

THE RISE AND FALL OF THE TUBERCULOSIS SANITARIUM IN RESPONSE TO
THE WHITE PLAGUE

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Chapter 1: Introduction

In 1942, my grandmother, Olive Patterson, was just one of millions of U.S. women toiling in the dark, damp factories for the war effort (see Fig. 1.1). Building wood panels for fighter planes at Roddis Plywood Company in Marshfield, Wisconsin, she spent most of the day ankle-deep in water, passing large sheets of plywood through a wood planer. Not surprisingly, many of her coworkers contracted tuberculosis due to the dark, damp conditions of the company's basement assembly line. The twenty-one year old soon fell ill as well. Though tuberculosis was a common disease, the doctors misdiagnosed my grandmother twice before giving her a chest x-ray that revealed her pulmonary tuberculosis. So thin she was unable to keep her shoes from sliding off and given only months to live, she was admitted to the Wisconsin State Sanitarium in Wales.

In accordance with state laws that required consumptives to be hospitalized, my grandmother spent the war years isolated at the southeastern Wisconsin sanitarium. Miles from the closest railroad depot in Waukesha, the site was accessible only by automobile, which only a few people could



Figure 1.1 Photograph of Olive Patterson, 1942, courtesy of Kris Grahn.

afford at that time. Moreover, limited weekly one-hour long visitation periods prevented friends and family from traveling to see her. Having only her savings to sustain her, the expense of a stamp discouraged Olive from sending correspondence home. Due to these barriers, my grandmother soon became acquainted with the other hospitalized consumptives who shared her loneliness.

As was typical in treating tuberculosis, Olive progressed through three prescribed stages of treatment. As a hospitalized patient, she was forced to spend long hours lying on her back to relax her lungs and became accustomed to reading in bed. Despite not having shown outward signs of tuberculosis prior to admission, she began coughing up the much dreaded phlegm while in this stage of treatment. Long hours taking the cure outdoors, however, helped calcify her tubercles and she progressed into the semi-ambulant stage of treatment. In this stage, she was allowed to change out of her pajamas and eat meals in the dining hall with other semi-ambulant and ambulant patients. Recovering further, she moved into an open-air cottage away from the

main hospital building and enjoyed the most freedom as an ambulant patient. As part of the treatment, she underwent occupational therapy, learning how to tie flies on fishing line, painting, leatherwork, and typing.



Figure 1.2 Photograph of women behind fence, c.1943, courtesy Kris Grahn.

In describing my grandmother's time at the sanitarium, my mother quoted Charles Dickens' famous opening line in *A Tale of Two Cities*, saying, "it was the best of times, and it was the worst of times."¹ The strict rules and regime meant to prevent mental idleness made the patients feel as though they were prisoners. The experimental medical treatment was torturous, requiring her once to swallow a lead pipe so that the doctor could examine her chest cavities. Radiation treatment was also common, another desperate attempt to fight tuberculosis. No drugs were available for her treatment or to ease her pain. At the same time, however, the sanitarium was not affected by rationing during the war and the rich food was the best she had ever had. Radio, movie nights, lectures, and mandatory long walks with other young consumptives filled her free time and provided entertainment. Though men and women were separated, required exercise on the site's landscaped trails provided a means for contact. In 1946, my grandmother was discharged from the Wisconsin State Sanitarium, though she later returned to work there as a secretary.

My grandmother's story is not unique. The White Plague, as tuberculosis was also known, once affected between twenty-five and thirty-percent of the North American and European population; however, today, its existence is barely remembered. With the emergence of the U.S. government-sponsored National Tuberculosis Association in 1904, there was greater focus on preventing the spread of consumption and curing those infected with the disease. States and local governments financed large institutions, devoted entirely to treating tuberculosis and serving as an instrument in the fresh-air treatment that required patients to rest outdoors up to eleven hours a day. Though these sanitariums isolated consumptives and prevented the spread of tuberculosis for the decades preceding World War II, the increased use of antibiotics following the war led to the overall abandonment of tuberculosis sanitariums by

the 1970s. This thesis will prove that American sanitarium architecture developed largely from trends set by European health spa and sanitarium design.

This paper examines the evolution of tuberculosis sanitarium architecture in response to scientific discoveries, medical advancements, and public perception. It is important to understand that the development of architectural features such as open-air porches, ward wings, and flat roofs played a vital role in curing consumption. As such, the need for sunlight and ventilation influenced the arrangement of rooms, and architects were sensitive to providing views of exterior landscaping and scenery to entertain bedridden patients. This thesis examines the influence of European health spas and sanitarium design on the construction of American tuberculosis sanitariums.

Scope

This paper chronicles the progression of U.S. sanitariums during the height of the American Sanitarium Movement, from the 1880s through the 1950s. The movement began with the construction of Dr. Edward Livingston Trudeau's Adirondack Cottage Sanitarium in 1884, led to the founding of the National Tuberculosis Association (NTA) in 1904, and follows the movement's push for public sanitariums built through the mid-twentieth century. The national organization promoted the construction of state hospitals to isolate and treat consumptives in an effort to eradicate the White Plague. The development of drug treatments during World War II and their increased use in the years immediately following the war led to the decline of U.S. tuberculosis sanitariums, the majority of which closed by the 1970s.

Methodology

This graduate thesis was undertaken in three parts. The first part considers the effects of the European health spa movement in developing resort-like health care institutions that cared for consumptives and the movement's limited adoption in the U.S during the late nineteenth century and early twentieth century, and examines U.S. and European architectural influences on the first U.S. sanitariums. The second section of this thesis shows that government-funded tuberculosis sanitariums evolved from earlier designs of federal institutions, such as prisons and Kirkbride asylums for the mentally ill. Finally, modern architecture, which valued simplified design and connected indoor and outdoor spaces, lent itself to the design of tuberculosis sanitariums in both Europe and the U.S.

Site visits to Kneipp Springs Sanitarium in Rome City, Indiana, as well as Silvercrest Sanitarium in New Albany, Indiana, explain the architectural progression of sanitarium development in the U.S. These two institutions represent the shifting public and medical opinion from health spa cures to isolating consumptives. The 1905 Kneipp Springs Sanitarium, which treated patients with cold water immersions, represents the health spa culture prevalent in Europe and in the U.S. during the nineteenth century. The 1938 Silvercrest Sanitarium, however, was a state hospital built to treat only consumptive patients in an institutional setting and was therefore very different from the resort-like atmosphere of health spas.

References

This thesis references a number of resources. Renè and Jean Dubos's *The White Plague: Tuberculosis, Man, and Society* and Thomas M. Daniel's *Captain of Death: The Story of Tuberculosis* illustrated the evolution of medical treatment and public perception. Historical medical research explained how early-twentieth century physicians approached the disease and their influences in developing treatment methods, such as improved diets, hydrotherapy,

heliotherapy, and fresh air exposure. Architectural critiques of prison architecture as well as Thomas Story Kirkbride's *On the Construction, Organization, and General Arrangements of Hospitals for the Insane with Some Remarks on Insanity and its Treatment* (1880) reflected the architectural influences that shaped the first state-funded sanitarium designs. The construction guidelines, *Notes on Sanitarium Planning*, published by the National Tuberculosis Association (NTA) in 1921, illustrated historical approaches to regulating the design of these massive institutions. Site visits and guided tours as well as local newspaper articles documented the history of two Indiana sanitariums, Kneipp Springs Sanitarium in Rome City and Silvercrest Sanitarium in New Albany.

Document Description

This graduate thesis is organized into five chapters that describe the evolution of U.S. sanitarium design in response to scientific discoveries, medical treatment, and public perception. The first chapter describes the history of the disease from the mid-nineteenth century through the 1960s and its impact on architecture. The next two chapters analyze the influences on European and health spa architecture on the first U.S. sanitariums. The fourth chapter chronicles the European sanitarium movement, and the fifth chapter examines the influence of this movement on the design of American tuberculosis sanitariums. The final chapter considers the American sanitarium movement's adoption of European modern architectural design.

Chapter 2: History of the Disease

The first chapter traces the history of tuberculosis prior to the development of the first U.S. sanitarium in 1884 and until the discovery of triple-drug chemotherapy in 1951. Scientific

discoveries, medical advancements, and public perceptions during this era influenced the architecture of early tuberculosis institutions.

Chapter 3: The European and American Health Spa Movements

The health spa movement in Europe and the U.S. largely motivated the U.S. Sanitarium movement. In Europe, wealthy health seekers vacationed at exclusive spas and resorts along Mediterranean coast lines and in the tropics. In 1841, John Coakley Lettsom opened the first open-air sanitarium in the Swiss Alps and spurred the development of similar sanitariums in Europe and the U.S. American health spas developed near natural mineral and hot springs. These early resorts valued fresh air and sunlight, and were the inspiration for later tuberculosis sanitariums.

Chapter 4: The Development of the European Sanitarium Movement

In 1859, Brehmer's mountaintop sanitarium established the fresh-air cure as the preferred method for treating consumption. By 1889, physicians realized that these early sanitariums catered only to European elites and began constructing tuberculosis hospitals throughout Europe to make treatment accessible to all classes.

Chapter 5: The Development of the American Sanitarium Movement

In 1884, Dr. Edward Livingston Trudeau opened the first cottage-style sanitarium in the U.S. The designs for the first American sanitariums that followed borrowed largely from radial prison designs, Kirkbride mental health institutions, and European resort architecture. By 1921, the National Tuberculosis Association (NTA) published *Notes on Sanitarium Planning*, outlining their recommendations for sanitarium design.

Chapter 6: The American Sanitarium Movement: Borrowing from European Modern

Architecture

At the beginning of the twentieth century, the modern architecture movement shared many of the core values of tuberculosis treatment. The movement that emerged as a reaction to ornate Victorian architecture styles promoted the simplification of architectural design to improve human health. The availability of hygienic construction materials such as steel and glass improved sanitarium design and allowed for greater access to sunlight and natural ventilation. Moreover, the strong horizontality of modern design supported the creation of flat roofs and overhanging balconies necessary for consumptives taking the cure.

1. Kris Grahn, interviewed by author, Oshkosh, WI, 5 January 2012.

Chapter 2: History of the Disease

At the beginning of the nineteenth century, English physician Thomas Young estimated that as much as one-fourth of Europe's population suffered from tuberculosis.¹ The disease was so prevalent that the romantics of the late eighteenth century grew fond of the pale, thin faces of consumptives. Many women replaced their rouge with whitening powders to give the appearance of frailty. Thin, sheer white dresses were fashionable, as were high-collared coats that hid the hideous scars and swollen lymph nodes of scrofula, a tuberculosis infection of the lymph nodes. Many physicians attributed these symptoms to multiple diseases. By 1804, French scientist René Théophile Laënnec concluded that the lesions, ulcers, and cavities typical of consumption, were caused by a single disease which he called phthisis.² Throughout the nineteenth century, many medical theories attempted to explain the disease; however, many physicians recommended sanitarium and health spa care to ailing consumptives until the development of a drug treatment in 1951.

The contagiousness of the disease and its prevalence in families led many physicians to believe consumption was hereditary. Scientists also claimed that certain complexions appeared more prone to tuberculosis than others, including non-Caucasian races and those with red hair and blue eyes. Many physicians, believing that chest size was also a contributing factor to susceptibility, considered tall and thin individuals more susceptible than those who were stout. Moreover, they insisted that pulmonary tuberculosis was more common among those with a deeper chest than those with a shallow one.

Historically, consumptives had typically gone to the tropical climates of the Mediterranean or the dry climates of the desert to overcome their lung disorders. However, by the early nineteenth century, the success of English physician John Coakley Lettsom's Royal Sea Bathing Infirmary proved that fresh air was more significant than climate in curing the disease. Lettsom chose the seaside location after noticing that fishermen rarely suffered from scrofula, and the physician prescribed saltwater baths to treat the disease. Despite Lettsom's ability to treat scrofula on the English coast, many in the medical community had doubts about his therapy and challenged the use of the fresh air treatment.

The polluted, overcrowded conditions of urban tenements during the Industrial Revolution soon convinced the public that there was nothing romantic about consumption. Malnourished men, women, and children toiled in dark, damp factories and lived in neighborhoods plagued by disease, coal dust, and smoke. Tuberculosis became synonymous with poverty, immoral behavior, and the alleged hereditary defects of the working classes. As the population shifted from rural to urban, the number of consumptives continued to grow and threatened the health of middle- and upper-class urbanites.

While the elite could afford to stay at exclusive resorts around the globe, physicians began devising new methods for treating consumption closer to home. In *La Peau de Chagrin* (1831), Honoré de Balzac recounted a Swiss consumptive who was cured by slowly inhaling the "thick air of a cow house."³ An inexpensive cure, U.S. physicians recommended their bedridden patients be moved into barns above cow stalls. In 1840, London physician George Bodington announced that cold air inhalation had a positive effect on curing the disease, and the Brompton Hospital for Consumption opened in England the following year.⁴ Inspired by Bodington's use of cold air, Dr. John Grogan pioneered open-air treatments in the U.S. by housing consumptives in

Mammoth Cave, Kentucky, in 1842.⁵ Physicians believed that cold air increased blood flow to the lungs, building their resistance to tuberculosis and other lung disorders. Despite these attempts to cure pulmonary tuberculosis with natural inhalation, however, the disease persisted.

In addition to exposing patients to fresh air and sunlight, other physicians advocated exercise and good nutrition. This treatment was recreated at Dr. Herman Brehmer's mountaintop sanitarium in Göbersdorf, Silesia, in 1863.⁶ Brehmer's success soon spurred the European sanitarium movement which attracted consumptives to the health spas and sanitariums of the Swiss Alps. By the 1860s, Davos, Switzerland, had become a leader in the fight against tuberculosis and a favored health resort of the European elite.⁷

Architecture responded to the growing number of consumptives who sought the fresh air cure by creating picturesque cottages and resorts catering to the elite. Terraces along south-facing elevations, where sunlight was the most prominent, accommodated the "lungers" who spent long hours resting outdoors. Private covered balconies and screened porches protected those taking the cure from the elements, while still providing ample sunshine for heliotherapy. Similarly, large windows improved natural lighting indoors, which conformed with the well-accepted medical belief that sunlight was both mood-enhancing for the ailing and a natural disinfectant. Though many new institutions focused solely on curing tuberculosis, health spas continued to flourish throughout Europe and met mixed success in the U.S.

