients was clear of tubercle bacilli. Researchers quickly found two more drugs, ethambutol and thioacetazone, that worked in combination with isoniazid to ensure all bacilli were killed. Italian researchers added rifampin in the late 1960s to add yet another drug option to aid against resistant strains.44

A study conducted in India during the 1950s revealed that hospital or sanatoria stays were unnecessary as long as the drugs were taken as directed. Hospital care, or a lack thereof, did not affect the outcome of the drug treatment. Moreover, the study revealed that more family members were contracting tuberculosis while visiting patients in the hospital than while caring for them at home. This produced a strong incentive to close down such establishments.45

43 Daniel, Captain of Death, 207-216.
44 Daniel, Captain of Death, 217-219, 221. Today, patients take three or four drugs for a couple of months. They then follow this up with one or two additional drugs for many months to kill off any remaining resistant bacteria.
45 Daniel, Captain of Death, 219.
According to Thomas M. Daniel, there were over 800 American sanatoria in the early 1950s. The numbers of sanatoria began to drop after the discovery of isoniazid in 1953, and by 1977, only a few existed. The demise of outdoor air therapy clearly correlated with the introduction of drug cures. The drugs worked so rapidly and effectively that other methods were not necessary to supplement them. Therefore, outdoor air therapy did not end because researchers, or the general public, found it to be scientifically unsound or ineffectual. It ended only when researchers found another more efficient form of treatment to replace it.

Outdoor air treatment persisted despite a plethora of beliefs and ever-increasing knowledge within the medical field. Physicians and experts blended each theory with outdoor air treatment, allowing it to survive despite the lack of consensus and new developments. It was not until the advent of new drug treatments in the 1950s that belief in outdoor air treatment broke down.

\[46\] See Figure 24.1 in Daniel, *Captain of Death*, 220.
Conclusion

Outdoor air treatment of pulmonary tuberculosis in late 19th and early 20th century America was resilient and flexible, allowing it to be adapted to new situations. While cultural, technological and medical changes affected knowledge and cultural constructions of tuberculosis, the outdoor air treatment method continued. Following Robert Koch’s 1882 discovery of the bacillus that causes tuberculosis, the general public began to look at tuberculosis as an affliction, rather than a romanticized disease of beauty, creativity, and spirituality. Despite this major shift, outdoor air treatment continued, although it was modified slightly to fit these new attitudes. Healthy people became interested in the benefits of outdoor air through participation in health movements, like the Athletics Movement, which emphasized fresh air. Those who were ill, meanwhile, continued to utilize the principles of climatology when their finances allowed. Sanatoria and the home cure movement increasingly became new, viable options for greater participation in outdoor air treatment.

A variety of manufacturers and marketers sought to exploit the continued use of outdoor air treatment in the changing industrial climate of America. New technology and mass-manufacturing perpetuated and democratized outdoor air treatment through the creation of accessories for home use. These therapeutic tools were relatively inexpensive when compared to traveling for one’s health and allowed more people to participate. Moreover, the devices were available through mail order catalogs, like Sears, Roebuck and Company, which made the accessories accessible to many more Americans.
Despite varying medical theories and approaches to tuberculosis, as well as changes in the field of medicine, physicians continued to tailor outdoor air treatment to their specific beliefs. The persistence of outdoor air treatment for tuberculosis patients did not subside until researchers discovered efficient, quick, and effective drug treatment combinations in the 1950s. The ability of outdoor air treatment to be adapted to changes and circumstances is perhaps one of the reasons why it lasted for thousands of years, and weathered the rapid transformations in America during the late 19th and early 20th centuries.

Although tuberculosis is no longer considered a major threat in the United States, one-third of the world’s population is infected with tuberculosis and nearly two million die from it each year. The high figures have been linked to the HIV/AIDS epidemic. Those with latent tuberculosis are highly likely to develop active tuberculosis if they contract HIV. Likewise, those with HIV, due to decreased immunity, are at a greater risk for contracting and developing tuberculosis. Although tuberculosis can be treated in HIV patients, it remains a major killer of those with both infections.

The development of drug-resistant bacteria is perhaps more troubling than the high incidence of the disease. Those with multidrug-resistant tuberculosis (MDR TB) are infected with bacteria that are resistant to at least two of the most effective drugs. Those with rare, extensively drug-resistant tuberculosis (XDR TB) are resistant to the most effective drugs, as well as to many of the secondary drugs used for treatment. These types of resistance put patients at a major disadvantage by leaving them with fewer, and less

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effective, options. Treatments that do not include a variety of effective drugs in order to kill mutated bacteria have a higher risk of continued infection and relapse. Moreover, patients with resistant tuberculosis can spread the resistant strain to others. The study of historical treatment methods is extremely topical as tuberculosis bacteria continue to mutate and become resistant to pharmaceutical drugs.

It is reasonable that outdoor air treatment, with its astounding resilience, would leave a lasting impression. Although outdoor air treatment is no longer used to treat tuberculosis, a few aspects of outdoor air treatment live on in modern medical protocol and research. Researchers today explore ways in which ventilation and UV lights can help cut down on the spread of the tuberculosis bacteria in hospitals. Just as some 19th and early 20th century writers suspected, sunlight does in fact kill the bacteria and ventilating hospital air to the sun-lit outdoors can cut down on contagion. Moreover, a 2005 pamphlet from the Center for Disease Control blatantly states, “fresh air and sunlight make it harder for the TB germs to stay alive. The fresh air scatters the germs and the sunlight kills them.” Some studies suggest that sunlight, in addition to killing the bacteria, can also increase vitamin D levels, which in turn help the body’s defenses against tuberculosis. Although 19th and early 20th century physicians did not have vitamin D levels in mind when prescribing outdoor life, they may not have been

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completely incorrect in believing exposure to the outdoors had some benefit. Perhaps other aspects of 19th and 20th century outdoor air treatment require a second look and additional research.

Outdoor air treatment may have left other legacies within modern culture. Today, many Americans continue to vacation in the mountains, beaches, or camping areas. Vacationers no longer travel in search of health, but they certainly attempt to relax and rejuvenate in “the great outdoors”. Tanning beds and spray-on tans approximate the “healthy” appearance of having spent plenty of time out of doors. The Fresh Air Fund is another legacy of outdoor air treatment in present times. It is a charitable organization that sends urban children and teenagers to live with host families in suburban and rural areas during summer breaks from school. Today, the Fresh Air Fund focuses on allowing disadvantaged children to take a break from the inner city and enjoy country-style activities. The organization, however, recognizes its 1877 origins are tied to the high prevalence of tuberculosis in New York City at that time. Continuities exist between outdoor air treatment and modern medical life and culture, demonstrating the truly remarkable persistence of outdoor air treatment.

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