Though the Industrial Revolution in Europe had brought public attention to the suffering of consumptives, the efforts to improve the conditions in poverty-stricken neighborhoods did not emerge until the mid-nineteenth century. Health associations, such as the American Lung

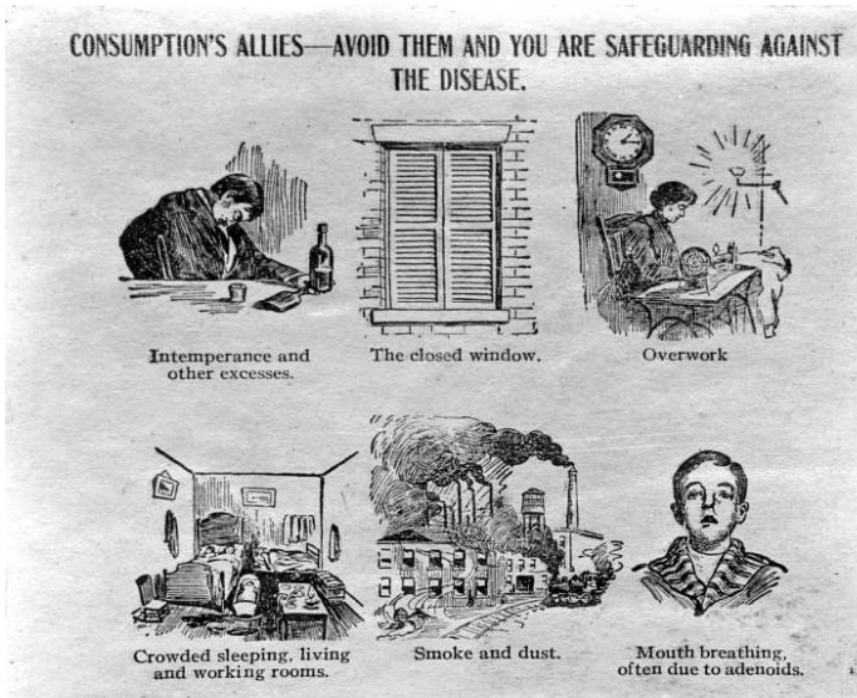


Figure 2.1 “Consumption's Allies -- Avoid Them and You Are Safeguarding Against the Disease.” Photograph mounted on card. Indianapolis: American Lung Association of Indiana, c.1910. Indiana Historical Society, Content Collection. Photograph, <http://images.indianahistory.org/u?/tuberculosi,37> (accessed 28 Feb. 2012).

association, reminded the public that immoral activities and poor living conditions contributed to the spread of tuberculosis, as depicted in Figure 2.1. Many physicians

blamed tobacco chewing and smoking for pulmonary tuberculosis and

other lung defects. Social reformers sought to increase the affordability of meats, dairy, and produce to improve the diets of the poor. Because the public continued to believe that tuberculosis was hereditary, many blamed poor genetic breeding for the multitude of diseased children born of consumptive parents.⁸

In 1882, bacteriologist Robert Koch’s discovery of the germ theory challenged the medical belief that tuberculosis was hereditary.⁹ The German doctor isolated the tubercle bacillus, the bacteria that caused the disease, and documented its movement through the blood stream of mammals. He demonstrated that the bacteria could be exhaled by consumptives and inhaled by those in proximity to the diseased. Koch’s findings explained the prevalence of

tuberculosis in families that were continuously exposed to the contagious disease as well as its rapid spread through overcrowded tenements. Despite this medical landmark, few treatments, apart from the fresh air cure, existed. Nevertheless, a better understanding of the spread of infection enabled public officials to take actions.



Figure 2.2 “Children Made Orphans by Tuberculosis” Photograph mounted on card. Indianapolis: American Lung Association of Indiana, c.1910. Indiana Historical Society, Content Collection. Photograph, <http://images.indianahistory.org/u/?tuberculosisi,50> (accessed 28 Feb. 2012).

Public health officials, physicians, and scientists united to educate the public about Koch’s germ theory in an attempt to thwart the spread of the White Plague. In 1887, Dr. Herman M. Biggs of the New York Health Department produced the first informational pamphlet published in the United States which instructed readers how to prevent the spread of illness.¹⁰ Biggs also

encouraged the passing of a state law that required all consumptives to identify themselves within ten days of diagnosis in order to ensure their proper care and isolation.¹¹ New York led the anti-tuberculosis movement and soon inspired other states to develop similar associations dedicated to the eradication of tuberculosis. State and local anti-tuberculosis organizations developed printed materials that informed the public about ways to prevent the spread of infection while posters, such as the one shown in Figure 2.2, encouraged consumptives to seek medical treatment.

A year after the commencement of Biggs's anti-tuberculosis campaign, Dr. Edward Livingston Trudeau opened the Saranac Laboratory, the first in the United States devoted exclusively to the study of the disease.¹²



Figure 2.3. “Little Red.” Photograph. Adirondack Architectural Heritage. Photograph, <http://www.aarch.org/resources/map/county/franklin/window/red.html> (accessed 28 Feb. 2012).

Trudeau became a leader in tuberculosis research in the United States and established the first public tuberculosis sanitarium at Saranac Lake, New York, in 1884.¹³ Adopting the open-air treatment method that had been popularized in Europe, the doctor first treated sisters Alice and Mary Hunt in a tiny cottage named “Little Red” in 1885.¹⁴ The small shack featured large windows and a small porch, with room enough for a single cure chair (see Fig. 2.3). These features maximized the patient’s exposure to natural light and fresh air. In the following year, Trudeau constructed two additional cottages, Little Blue and Little Green. By 1900, he had expanded the Adirondack Cottage Sanitarium into a full campus, complete with administrative, research, and infirmary pavilions.¹⁵

Trudeau’s Adirondack Cottage Sanitarium set the precedent for cottage-style sanitariums that became the preferred style of sanitariums constructed at the beginning of the early American Sanitarium Movement. Initially these buildings were no more than “shacks;” however, as the sanitarium movement grew, they progressed into well-designed pavilions and cottages, often consisting of two- or three-bed dormitories, each with a private screened porch,

surrounding a shared space (Fig. 2.4, Fig. 2.5). Though patients ate meals in the institution's main dining room, individual cottages often included a shared day room or sitting room for socializing. Bath rooms, toilets, and dressing rooms were also common features.



Figure 2.4. An example of an open-air cottage built in the early twentieth century. T.B. Kidner. "Sanatoria for Tuberculosis Cases." *The Architectural Review*. (January 1921): 18.

While Trudeau and his contemporaries continued treating

patients using the fresh-air method, other physicians and laymen searched for different treatment methods. In 1886, Father Sebastian Kneipp published *My Water Cure*, describing his own treatment of tuberculosis through immersion in the cold waters of the Danube River.¹⁶ The Catholic priest prescribed specific cold water baths and showers to treat tuberculosis, as well as

other physical ailments. Cold water immersions and compressions, he claimed, increased circulation and promoted blood formation. This reaction to cold water cured infectious disease, but also other physical defects, muscular pains, and tumors. Kneipp also

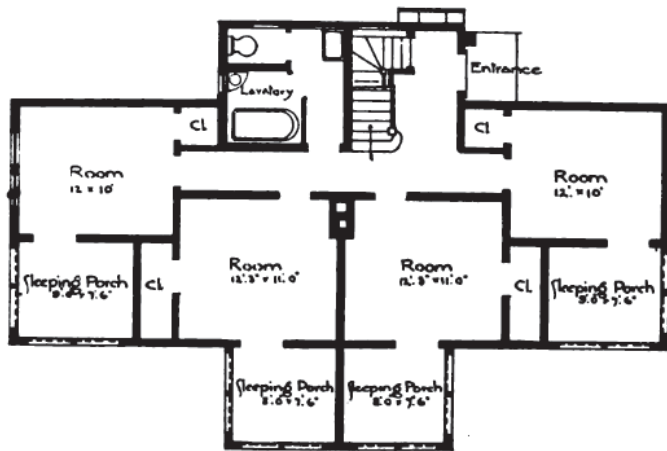


Figure 2.5 Ideal cottage-type plan. T.B. Kidner. "Sanatoria for Tuberculosis Cases." *The Architectural Review*. (January 1921): 21.

recommended the use herbs, such as chamomile and fennel, in teas and administered externally to treat scrofulous tumors, aches, and pains. By the late-nineteenth century, this treatment method had gained popularity in Europe, yet many U.S. physicians doubted the healing abilities of cold water applications.

In the U.S., tuberculosis continued to spread through urban tenements brought greater public attention to the disease as a health threat. Social reformers continued to blame the polluted air, drunkenness, and immoral behavior of the urban poor for the spread of tuberculosis. In 1892, medical researcher S.A.K. Strahan declared that uneven wealth distribution was a leading cause for the spread of disease. Believing consumption was hereditary, Strahan went so far as to blame “injurious marriages” for the continuous spread of tuberculosis through tenements.¹⁷ Because of the vast spread of consumption, physicians and social reformers worked to bring an end to the White Plague.

During this same period, medical researchers made several significant discoveries. In 1898, Theobald Smith differentiated strands of bovine and human tuberculosis.¹⁸ In response to the discovery of tuberculosis in so many cattle, German doctor Emil Von Behring created the “bovo vaccine” in 1900. Despite the initial public acceptance of the vaccine, the discovery of human bacilli, or human tuberculosis bacteria, surviving for months or even years in cows and reappearing in meat and milk that humans consumed, made the vaccine futile.¹⁹ In 1908, Albert Calmette and Camille Guerin developed a human vaccine against tuberculosis, known as Bacille Billé Calmette et Guérin (BCG).²⁰ Fearing that infected cattle would spread the disease to humans, health officials tested over 200 million animals and slaughtered the nearly 8% of U.S. cattle that tested positive for tuberculosis between 1917 through World War II.²¹

From the end of the nineteenth century through the years immediately preceding World War I, work began to prevent the spread of tuberculosis through laws and ordinances. In 1896, Dr. Charles Ingram convinced the American Medical Association of the necessity to create a network of state hospitals that allowed consumptives to be isolated, rather than treated at home where they could infect their caretakers.²² A year later, the New York Health Department Tuberculosis Control Campaign endorsed anti-spitting laws as well as fumigating the apartments of deceased consumptives.²³ The Tuberculosis Control Campaign promoted the isolation of consumptives to prevent them from spreading the contagious disease to those they came in contact with.²⁴ Moreover, the campaign advocated that the potential for recovery was greatest outside of city tenements where public contact was limited and fresh air was abundant.

Encouraged by the success of the New York campaigns, medical officials and concerned social reformers founded the National Tuberculosis Association (NTA) to educate the public and lobby for the creation of government programs designed to cure TB on June 6, 1904.²⁵ The following year, physicians and laymen created the American Sanitarium Association to promote the construction of public hospitals devoted to the study and treatment of the disease.²⁶ The anti-tuberculosis movement made significant strides with the establishment of these two organizations and drew public attention to the White Plague. In 1908, the NTA hosted global leaders in the field, laymen, and physicians at the Sixth International Congress in Washington, D.C., promoting the credibility of the U.S.'s national anti-tuberculosis campaign to the world.²⁷

That same year marked the beginning of the Christmas Seals fundraising campaign that financed the business operations of the NTA and the creation of a network of state and local organizations.²⁸ Ten percent of each seal funded the operations of the NTA; however, the majority of the proceeds benefitted state-wide and community anti-tuberculosis associations who had sold the seals. These funds allowed the NTA and local organizations to publish informational pamphlets, support the construction of new tuberculosis sanitariums and hospitals, purchase machinery for detecting consumption, and organize new branch offices in the community that sold the seals.²⁹

By 1917, the NTA had created tuberculosis associations in all forty-eight U.S. states as well as Washington D.C.³⁰

In October 1904, Hoosier physicians and social reformers founded the Anti-Tuberculosis Society of Indiana; however, it soon dissolved due to disorganization and several Indianapolis-based campaigns replaced the statewide organization.³¹ The NTA reorganized the state's anti-tuberculosis

association as the Indiana Association for the Prevention of Tuberculosis in order to create a comprehensive statewide program in 1907.³² By 1922, the Indiana Association had established

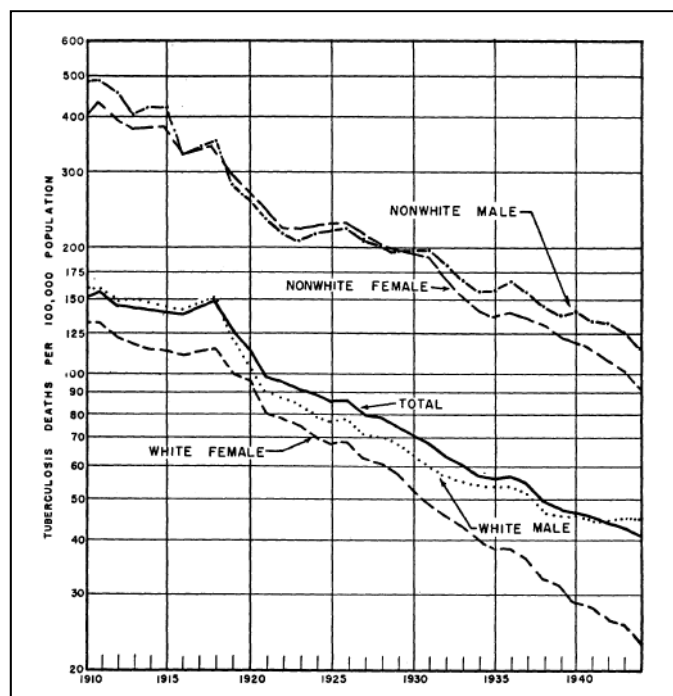


Figure 2.6. Trend of death rates per 100,000 population for tuberculosis (all forms) by race and gender: Death registration States, 1910-1944. Yerushalmy, J. and I.M. Moriyama. "Mortality in the United States and in Each State: 1944," *Tuberculosis Control*, No.2 (5 April 1946) in *Public Health Reports (1896-1970)*: 491.

89 city and county tuberculosis associations, five county and municipal hospitals, twenty-eight permanent clinics, eight infant welfare clinics, and eighteen open air schools with the help of state funding.³³ The state also employed 250 tuberculosis and public health nurses in an effort to limit the spread of the White Plague.³⁴

Scientists continued to research and uncover drug cures to prevent the spread of tuberculosis and limit the need for sanitariums from the beginning of World War I through the Second World War. Though Albert Calmette and Camille Guérin had discovered a tuberculosis vaccine in 1908, physicians did not administer BCG to the public until 1924.³⁵ Then in 1930, seventy-two infants died in Lübeck, Germany, after being injected with the live tuberculosis virus contained in the vaccine.³⁶ Others later developed tuberculosis or tested positive for consumption, though they demonstrated no symptoms. Despite the setback and the discontinued use of BCG, the vaccine gave the world hope that a drug cure would soon be available. In the United States, tuberculosis remained a leading cause of death, and states scrambled to find ways to prevent the spread of the contagious disease.

During the 1920s and 1930s, greater demand for sanitariums emerged as federal laws required states to provide hospital beds equal to the number of tuberculosis-related deaths in each state and states passed laws mandating that consumptives be hospitalized. To meet these demands to provide public health care to consumptives, states funded the construction of new public tuberculosis sanitariums or the modification of existing residential estates to be used as sanitariums. These hospital facilities featured similar characteristics which included porches and verandas that allowed patients to take the cure as well as large windows and French doors that maximized patients' exposure to fresh air and sunlight. Open-air cottages were also common

and outbuildings housed office space, storage, utility buildings, or spaces for billiards rooms, theatres, and occupational therapy classrooms.

The NTA, as well as state and local anti-tuberculosis campaigns, pushed states to finance public institutions devoted to treating tuberculosis led to the construction of large sanitariums. Representative of other previous government-funded architecture, these institutions borrowed architectural designs from previously developed institutions such as early nineteenth century radial prison plans and American psychiatrist Thomas Story Kirkbride's *On the Construction, Organization, and General Arrangements of Hospitals for the Insane* published in 1854. A better understanding of Koch's germ theory also promoted plain interior architectural detailing where dust containing contagious tubercle bacilli would not accumulate.

At the beginning of the twentieth century, the modern architecture movement sought to resolve the conflict between traditional architectural design and rapid technological advancement that made materials such as steel possible. Modernist architect Louis Sullivan coined the phrase, "form follows function," emphasizing the importance of design reflecting the use of the building.³⁷ Rather than concealing structural elements, modernists expressed the structure and endorsed the simple beauty of materials such as steel and concrete. The machine aesthetic of these new buildings emphasized the horizontal and vertical lines of their design. Newly-invented sheet glass enabled architects to design glass walls spanning the distance between steel and concrete structural supports. Modernists valued the uninterrupted views generated by these glass walls that created a greater connection between indoor and outdoor spaces. They believed that sunlight and access to nature improved the quality of human life.

The European modernist movement influenced the design of new sanitariums, revolutionized by the availability of mass-produced materials, beginning in the 1920s. In 1926,

Johannes Duiker and Bernard Bijvoet designed the Zonnestraal Sanitarium in Hilversum, Netherlands, the first of its kind to use an exposed concrete frame and walls of glass. Much like earlier radial prison designs, the structure’s sunburst shape featured radiating wings to maximize natural lighting and ventilation. Three years later, Alvar Aalto took modern architecture one step further in his plan for the Paimio Sanitarium in Finland by designing a reinforced concrete high rise structure. The architect also custom designed splash-proof sinks, lighting fixtures, and doorknobs as part of the sanitarium’s overall role as an “instrument in healing.”³⁸ The contributions of these early European modernists to the architectural movement are expressed in the design of Silvercrest Sanitarium in New Albany, Indiana, as well.

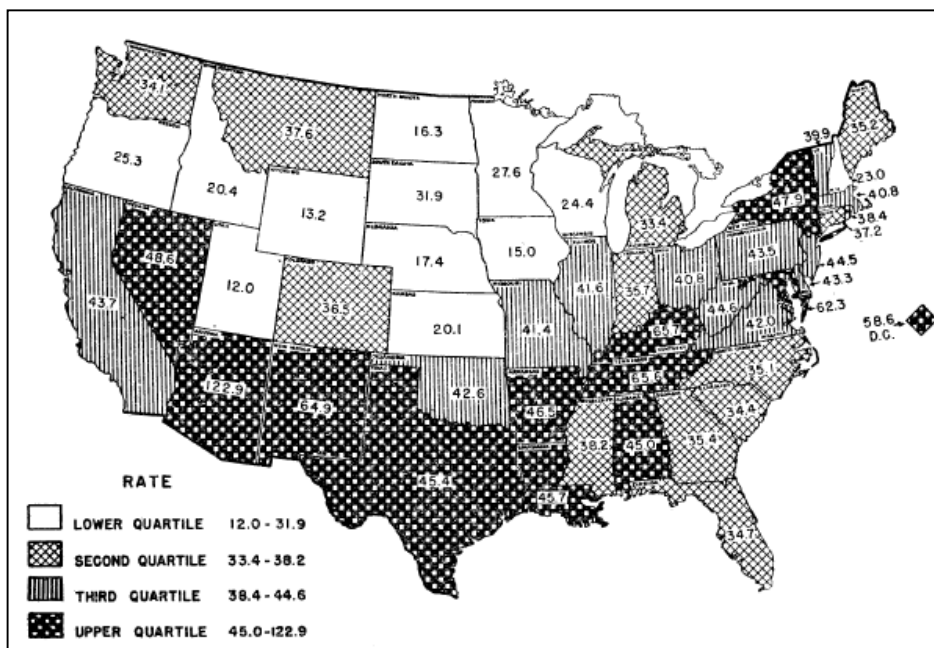


Figure 2.7. Death rate per 100,000 population for tuberculosis (all forms), 1944. Yerushalmy, J. and I.M. Moriyama. “Mortality in the United States and in Each State: 1944,” *Tuberculosis Control*, No.2 (5 April 1946) in *Public Health Reports (1896-1970)*: 500.

Because the majority of patients were between twenty and forty years old, the healing process also included occupational therapy that taught valuable job skills that

would allow them to rejoin the workforce after their sanitarium stay. Physicians began endorsing this type of therapy in the 1920s, and the 1921 National Tuberculosis Association’s

(NTA) *Notes on Sanitarium Planning* recommended that occupational therapy feature four courses of study—academic, typewriting, and general commercial and mechanical drafting.³⁹ In both the U.S. and Europe, large institutions often included vocational training centers, such as the 1926 Zonnestraal School at the Zonnestraal Sanitarium.

Though these sanitariums and their treatment therapies had contributed to the overall decline of tuberculosis throughout the U.S., the discovery of three drugs during the World War II era helped to eradicate tuberculosis and contributed to the end of the White Plague by the mid-nineteenth century. Shatz, Bugie, and Waksman reported their discovery of streptomycin in January 1944.⁴⁰ That same year, Dr. Karl F. Pfeutze succeeded in curing a terminally ill consumptive by administering the “magic bullet,” streptomycin, to Patricia T. at the Mineral Springs Sanatorium in Cannon Falls, Minnesota.⁴¹ Ten months later, Swiss scientists Jorgen Lehmann announced his discovery of curing tuberculosis by orally consuming paraaminosalicylic acid (PAS). In 1951, the drug isoniazid was discovered.⁴² Paired with PAS and streptomycin, the trio became known as “triple-drug chemotherapy” and soon brought an end to the tuberculosis epidemic. Following the discovery of triple-drug chemotherapy, sanitariums continued to use fresh air as part of the cure, but there was a greater reliance on drug treatment.

Following World War II, most sanitariums throughout the U.S. and Europe ceased to operate due to the increased use of drug treatment and by the 1970s, the last ones had closed their doors. Though tuberculosis no longer led to the creation of sanitariums, an extinct building typology designed to serve as an instrument in the overall treatment of tuberculosis. As the following chapters will show, many of the design innovations introduced in sanitarium architecture are seen in contemporary architectural design.

For much of the nineteenth century, tuberculosis had been a leading cause of death.

However, American physicians and social reformers did not actively endorse its prevention until

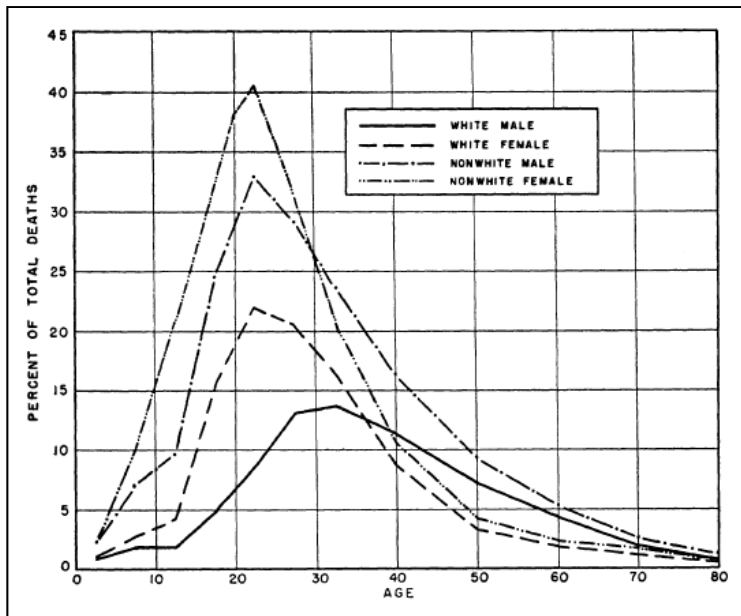


Figure 2.8. Deaths from tuberculosis (all forms) as percentages of deaths from all cases, by age, race, and sex in the United States, 1944. Yerushalmy, J. and I.M. Moriyama. "Mortality in the United States and in Each State: 1944," *Tuberculosis Control*, No.2 (5 April 1946) in *Public Health Reports (1896-1970)*: 496.

the beginning of the twentieth century. While consumptives had historically fled to tropical and arid climates to cure their ailments, physicians such as Lettsom, Brehmer, and Trudeau helped establish the fresh-air cure that patients could undergo in any climate.

The ability to treat tuberculosis with fresh air and sunlight led to the construction of public and private sanitariums which

mimicked the design of elite European health resorts and featured large terraces, balconies, and resort accommodations. As states recognized the need to provide public health care, however, they constructed hospital-like institutions that isolated and treated hundreds of consumptives. American sanitarium architecture developed largely from trends set by European health spa and sanitarium design.

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 22. Coker, 40.
 23. William G. Rothstein, *Public Health and the Risk Factor: A History of An Uneven Medical Revolution* (Rochester, NY: University of Rochester Press, 2003):109.
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 26. Murray, 1182.
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 29. Ibid.
 30. Ibid.
 31. Sigard Adolphus Knopf, *A History of the National Tuberculosis Association* (New York: National Tuberculosis Association, 1922): 93.
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 33. Ibid., 93.

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34. Ibid.
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 36. Ibid.
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 41. Ibid., 1183.
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Chapter 3: The European and American Health Spa Movements

For centuries, health resorts provided private medical treatment for city residents seeking an escape from congested urban areas. During the nineteenth century, many consumptives sought the healing abilities of warm climates; however, in 1791, English physician John Coakley Lettsom proved cold air could be as beneficial in curing consumption, which led to the construction of health resorts in the Swiss Alps, a favored destination for wealthy consumptives. Others such as Monsignor Sebastian Kneipp used cold water treatments to relieve lung disorders. While health resorts were popular destinations for European elites, they did not gain the same acceptance in the United States and were limited to natural springs credited with curing abilities.

In 1791, Quaker physician John Coakley Lettsom opened the first open-air tuberculosis sanitarium, the Magnate Infirmary in England.¹ Contrary to prevailing medical opinion, the damp English seashore proved as effective in curing the disease as the warm tropical climates of southern Europe and the aridness of North Africa's desert. Having observed that fishermen rarely suffered from tuberculosis, Lettsom chose a seaside location for the sanitarium that was later renamed the Royal Sea Bathing Infirmary. While the doctor recommended vacationing near the sea as a cure to his wealthy patients, he was discouraged that the seaside was inaccessible to the urban poor. The Royal Sea Bathing Infirmary treated consumptives of all classes with clean air, nutritious diets, salt water bathing, and rest. Patients spent long hours

sleeping on verandas and inhaling the cold, fresh air. Though the thirty-six-bed hospital was successful in treating TB, many physicians doubted Lettsom's therapy. Skeptics argued that the five-hundred year old treatment method that incorporated fresh air, sunlight, and rich food had long been discredited.

Nevertheless, European physicians had long recommended that their patients seek the warm, dry air of deserts, the Mediterranean and tropics, and the countryside, away from polluted industrial centers. During the nineteenth century, these destinations became popular health resorts attracting affluent consumptives who had the means to travel to rejuvenating spas, hotels and inns, and bustling entertaining districts. The urban poor, however, continued to suffer in overcrowded tenements and spread the disease to their families and caregivers.

Since the 1840s, Davos, Switzerland, had been a healing destination for European elites, and Dr. Alexander Spengler began recommending the resort to consumptive patients in 1853.² The establishment of Dr. Herman Brehmer's Göbersdorf Sanitarium in 1859 transformed the city into a favored resort for wealthy European consumptives by the 1860s.³ In 1887, Davos attracted over 3,000 consumptives.⁴ The sanitariums built in the latter half of the nineteenth century took the shape of traditional European timber chalets and restful resorts rather than hospitals. Because of the large number of sanitariums devoted to tuberculosis treatment, Davos became a leading research center. Furthermore, architectural trends set in Davos became standards in sanitarium design in later decades.

Rather than relying on fresh air to treat consumption, Catholic Monsignor Sebastian Kneipp promoted his use of cold-water therapy in the 1850s. As a village priest, Kneipp treated the sick with modified versions of his water treatment. In 1855, the Catholic Diocese sent the priest to the poverty-stricken village of Wörishofen in Bavaria, Germany.⁵ Kneipp continued to

administer his treatment to consumptives as well as patients with physical ailments, and word spread of his healing powers. Patients from around the world, seeking the priest's healing abilities, traveled to Wörishofen and transformed the quiet village into a city of 24,000 residents by 1880.⁶ Two years later, Kneipp outlined his treatment methods in his first book, *My Water Cure*, which was immediately translated into fourteen languages and went through one-hundred printings.⁷ By the 1890s, the hydro therapist had developed a strong following and gave daily public lectures at Wörishofen as well as on his European lecture tours.⁸

Convinced that weakened blood was more susceptible to disease, Kneipp believed God had provided a natural cure for every human ailment. He credited herbal cold water immersions and showers for removing toxins from the blood stream and curing affected areas of the body. Kneipp thought that cold water applications restored natural circulation and thus rid the body of its ailments. He developed a specific routine for consumptives in order to strengthen their bodies and repel disease. He instructed patients to walk barefoot in wet grass or on wet stones as well as in the snow to draw blood to their feet, thereby increasing circulation and stimulating blood formation. He and his staff also administered knee showers, requiring patients to sit or stand in cold water up to their knees, as seen in Figure 3.1. The treatment's administrators used as many as ten watering cans to proportionately pour cold water onto the exposed legs of the patient, beginning at the knees and moving down towards the feet. At times, patients waded in shallow pools, immersing their legs in knee-

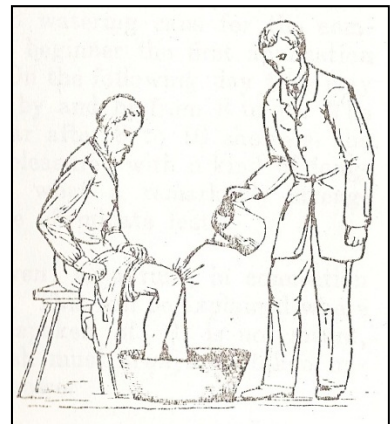


Figure 3.1. How to administer a knee shower. Kneipp, Sebastian. *My Water Cure*. (Kempton, Bavaria: Jos. Koesel, 1972): 99.

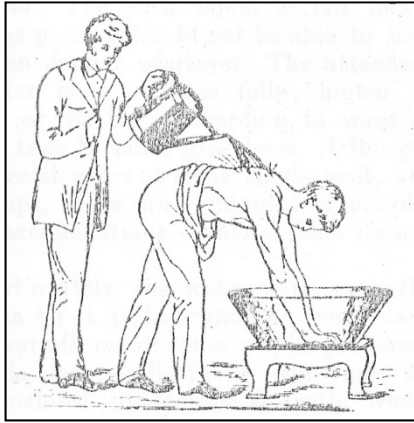


Figure 3.2. Administering the upper shower. Kneipp, Sebastian. *My Water Cure*. (Kempton, Bavaria: Jos. Koesel, 1972):106.

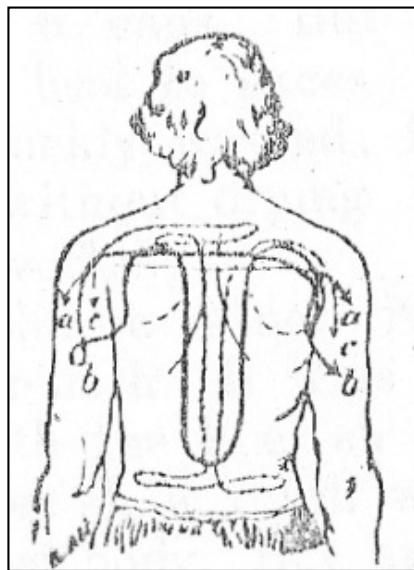


Figure 3.3. Path taken by watering can. Kneipp, Sebastian. *My Water Cure*. (Kempton, Bavaria: Jos. Koesel, 1972):108.

high water for a similar effect.

“Upper showers” were also an instrumental part of the cold water treatment. Leaning forward from the waist, patients bent over into a raised tub, as illustrated in Figure 3.2. Watering cans dispersed water, showering the patients’ bare right shoulder and arm followed by their left side. At the same time, two more watering cans focused on the seventh cervical vertebrae before progressing over the entire spine (see Fig. 3.3). Water drenched the entire back and neck, running off the patient’s body into the tub. After the shower, patients dried only their hands and face, but reapplied their clothes over their wet bodies. Kneipp believed that properly drying off the body required rubbing which he claimed resulted in uneven body temperature. After their cold showers, patients exercised outdoors for fifteen to forty-five minutes to return their body temperature to normal.⁹

Agreeing with many late nineteenth century physicians who believed that the consumptive’s constitution could be improved through nutrition, Kneipp

created a specified diet to improve the health of his patients. Reflecting popular medical perception, Kneipp believed that milk was “preferable to all other kinds of food.”¹⁰ Yet while other sanitariums and health spa diets featured rich, fatty foods to promote weight-gain in

gaunt patients, Kneipp claimed that simpler foods were best. Moreover, he discouraged excessive wine and beer drinking and recommended simple broths and starch-based diets. He instructed patients to drink daily two cups of tea containing fennel, and herbs such as chamomile, fennel, and oat straw allegedly improved nutrition. Kneipp also administered these herbs as a paste removed scrofulous tumors.

Kneipp's use of hydrotherapy was popular in Europe and contributed to the development of a number of health spas that employed his healing methods. These European spas provided a respite for the wealthy who sought to escape urban congestion. Many health seekers spent months vacationing in resort towns where they restored their health through regimens such as those outlined by Kneipp. Others sought natural surroundings to heal their illnesses and enjoyed the fresh air and change of scenery.

Architecturally, European health spas and sanitariums took the appearance of resorts. Borrowed from Mediterranean architecture, European timber chalets incorporated large terraces and private balconies that allowed patients to rest outdoors. Summer garden houses and gazebos were common features in gardens during the medieval period and gained popularity at resorts, providing outdoor spaces for afternoon teas. Small cottages with greater accessibility to fresh air and sunlight served as private guest accommodations. Located along the seaside or in the Swiss Alps, these resorts provided a natural respite for those escaping European industrial centers.

In the United States, health spas and resorts developed largely around natural springs credited for their healing abilities. Architecturally, these spas mimicked European design in their use of balconies and terraces which overlooked manicured grounds. Large windows and French

doors provided abundant natural lighting and fresh air. Well-endowed guests favored elegant dining rooms, parlors, and libraries. Guest rooms often featured private baths. Administrative and medical offices were common as well. This adaptation of European architecture and health spa accommodations was evident in the design of many late nineteenth century American health resorts in the Midwest.

In 1894, Dr. W.G. Geirmann established the Silver Springs Sanitarium in Rome City, Indiana, and was the first to introduce Kneipp's hydrotherapy.¹¹ Having trained with Kneipp, Geirmann recognized the benefit of the site's twelve natural hot springs in administering the priest's cure.¹² Moreover, the 188-acre site overlooking Sylvan Lake provided ample room to develop a large resort that could comfortably accommodate wealthy vacationers spending the summer in Rome City.

Even before Geirmann's sanitarium construction began, over 2,500 patients came to Rome City seeking the Kneipp treatment in 1884.¹³ Health seekers predicted the health spa would become the "Carlsbad of the Mississippi Valley," and the sanitarium catered to wealthy patients who could afford to spend three weeks undergoing treatment.¹⁴ Similar to Davos's health tourists, many of Rome City's health seekers spent summers at Sylvan Lake. Those travelers who did not stay at Geirmann's Silver Springs Sanitarium resided at the Lake Side and Mansion House Hotels as well as private rented cottages.¹⁵ Much like the Alpine health resorts of Europe, the local economy became dependent on health tourism by of the early twentieth century.

Having established his sanitarium, Geirmann constructed the first hollow-block, brick structure on the site in 1897.¹⁶ As was typical of sanitarium design of that era, the first floor

offered well-lit and naturally ventilated day rooms for social gathering and shared dining rooms. Large screened porches provided spaces for resting outdoors. On the second and third floors, private suites and dormitories lined the south side of the building. Large windows brightened interior hallways on the north side of the building. A three-story central staircase,



Figure 3.4. Resident physician's cottage, as it exists today. Photograph courtesy of author.

naturally lit by a large glass skylight, linked all three levels. Historical documents credit Wing and Martin Architects of Fort Wayne for the design of Geirmann's original structure.¹⁷

Overwhelmed by the sanitarium's popularity, Dr. Giermann sought the aid of the Sisters of the Precious Blood in Maria Stein, Ohio, who arrived in 1901.¹⁸ German-born Sister Margaret Schlacter was one of the first women to study with Monsignor Kneipp, and she was instrumental in training the other Sisters that aided Geirmann in administering Kneipp's water cure.¹⁹

Exhausted by the demands of managing the health spa, Geirmann agreed to sell Silver Springs Sanitarium to the Sisters for \$30,000 cash in 1902. Almost immediately, the Sisters transformed it into a convent and health resort.²⁰ They continued to treat patients of all religious denominations and never turned individuals away because they were unable to pay for their treatment. The Sisters also renamed Geirmann's sanitarium Kneipp Springs in honor of Sebastian Kneipp.

The Sisters hired local builders to construct additional pavilions to accommodate their growing number of guests in the first years after the sale. East of the main building, the builders

constructed a brick Queen Anne physician's cottage around the turn of the century (see Fig. 3.4). They also erected bath houses, though little documentation exists of these now-demolished wood huts. Shallow knee-deep wading pools built south of the main building supported the Kneipp treatment. To segregate genders, the Sisters planted tall evergreen shrubs around the ladies' wading pool southwest of the main complex, while the men's pools directly south of the complex did not require landscaped privacy screens.

In response to the large number of health seekers visiting Kneipp Springs Sanitarium, the Sisters hired German craftsmen to build a three-story Greek Revival addition in June 1905 (see Fig. 3.5).²¹ At this time, they altered the first floor plan of the 1897 structure to create office spaces, a large communal dining room, and additional day rooms segregating male and female patients. The new floor plan placed apartments for the groundskeeper and other site managers in the northeast corner of Geirmann's original structure. The second and third floors of the new addition differed from Giermann's structure in that a central hallway divided the space into two lines of private dormitories. In elevation, the architectural term describing the side view of a building, three levels of covered porches and balconies united these spaces.

The new addition shared many of the construction materials used in later sanitarium design to promote sanitation. Though terrazzo flooring and ceramic tile lined the hallways and entryways, wood flooring was reserved for private dormitories and suites due to cost. Tall double-hung windows in each room supplied natural light and abundant fresh air. Transom windows above interior doors provided natural ventilation. The Sisters administered the Kneipp treatment in shared baths on the second and third floors to patients who were unable to travel to the springs outdoors. Ceramic tile lined these baths and partition walls to create necessary privacy. Deep balconies, lined with Adirondack chairs, promoted outdoor rest.

The Sisters also made alterations to Geirmann's original sanitarium that supported the Kneipp cure. They built spas in the basement of the main building that utilized the natural hot springs flowing beneath the structure. The Sisters also built a gymnasium and constructed trails and formal gardens south of the complex for patients exercising after their Kneipp treatment. They also excavated additional pools, fed by hot springs, on the grounds that allowed patients to wade knee-deep in water. The Sisters also grew the herbs (promoted in *My Water Cure*) in flower and vegetable gardens that surrounded the structure. A grape vineyard allowed the Sisters to bottle their own wine.



Figure 3.5. Kneipp Sanitarium, c. 1905. Photo courtesy of Our Lady the Immaculate Virgin.

Similar to other sanitariums, Kneipp Springs featured a private chapel. In 1915, construction commenced on Our Lady Mother of Mercy Chapel, officially dedicated on

November 21, 1917.²² As they had already done with previous additions, the Sisters hired German craftsmen to build the chapel, which included hand-painted, stained glass windows, all of which feature images of the Virgin Mother, from St. Peter's Catholic Church in Rome, Italy.

By 1917, the Sisters' spa had attracted such a large following that they added an additional guest wing, Victory Hall, and a convent wing (see Fig. 3.6).²³ Private hallways linked the convent to the chapel and other shared spaces of the sanitarium. The new addition provided a private suite for the chapel priest at the southwest corner of Victory Hall. The first floor contained additional office and public spaces, while the second and third floors mimicked that of the previous addition. Covered porches and balconies spanned all three levels of the south elevation of Victory Hall. The convent wing built northwest of Victory Hall that adjoined the chapel housed the Sisters of Kneipp Springs Sanitarium.



Figure 3.6. Kneipp Sanitarium, c. 1917. Image courtesy of Penny Postcards of Indiana.

To ensure the sanitarium's self-sufficiency, the Sisters constructed a number of utility buildings on the site (see Fig. 3.7). North of the main grounds on the opposite side of Northport Road, a powerhouse pumped steam underground to heat the main complex. Water pumps built just north of this large utility building provided running water. The Sisters constructed a farm west of the powerhouse, which included a massive Dutch gabled barn, several sheds, and a chicken coop. Across from the 1905 addition that housed the kitchen, they built a two-story slaughter house adjacent to the Main Complex. Another brick structure devoted exclusively to canning formed an interior courtyard between the Main Building and secondary utility buildings. With the advent of the automobile, the Sisters constructed garages for the priest and resident physician. When the caretaker and his wife outgrew the small apartment in the main complex, the Sisters built his growing family a Cape Cod cottage northwest of the Convent Wing around 1940.²⁴

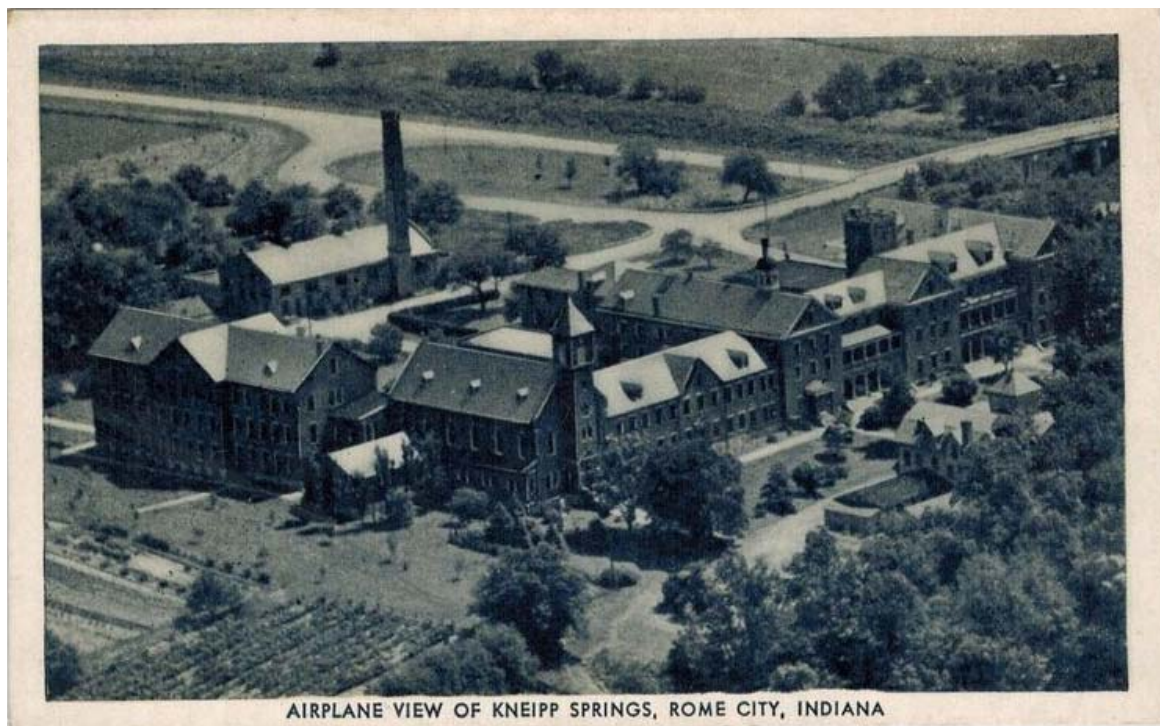


Figure 3.7. Kneipp Sanitarium, c. 1917. Image courtesy of Penny Postcards of Indiana.

According to a promotional brochure of the period, Kneipp Sanitarium had “all the modern conveniences of a hospital and all the comforts of home,” during its heyday, at the beginning of the twentieth century.²⁵ Materials such as lacquered wood, terrazzo, and ceramic tile reflected the sanitary design of the interior. To promote hygiene, the sanitarium featured private bath rooms, porcelain sinks in most dormitories, and natural ventilation and lighting.

Triangular cast iron fasteners between stair treads and risers prevented dust collection while large windows encouraged natural air flow that disinfected interior spaces (see Fig. 3.8).

Lavishly decorated public rooms, featuring painted plaster walls and upholstered furnishings, suited the tastes of the sanitarium’s wealthy clientele and reinforced the resort-like atmosphere of the institution.

The European and American health spa movements contributed to the rise of tuberculosis sanitariums at the turn of the twentieth century. Accommodating wealthy health seekers, these health resorts took the appearance of European timber chalets and fashionable resorts. Large windows and French doors as well as private terraces and balconies facilitated natural ventilation. Borrowing from resort design, the sanitarium typically featured stylish salons, parlors, and dining halls. Pavilions, such as garden houses and gazebos, provided outdoor spaces for gathering and rest as well. Reflecting the need for fresh air and sunlight,



Figure 3.8. Triangular, cast iron members were installed in the corners created in the staircase to prevent dust buildup. Photo courtesy of author.

many of these design elements would be adopted to benefit consumptives taking the cure in later nineteenth century tuberculosis sanitariums.

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 2. Smith, 98. Peter Warren, "The Evolution of the Sanatorium: The First Half Century, 1854-1904," *CBMH/BCHM* 28, no. 2 (2006): 464.
 3. Thomas M. Daniel, *Captain of Death: The Story of Tuberculosis* (Rochester, NY: University of Rochester Press, 1997): 179.
 4. Smith, 99.
 5. Ibid.
 6. Friedhelm Kirchfeld and Wade Boyle, *Nature Doctors. Pioneers in Naturopathic Medicine* (East Palestine, OH: Buckeye Naturopathic Press, 1944): 79.
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 8. Ibid., 85.
 9. Ibid., 27.
 10. Ibid., 242.
 11. M.F. Owen, *History of Orange Township, Noble County, Indiana* (Rome City, IN: American Legion Post 381, 1953): 83.
 12. Sherman Goldenberg, "Secretive sect breeds fear, rumor," *The Journal-Gazette*, 11 Feb. 1979, in "Way International" Clippings File, Evergreen Library, Rome City, IN.
 13. Norbert Chester, interviewed by author, Rome City, IN, 3 Feb. 2012; Owen, 83.
 14. Located in Western Bohemia, Czech Republic, the resort city of Carlsbad attracted international celebrities who believed the regional's natural hot springs would cure their physical ailments during the nineteenth century. Owen, 85.
 15. Ibid.
 16. Ibid., 83.
 17. Ibid.
 18. Ibid.
 19. Ibid.; Norbert Chester.
 20. Owen, 86.
 21. The Sisters preferred German craftsmen to local builders and believed their work was better in quality than Indiana craftsmen. Ibid.
 23. Norbert Chester.
 23. Ibid.
 24. Chester.
 25. M.F. Owen, *Scrapbooks of M.F. Owen: Rome City Area History: 1880-1931* (Kendalville, IN: Kendallville Public Library, 1995), 16: 004831.

Chapter 4: The Development of the European Sanitarium Movement

During the mid-nineteenth century, the European sanitarium movement evolved largely from the continent's health spa movement. In 1840, George Bodington pushed for the creation of tuberculosis hospitals that would cure consumptives through rest, diet, and medical treatment. Dr. Herman Brehmer led the movement for tuberculosis hospitals when he founded the first tuberculosis sanitarium devoted exclusively to tuberculosis treatment and research in Göbersdorf, Silesia, in 1859. Brehmer and his followers encouraged the construction of similar sanitariums, and tuberculosis sanitariums became commonplace throughout Europe by the 1890s. The opening of Dr. Otto Walther's Nordrach Sanitarium in Germany in 1889 drew attention to the need for public health care institutions devoted entirely to consumptives. The adoption of the fresh-air cure in treating tuberculosis led to the development of shared architectural features at public and private sanitariums.

The sanitarium that sparked the European tuberculosis sanitarium movement, Brehmer's tuberculosis sanitarium opened in Göbersdorf, Silesia, in 1859.¹ As a botany student, Brehmer had recovered from tuberculosis in the Himalayas and believed the Silesian Mountains could have the same effect.² The doctor argued that malnourished patients often had weakened hearts, a hereditary condition that prevented adequate blood circulation to the lungs and made patients more susceptible to consumption. Brehmer believed that inhaling the cold mountain air increased blood flow to the lungs, strengthening the respiratory system and

building its resistance to tuberculosis. He also recommended a rich diet, supervised exercise, and hydrotherapy.

Like Brehmer, many contemporary medical practitioners believed that the thin, cold mountain air allowed consumptives to take deeper breaths, growing their chest size and encouraging lung growth at the apex, the area most often susceptible to tuberculosis. The thinner air at high altitudes increased the patient's heartbeats as well as blood flow to the lungs that provided much needed nutrients to prevent the growth of tubercle bacillus. Some physicians argued that the consumptives' blood became germicidal to the bacteria at high altitudes due to increased levels of hemoglobin.³ Brehmer also conducted several studies comparing the effects of barometric pressure on tuberculosis and recommended sites at 500 meters above sea level in Germany and 1,500 to 1,700 meters in Switzerland.⁴ These medical theories encouraged the construction of tuberculosis sanitariums at high altitudes in the Swiss Alps.

With the success of the Göbersdorf Sanitarium, Brehmer developed design guidelines for the construction of tuberculosis sanitariums. In addition to choosing a mountainous site that complied with his recommendations about barometric pressure and cold air, the physician advised sunny locations that supported the widely-adopted use of helio-therapy, or sun therapy, in addition to the fresh treatment. Accordingly, Brehmer called for the construction of deep terraces or *leigen hallen* that accommodated the patients' cure chairs.⁵ Terraces had to limit patients' exposure to dust, and Brehmer suggested that they overlook manicured gardens rather than dusty transportation paths. The architecture of these institutions incorporated large windows and French doors to make the most of natural light, which Brehmer believed served as a mood-enhancer and a disinfectant. Shades and curtains protected patients from intense

sunlight as they took “the cure,” which required them to spend nearly eleven hours daily resting and sleeping in cure chairs exposed to sunlight and inhaling fresh air. To maximize the patient’s exposure to sunlight and fresh air, Brehmer began constructing open timber-frame pavilions on the grounds of the Göbersdorf Sanitarium in the 1870s.⁶

In response to Brehmer’s ability to cure tuberculosis with cold mountain air, many new tuberculosis sanitariums opened in the Swiss Alps. Promoted by the Swiss Society of Public Utility in 1891, municipal governments constructed new treatment centers, foreseeing the benefits of isolating consumptives and preventing the spread of the White Plague (Table 4.1).⁷ The sanitariums of the Swiss Alps, however, catered largely to the wealthy and there was little relief for the urban poor.

Sanatorium.	Place established.	Year.	Elevation.
			<i>Meters.</i>
Berne.....	Heiligenschwendi.....	1895	1,180
Basel.....	Davos.....	1895	1,600
Glaronnais.....	Braunwald.....	1898	1,200
Zurich Canton.....	Wald.....	1899	900
Neuchatel Canton.....	Malvilliers.....	1903	860
Vaud Canton.....	Leysin.....		1,450
Children’s Sanatorium.....	do.....		1,450
Genevise Sanatorium.....	Clairmont.....	1903	1,460
St. Gall.....	Knoblisbühl.....	1909	1,000
Soleure.....	Allerheiligen.....	1910	900
Argovie.....	Barmelweid.....	1912	774
Zoug.....	Aegeri.....	1912	860

Table 4.1. Construction of Swiss Sanitariums, 1895-1912. Rucker, W.C. and R.A. Kearny, “Tuberculosis in Switzerland: Results of the Campaign Against the Disease,” *Public Health Reports (1896-1970)* 28, no. 52 (26 Dec. 1913): 2815.

Dr. Otto Walther became a leading advocate of a sanitarium system accessible to all social classes. In 1889, he opened the Nordrach Sanitarium in German’s Black Forest. A former pupil of Brehmer’s, he realized that many consumptives could not afford to travel great distances to find natural cures for their disease. In accordance with Brehmer’s belief that altitude effected blood flow and reduced the spread of consumption, Walther chose a site

“1500 feet above sea level and exposed to every wind.”⁸ Since many physicians believed that “re-breathed” indoor air containing tubercle bacillus made recovering patients susceptible to relapse, thus at Nordrach balcony doors were open year-round to provide ventilation. Though many medical physicians and researchers ridiculed Walther for choosing a cold, damp climate, his and Brehmer’s ability to treat tuberculosis through fresh air cures soon became the established norm.

The medical community’s acceptance of the fresh-air cure led to the development of public and private institutions which shared common architectural features. Borrowing from resort architecture, the first sanitariums featured balconies and terraces used for heliotherapy and taking the cure. Large windows and doors provided natural ventilation, expelling contaminated indoor air. Minimized architectural ornamentation sought to prevent the accumulation of dust, believed to harbor infectious tubercle bacilli. In 1902, Swiss physician Karl Turban partnered with architect Jacques Gros to develop folding sliding glass windows that transformed patient rooms into outdoor spaces by removing glass barriers.⁹ Wood and linoleum floors were sanitary and could be easily disinfected. Borrowed from the Mediterranean, the flat roofs on Swiss sanitariums evolved into the so-called *davoserflachedact*, or Davos Flat Roof, that prevented icicles from forming in the winter, as they had on the gabled rooftops, and they also functioned as rooftop decks.

Dr. Brehmer’s Göbersdorf Sanitarium popularized the fresh-air treatment and sparked the European Sanitarium Movement during the second half of the nineteenth century. The development of public sanitariums throughout Europe, however, made health care accessible to all classes. The mass acceptance of the fresh-air cure required sanitariums to incorporate large windows and doors for natural ventilation, terraces and balconies for heliotherapy, and new

materials that promoted sanitation; yet day rooms, dining halls, and parlors retained characteristics of resort and hospital design. Borrowing from the European health spa and sanitarium movements, the first U.S. sanitariums incorporated these familiar architectural elements to develop large-scale, hospital-like institutions devoted to treating tuberculosis.

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1. Ibid., 462.
 2. Peter Warren, "The Evolution of the Sanatorium: The First Half Century, 1854-1904," *CBMH/BCHM* 28, no. 2 (2006): 463.
 3. Ibid., 465.
 4. C. Theodore Williams, "A lecture on the open-air treatment of pulmonary tuberculosis as practiced in German sanatoria," *The British Medical Journal* 1, no. 1951 (21 May 1898): 1309.
 5. Ibid.
 6. Margaret Campbell, "What Tuberculosis Did For Modernism: The Influences of a Curative Environment on Modernist Design and Architecture," *Medical History* 49 (2005): 480.
 7. W.C. Rucker and R.A. Kearny, "Tuberculosis in Switzerland: Results of the Campaign Against the Disease," *Public Health Reports (1896-1970)* 28, no. 52 (26 Dec. 1913): 2815.
 8. E.R. Smith, *The Retreat of Tuberculosis 1850-1950* (New York: Croom Helm, 1988): 98.
 9. Campbell, 478; Hugh Pearman, "Find modernist architect chill and clinical? Your response is historically appropriate," *The Sunday Times* (9 March 2007), <<http://www.hughpearman.com/2008/05.html>> (accessed 17 Jan. 2012).

Chapter 5: The Development of the American Sanitarium Movement

Wealthy American consumptives often found relief at European health spas or those in the American southwest. Dr. Edward Livingston Trudeau, believing that the Adirondack Mountains could have curative abilities similar to the Swiss Alps, opened the Adirondack Cottage Sanitarium in upper state New York in 1884. Trudeau's cottage-style sanitarium brought greater attention to the need for public sanitariums open to all classes. The first public sanitariums, providing state-funded health care, were large institutions that borrowed design elements from previously developed radial prisons and Thomas Kirkbride insane asylums. Unlike prison and asylums, however, and much like earlier resorts and European sanitariums, these first state tuberculosis hospitals favored natural ventilation and day lighting and incorporated familiar elements such as balconies, terraces, and private screened cottages.

Trudeau, having contracted tuberculosis from his brother, believed he was near death when he sought out the Adirondack Mountains in May 1873.¹ Arriving at Paul Smith's Inn at Saranac Lake, the ailing doctor spent the summer resting outdoors in the fresh mountain air. Within a few months, Trudeau had recovered and returned home to New York City. Combating another bout of TB in 1875, the doctor and his family permanently relocated to Saranac Lake for its curative abilities.²

Inspired by Hermann Brehmer who had opened the Görbersdorf Sanitarium in 1859 and by his own recovery at Paul Smith's Inn, Trudeau built the first semi-public institution for the treatment of tuberculosis in the United States in 1884.³ The Adirondack Cottage Sanitarium opened with a single one-room cottage named "Little Red" that Trudeau built for the cost of

\$350 in 1884.⁴ The tiny cottage held “a wood stove, two cots, a washstand, two chairs, and a kerosene lamp.”⁵ The porch was large enough to shelter one patient at a time. The first patients to rent the cottage for \$5 a week were two factory girls, sisters Alice and Mary Hunt, in 1885.⁶ Trudeau prescribed a strict routine for the young women, complete with long hours of outdoor rest. By curing the Hunt sisters in the Adirondacks, where winters were cold and summers rainy, Trudeau discredited the commonly accepted idea that only warmer, dry climates could cure TB. Moreover, Trudeau’s discovery proved Brehmer’s methods were not limited to the Swiss Alps and could be as effective in the United States. A year after the construction of “Little Red,” Trudeau expanded his institution by constructing two more cottages—Little Blue and Little Green. The physician’s use of cure cottages sparked the trend in building cottage-style sanitariums.

Building on the success of Trudeau’s Adirondack Cottage Sanitarium and the reputation of its laboratory, the village of Saranac Lake became a haven for consumptives. With the expansion of the sanitarium into a formal institution in the early twentieth century, the town of Saranac Lake grew to 8,000 residents, including 2,000 consumptives by 1932.⁷ The town constructed additional sanitariums and cottages to accommodate the growing number of patients. Residents built porches and balconies onto existing houses and rented them to TB patients taking their afternoon cure. The Saranac Hotel, high-end shops, restaurants, and the Fox Pontiac and Colonial Theatres, which showed motion pictures and staged Vaudeville acts, profited from wealthy patients drawn to the resort town. Healthy visitors noted the eerie silence of the otherwise bustling town from two to four o’clock every afternoon as consumptives took their cure. Known as the “City of the Sick,” the town catered to the tuberculosis-infected, even hosting an annual Winter Carnival to entertain patients.⁸

At the beginning of the twentieth century, Trudeau brought greater attention to consumptives as a leader in the anti-tuberculosis movement and supported state public health systems that recognized the need to provide health care to all social classes. Public health campaigns and anti-tuberculosis associations lobbied for state-funded sanitariums to hospitalize consumptives in order to treat the disease and prevent its spread through isolation. By the 1930s, many states had laws dictating that each state provide hospital beds that corresponded with the number of TB-related deaths. Government involvement in public health care led to the construction of large public sanitariums devoted exclusively to treating tuberculosis.

Relying on previously developed building typologies, these first sanitariums took inspiration from the designs of early nineteenth century prisons. During the 1780s, English architect William Blackburn had designed the first radial prison plans that featured a central warden's office and apartment that allowed him to oversee the prison staff and inmates that resided in the radiating wings of the structure.⁹ Built in 1821, John Haviland's Eastern State Penitentiary in Philadelphia was the first radial prison plan (see Fig. 3.1) constructed in the United States. To improve sanitation and prevent disease, the architect's Gothic Revival prison featured wings of cells with private exercise yards.¹⁰ This arrangement maximized natural lighting and ventilation. The seven wings met at a central pavilion, featuring offices and apartments for the warden and lead keeper. Haviland located service rooms, such as the prison kitchen, in the basement to separate staff from the inmates, but still provide accessibility to the wards above.

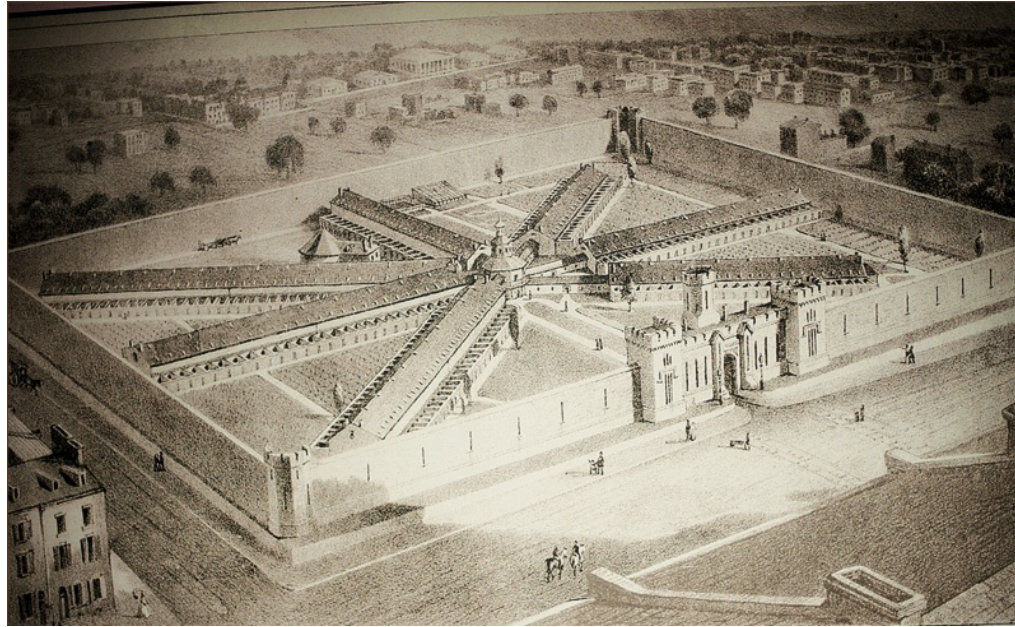


Figure 5.1. Eastern State Penitentiary, Philadelphia, designed by Georg Haviland, 1821. Photo courtesy of Philly Bricks, <http://ilovebricks.blogspot.com/2011/12/do-we-really-still-need-eastern-state.html> (accessed 20 Nov. 2011).

Early twentieth century sanitarium architects also embraced American psychiatrist Thomas Story Kirkbride's *On the Construction, Organization, and General Arrangements of Hospitals for the Insane*, published in 1854.¹¹ Kirkbride believed the alleged poor morals of society contributed to insanity. Thus, he promoted rural locations for his sanitariums that removed patients from those social acquaintances and family members that had likely contributed to their condition. Rural sites also permitted the development of large manicured gardens, referred to as "pleasure grounds," that provided an outdoor space for recreation and exercise. Groves of trees and shrubs separated male and female patients while providing privacy from curious visitors. Believing mental illness could be treated in the same way as physical illnesses, Kirkbride led the movement to reposition "insane asylums" as "state hospitals" devoted to mental health.

The design of the asylum incorporated the familiarity of domestic architecture that conformed to the patriarchal treatment approach.¹² Common rooms took on the appearance of parlors, complete with comfortable and familiar furnishings. Day rooms and dining rooms reinforced moral behavior by serving as a gathering space for the asylum “family.” Libraries, recreational spaces, and classrooms reflected nineteenth century psychiatrists’ attempts to prevent mental idleness and encourage self-discipline by conforming to daily routines. Promoting the notion that the asylum as a collective was a family, staff housing was on site as well.

Despite the desire to develop a comfortable, home-like atmosphere for patients, the design of the institution also supported its use as a hospital. The central core typically contained offices for medical and administrative staff, reception rooms, public parlors, lecture hall, exam rooms, operating rooms, and pharmacies. Patients were separated into wards provided for each category of patient (ambulant, semi-ambulant, and hospital) that contained patients’ rooms, lavatories, day rooms, dining rooms, and support rooms for attendants. The lower level was utilitarian, containing industrial kitchens, laundries, and store rooms.

Moving away from typical nineteenth century hospital design that consisted of a series of connected pavilions, Kirkbride was the first to create a linear, shallow v-shaped plan (see Fig. 5.2, 5.3, and 5.4). The shallow depth of these pavilions promoted natural ventilation and day lighting. Kirkbride recommended that hospital structures be no more than two stories tall, though variations of this plan were developed to accommodate greater numbers of patients.¹³ The psychiatrist also suggested traditional architectural styles that reinforced the familiarity of home while providing a formal intuitional appearance.

PLATE VIII.

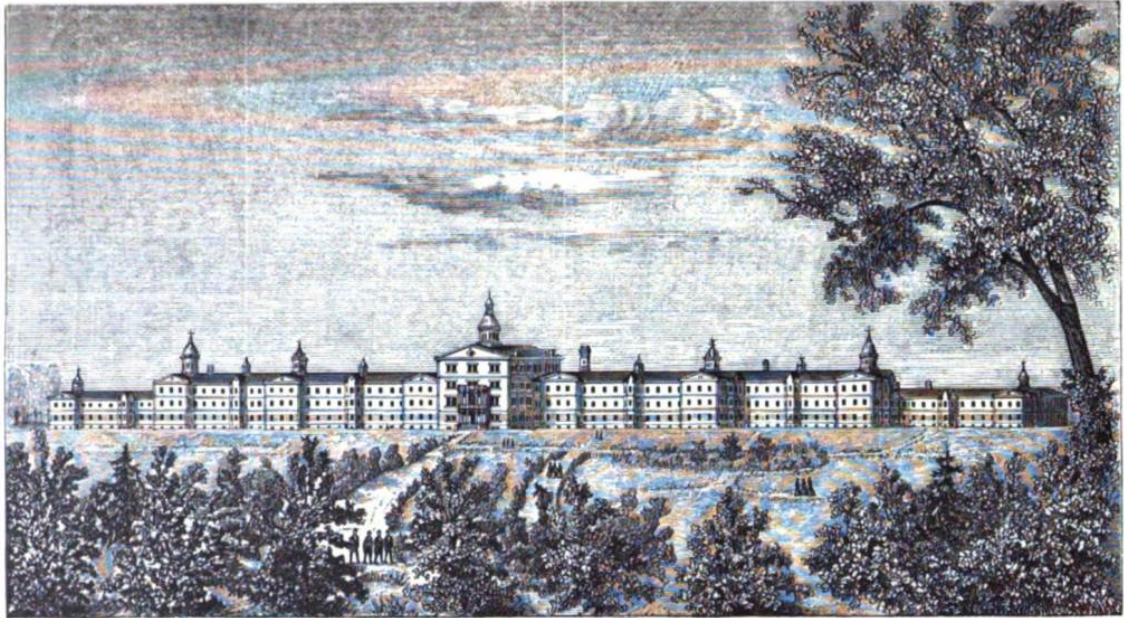


Figure 5.2. Recommended elevation for the linear plan of Kirkbride Institution. Kirkbride, Thomas. *On the Construction, Organization, and General Arrangements of Hospitals for the Insane with Some Remarks on Insanity and its Treatment.* (Philadelphia: J.B. Lippincott & Co., 1880): 150.

Kirkbride's 1854 plan created the first set of design guidelines for the construction of state hospitals. The psychiatrist developed a holistic approach to hospital design, addressing site layouts and architectural design that supported staff while serving as a vehicle in the treatment of mental illness. Kirkbride's comprehensive plan also dictated the use of materials, fire-proofing, lighting, plumbing, and heating and cooling systems as well as room dimensions and ceiling heights. Building on earlier architectural improvements for state prisons that required greater natural lighting and ventilation, Kirkbride's construction guidelines set the standard for the first tuberculosis sanitariums.

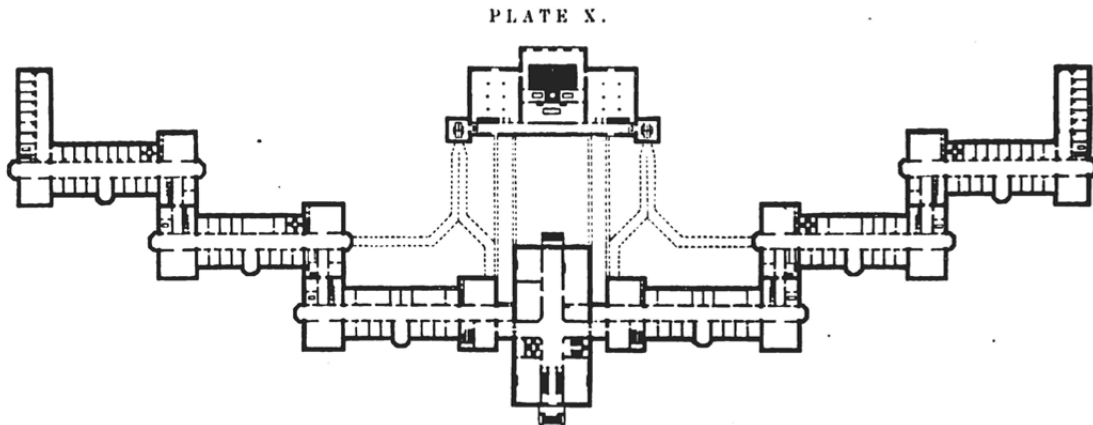


Figure 5.3. Cellar of Linear Hospital Plan. Kirkbride, Thomas. *On the Construction, Organization, and General Arrangements of Hospitals for the Insane with Some Remarks on Insanity and its Treatment.* (Philadelphia: J.B. Lippincott & Co., 1880): 163.

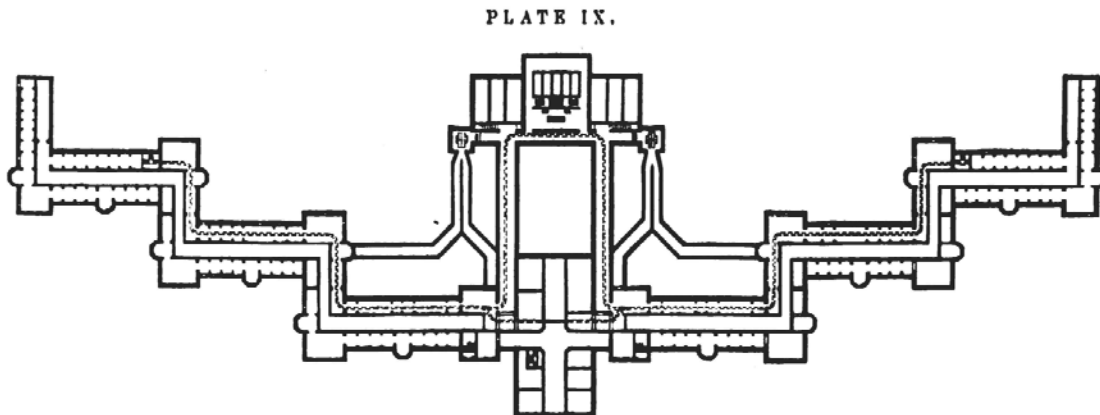


Figure 5.4. First floor of Linear Hospital Plan. Kirkbride, Thomas. *On the Construction, Organization, and General Arrangements of Hospitals for the Insane with Some Remarks on Insanity and its Treatment.* (Philadelphia: J.B. Lippincott & Co., 1880): 141

As early as 1908, the National Tuberculosis Association (NTA) recognized the need to develop public sanitariums devoted to tuberculosis research and treatment. That same year, the NTA hired Dr. Thomas Spees Carrington to head the organization's Bureau of Sanitarium

Construction, and he worked with architects, physicians, and patients to publish a standardized set of plans for tuberculosis sanitariums in 1909.¹⁴ As mentioned in *Chapter 2. History of the Disease*, local anti-tuberculosis associations received donations, grants, and state funding to finance the construction of sanitariums in their communities, and Carrington advised local groups on sanitarium planning to ensure the feasibility of these projects.¹⁵ As state laws mandated the hospitalization of tuberculosis sufferers and the threat of the White Plague spread, these institutions grew to accommodate larger numbers of consumptives. Though the NTA originally intended sanitariums to treat only ambulant patients, physicians soon discovered that a complete cure was more likely if consumptives were treated at the onset of the disease. This realization forced sanitariums to accommodate the needs of advanced cases, and so sanitariums evolved into hospital-like institutions. As new requirements for treating consumptives emerged, the NTA published revisions reflecting new design solutions for these demands.

In 1921, Carrington's successor, Dr. Thomas B. Kidner, published the latest revised edition, *Notes on Tuberculosis Sanitarium Planning*.¹⁶ Just as Kirkbride's guide had done in the previous century, this new set of recommendations was based on a holistic approach to sanitarium building. Kidner's revised edition described the characteristics and dimensions of each room including exam and operation rooms, nurses' stations, medical and administrative offices, and patient wards (see Table 5.1). The standards addressed issues such as site selection, building systems, the use of construction materials, and interior design suggestions. The guidelines served to aid architects in designing institutions that met with U.S. tuberculosis hospital accreditation regulations.

Sanitarium Planning	
<i>Rooms organized by pavilion</i>	<i>Recommended Dimensions</i>
Medical Administration	
Operating Room	No less than 15 ft. x 15 ft.
Hospital Building	
Corridors	
	No less than 8 ft. wide
Patients Quarters	
Hospital	Not provided
Semi-Ambulant	No less than 24 ft. from front to rear
Ambulant	Not provided
X-Ray Laboratory	
Operating Room	No less than 12 ft. x 16 ft.
Dark Room	No less than 8 ft. x 12 ft.
Loading Room	5 ft. x 8 ft.
Machine Room	6 ft. x 8 ft.
Office	10 ft. x 12 ft.
Interpretation and Filing Room	12 ft. x 18 ft.
Waiting Room	12 ft. x 16 ft.
Occupational and Prevocational Therapy	
Administration	
Office for Chief Aid	10 ft. x 12 ft.
Storeroom for materials	10 ft. x 12 ft.
Finishing Room	12 ft. x 18 ft.
Office for Vocational Building	10 ft. x 12 ft.
Storeroom for academic class supplies	6 ft. x 12 ft.
Storeroom for shop supplies	10 ft. x 25 ft.
Classroom	20 ft. x 28 ft.
Shops and Laboratories	150 SF/student

Table 5.1. Sanitarium Planning. "Notes on Tuberculosis Sanatorium Planning," *Public Health Reports (1896-1970)* 36, no.24 (17 June 1921): 1374-1378, 1379-1391.

Early twentieth century sanitariums provided many of the same medical and administrative spaces as Kirkbride institutions. Often located in the central hospital building, private offices for the superintendent and his staff, chief physician, assistant physician, head nurse, and waiting rooms supported administrative tasks. Exam rooms, pharmacy, laboratories, and surgical rooms provided space for medical treatment similar to hospital design. Because the majority of patients were young adults who spent years institutionalized at sanitariums, these institutions differed from previously developed treatment centers in that they included occupational and vocational training classrooms. The main building or separate

detached pavilions typically contained these educational spaces. Libraries, reading rooms, and billiards rooms, served as communal gathering spaces. Dining halls, used by all but bedridden consumptives, brought patients and often medical staff together for daily meals. Furthermore, these institutions typically provided on-site housing for staff. Because patients often spent years or even decades at these sanitariums, these tuberculosis hospitals borrowed from the health spa movement to provide a home-like atmosphere for patients while incorporating many of the same medical amenities

Similar to the Kirkbride insane asylums that segregated patients by condition, state-funded sanitariums typically categorized patients into three distinct classes based on the progression of their disease: hospital, semi-ambulant, and ambulant. Upon entering the sanitarium, physicians prescribed bed rest to patients for diagnosis and observation. The NTA suggested these types of patients comprise no less than forty percent of the total number of sanitarium patients.¹⁷ They assigned the critically ill private rooms while all others shared four-, six-, and eight-bed wards in the main building. Semi-ambulant patients, permitted only to leave their beds and rest chairs for meals, shared wards in “one-story or two-story buildings of the ‘pavilion type.’”¹⁸ These wards had to accommodate the overflow of hospital patients or isolated a semi-ambulant patient suffering from a relapse. Moreover, thirty-five percent of the patients made up this category.¹⁹ Ambulant patients, who required the least amount of medical attention, enjoyed a larger degree of freedom than other patient types. Two to four ambulant patients formed a unit, often housed in small cottages away from the main hospital building. This patient class was the smallest, comprising twenty-five percent of the total sanitarium population.²⁰ Throughout patient wards, nurse stations, janitorial closets, linen closets, and utility rooms supported hospital activities. The standards recommended segregating patients by

Sharing many of the same construction materials used in Kirkbride Institutions, the 1921 guidelines promoted the use of materials that could be disinfected (see Table 5.2). White hard plaster walls contributed to the interior's a sanitary appearance and dark green or gray-colored tile often lined interior walls. Rather than the standard door width of two feet eight inch, the

	<i>Notes on Tuberculosis Sanitarium Planning</i>	<i>On the Construction, Organization, and General Arrangements of Hospitals for the Insane</i>
Roofing	No preference provided	Tin or Slate
Exterior Walls	No preference provided	Stone or Brick
Interior Walls	Hard plaster in all spaces, painted white Dark green or cool gray-colored tile to the height of 6 ft. in operating rooms	Hard plaster in all spaces, painted white or agreeable shades of color
Doors	Recommended width of 3ft. 6 in. "to allow standard bed to pass through freely" ²¹ Threshold strip should never be installed	Recommended dimensions: 6 ft. 8 in. x 2 ft. 8 in. wide. Doors should open to corridor to prevent patients from barricading themselves inside the room
Windows	Sashes that pivot outside, allowing windows to remain open during stormy weather Interior Screens	Recommended dimensions: 6 ft. 6 in. x 3 ft. Two sashes each containing 10 lights Interior screens that prevent patients from breaking the glass
Floors	Heavy battleship linoleum or hardwood Smooth, lacquered finished concrete in corridors Smooth vitreous tile in operating rooms	Well-seasoned wood

Table 5.2. Comparison of Notes on Tuberculosis Sanitarium Planning and On the Construction, Organization, and General Arrangements of Hospitals for the Insane. "Notes on Tuberculosis Sanatorium Planning," *Public Health Reports (1896-1970)* 36, no.24 (17 June 1921): 1371-1395; Thomas Kirkbride, *On the Construction, Organization, and General Arrangements of Hospitals for the Insane with Some Remarks on Insanity and its Treatment* (Philadelphia: J.B. Lippincott & Co., 1880): 59-60, 62-68.

standards recommended door widths of three feet six inches that allowed standard-sized hospital beds to easily pass through. The publication also suggested heavy battleship linoleum and hardwood flooring both for its durability and cleanliness. Smooth, lacquered concrete in corridors was also sterile and resilient to wear and tear. These materials gave tuberculosis sanitariums a sterile appearance.

During the 1920s and 1930s, the passing of state laws requiring the hospitalization of consumptives created a greater need for tuberculosis sanitariums and led to the conversion of private residences to tuberculosis hospitals. Though *Notes on Sanitarium Planning* focused on the construction of new sanitariums, its recommendations were useful in the rehabilitation of donated estates, such as the Esteb farm in Wayne County, Indiana. In 1917, David and India Esteb donated their estate to the county for use as a tuberculosis sanitarium.²² During the late 1920s, the county severely altered the Greek Revival house to provide additional space for administrative and medical offices as well as patient wards (Fig. 5.6 and 5.7).²³ Large two-story wings, each two bays wide, were added to the north and south elevations. The gabled third floor attic was eliminated, as well, to incorporate a full third floor. The renovation removed the historic structure's architectural ornamentation to reduce maintenance and prevent dust collection on ornate moldings. Though little documentation detailing the state's renovation of the Smith Esteb estate exists, it is likely that the new design adopted many of the materials and finishes suggested by the 1921 *Notes on Sanitarium Planning*.

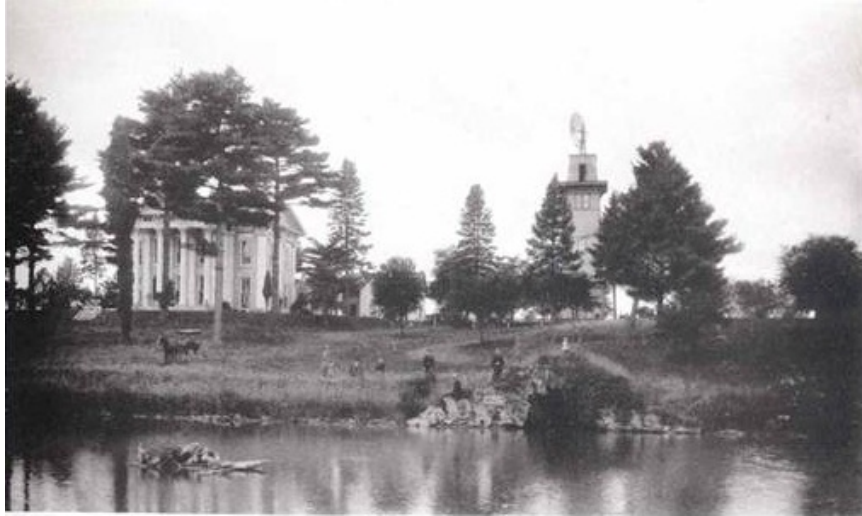


Figure 5.6. Historic Photograph of Smith-Esteb residence, US 27 south of Richmond. Photo courtesy of Morrison-Reeves Library.



Figure 5.7. Historic postcard of Smith Esteb Memorial Hospital, Richmond. Photo courtesy of Morrison-Reeves Library.

Though the first tuberculosis sanitariums had strong ties to the health spa movement, sanitarium design began to move toward hospital design by the early twentieth century. The incorporation of day rooms, dining halls, and parlors offered the familiarity of home while medical and administrative offices supported hospital functions. Pharmacies, x-ray laboratories,

and research facilities also matched the sanitarium's medical use. Designers used plaster, wood, and later metals and plastics to provide durable, cost-effective materials that were hygienic and easily disinfected. The simplification of architectural ornamentation, which in part inspired the Modernist movement, arose from the need to create sanitary environments that complemented the fresh-air treatment while supporting cleanliness.

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1. Thomas M. Daniel, *Captain of Death: The Story of Tuberculosis* (Rochester: University of Rochester Press, 1997), 182.
 2. Ibid., 182.
 3. Edward R. Baldwin, "Saranac Lake and the Saranac Laboratory for the Study of Tuberculosis," *The Milbank Memorial Fund Quarterly Bulletin* 10, no.1 (January 1932): 2
 4. Ibid.; Robert Taylor, *Saranac: America's Magic Mountain* (Boston: Houghton Mifflin Company, 1986), 75.
 5. Taylor, 75.
 6. Ibid.
 7. Baldwin, 15.
 8. "The Wilderness Cure," Adirondack History Network, <http://www.adirondackhistory.org/newtb/four.html> (accessed 11 Dec. 2011).
 9. Norman Johnston, *Forms of Constraint: A History of Prison Architecture* (Urbana, IL: University of Illinois Press, 2000): 56.
 10. Ibid., 70.
 11. Thomas Kirkbridge, *On the Construction, Organization, and General Arrangements of Hospitals for the Insane with Some Remarks on Insanity and Its Treatment* (Philadelphia: JB Lippi Cott & Co., 1880)
 12. In this form of treatment, the patients referred to superintendents as "father" and the patients as whole as the "family,". Carla Yanni, *The Architecture of Madness: Insane Asylums in the United States* (Minneapolis: University of Minnesota Press, 2007), 55.
 13. Ibid., 56.
 14. Richard Harrison Shryock, *National Tuberculosis Association 1904-1954: A Study on the Voluntary Health Movement in the United States* (New York, Anno Press, 1977): 153.
 15. Ibid.
 16. "Notes on Tuberculosis Sanatorium Planning," *Public Health Reports (1896-1970)* 36, no.24 (17 June 1921).
 17. Ibid., 1376.
 18. "Notes on Tuberculosis Sanatorium Planning," 1380.
 19. Ibid., 1376.
 20. Ibid., 1376.
 21. Ibid., 1377.
 22. Sue King, email message to author, October 13, 2011.
 23. Ibid.

Chapter 6: The American Sanitarium Movement: Borrowing from European Modernist Innovation

At the beginning of the twentieth century, the Modernist architecture movement emerged as a reaction to the complicated, architectural ornamentation of ornate Victorian-era architectural styles. Much like tuberculosis sanitarium design, modern architecture sought to bring together indoor and outdoor spaces. Technological and engineering innovations allowed modern architects to maximize access to natural lighting and ventilation. Sharing these key values with tuberculosis sanitarium design, modern architecture lent itself to the design of sanitariums as is apparent in the construction of the Dutch Zonnestraal Sanitarium and Finish Paimio Sanitarium. These two hospitals inspired a trend in modern sanitarium design that was carried over to the U.S. and is evident in the design of Silvercrest Sanitarium in New Albany, Indiana. Both modern architecture and tuberculosis sanitariums valued fresh air, sunlight, and hygiene in an effort to improve human health.

Disliking the heavy architectural ornamentation of late-nineteenth century architectural styles, the first modern European architects believed that a healthier life could be achieved by the simplification of building design. They considered the building's form as an expression of its function. The availability of new materials such as sheet glass, concrete, and steel drove technological and engineering innovations that emphasized the simple beauty of industrial materials in exposed structural systems. Additionally, the modernists emphasized the need to integrate indoor and outdoor spaces in an effort to improve human health through access to fresh air and natural lighting.

In 1926, Dutch architects Johannes Duiker and Bernard Bijvoet and structural engineer Jan Gerko Wiebenga designed the first modernist tuberculosis hospital, the Zonnestraal Sanitarium in Hilversum, Netherlands.¹ Conforming to a limited budget, the design incorporated inexpensive, mass-produced materials such as steel and sheet glass. The architects employed a reinforced concrete structure, as well, that reflected the era's innovation in structural engineering. Furthermore, these materials created a machine-like appearance that represented the healthy sterility of its hospital-like function while reflecting the values of the fresh air treatment. Built as part of a larger colony for male-only tuberculosis patients, the stark white, sunburst-shaped sanitarium represented the technological advancements of the day.

The designers oriented the sanitarium buildings to allow patients access to fresh air and sunlight, but also to provide patients privacy in centralized spaces. Though two pavilions were never constructed, Figure 6.1 shows the proposed structures radiating out from an enclosed, central space. At the northern edge of the cluster, the main building (A) created a barrier between the outside world and private hospital grounds. Facing southward, the buildings looked inward toward the central courtyard to reinforce the division and further isolate sanitarium functions. Two pavilions (B), each featuring wings of hospital wards connected by a shared common space (C), frame the east and west sides of the courtyard. This radiating pattern was replicated in the design of the Zonnestraal School that was built outside of the main campus and provided occupational therapy to patients. In 1931, Duiker added housing for sanitarium staff and cottages beyond this cluster of buildings to house ambulant patients in their final stage of recovery.² Paths connected these separate entities and facilitated patient exercise as they moved between different function-oriented zones of the overall colony.

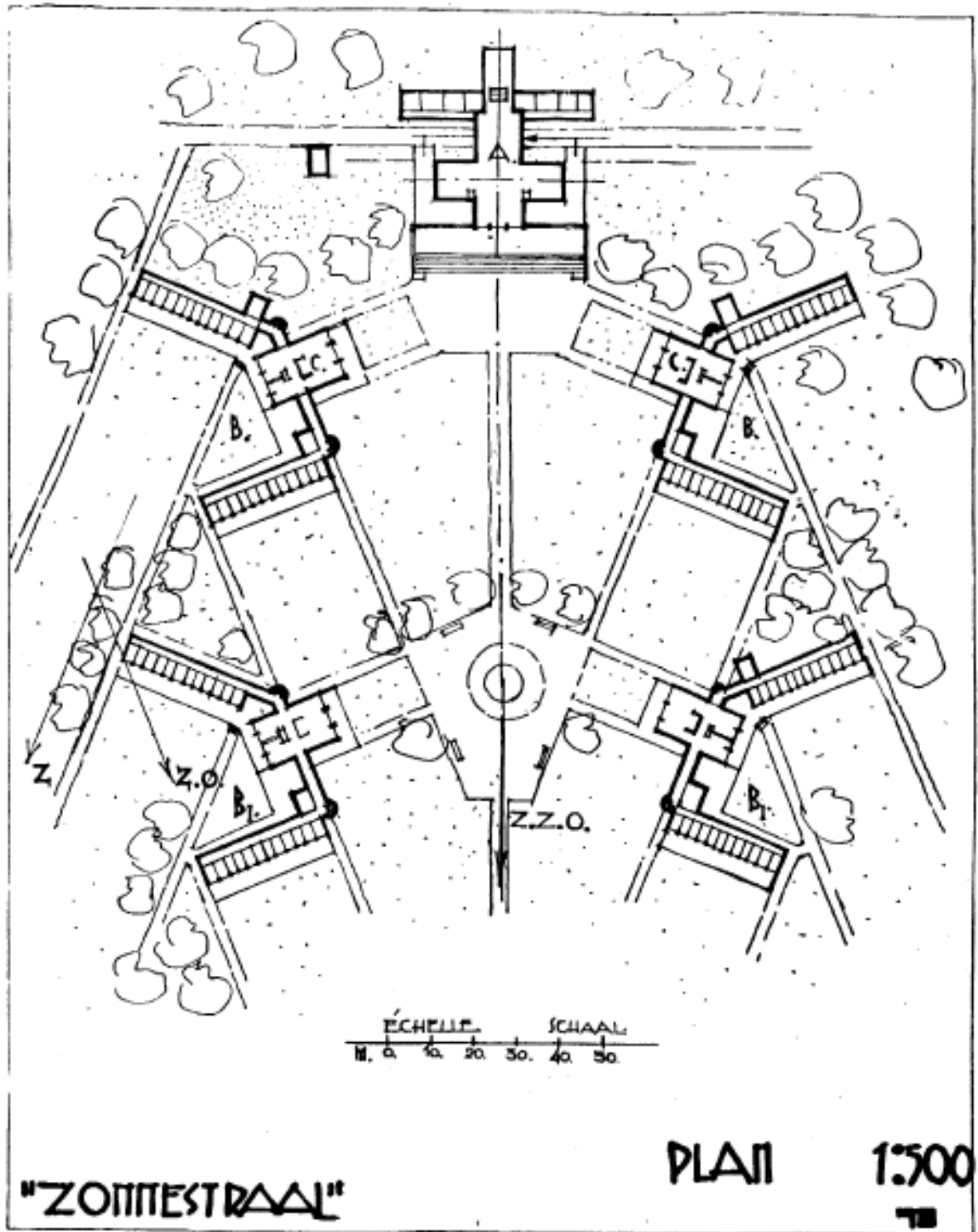


Figure 6.1. Zonnestraal Site plan. Robert Vickery, "Bijvoet and Duiker," *Perspecta* 13/14 (1971): 146.

In plan, the transparency of the central building is accentuated by the flow of exterior traffic directly between the ground level spaces of the structure. Duiker sought to tie the sanitarium to the outside world by weaving vehicle traffic through the central building structure. The driveway formed the east-west axis and divided the central kitchen space to the north from the medical administration space to the south. A secondary driveway broke away from the main route and formed a path surrounding the kitchen. Ordered by their function, the placement of the three spaces created a north-south axis that alluded to the larger progression of patients in the sanitarium from the most frequented medical offices at the center of the sanitarium to the transitional kitchen space and finally through the utility space that led to outside world.

The division of these spaces illustrated Duiker's belief that architecture connected the form and function of a structure. At the north end of the plan, the outermost space contained utilities such as the boilers and laundry facilities (shown at the bottom of Figure 6.2), as well as a cloak room. The kitchen was centrally-located, with rooms for food storage, preparation, and cooking. Facing southward into the courtyard, the final space was reserved for medical and administrative offices, a pharmacy, and an x-ray lab. Adjacent to this, Duiker designed a wing of six hospital rooms independently in plan that provided additional isolation for critically ill patients, but was still connected to medical staff.

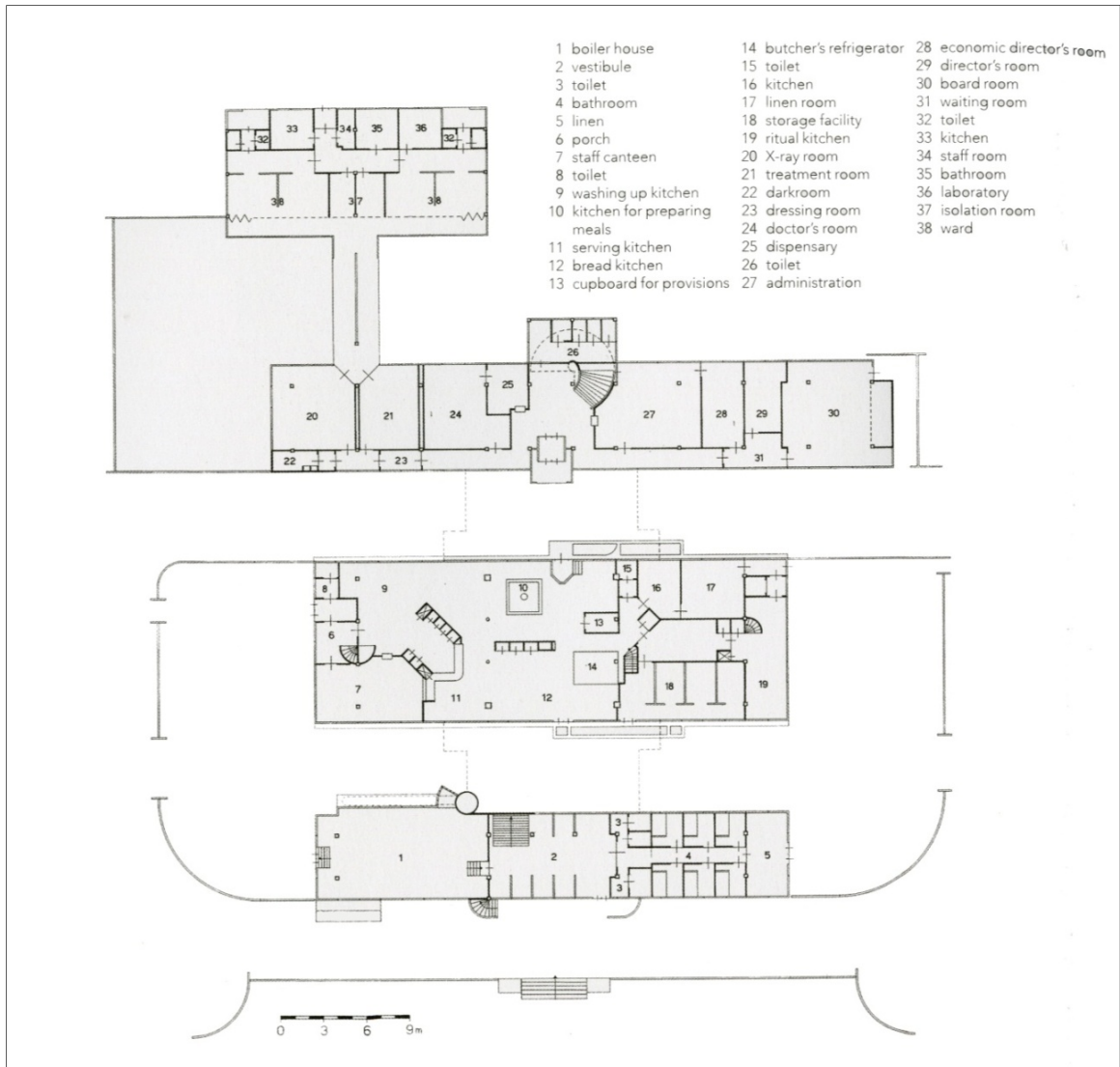


Figure 6.2. First Floor Plan of Central Building. Paul Meurs, *Sanatorium Zonnestraal: The History and Restoration of a Modern Monument* (Rotterdam: NAI Publishers, 2003):254.

The second story of the Central Building spanned the ground level plan, unifying the functions of the aforementioned spaces to create a cohesive, multipurpose structure (Figure 6.3). A circular, glass-enclosed stairway protruded into the courtyard to connect the lobby of the medical offices to the second floor lobby. Adjacent to this, the dining room consumed much of the structure's second level. By doing so, the glass-enclosed dining room had multiple exterior exposures, providing varying exterior views and changing natural light throughout the

day. When not in use, the dining hall became a recreational space that staff used for theatrical plays and film showings. Open-air balconies radiated from the dining hall and connected the second level to the rooftop deck by exterior staircases.

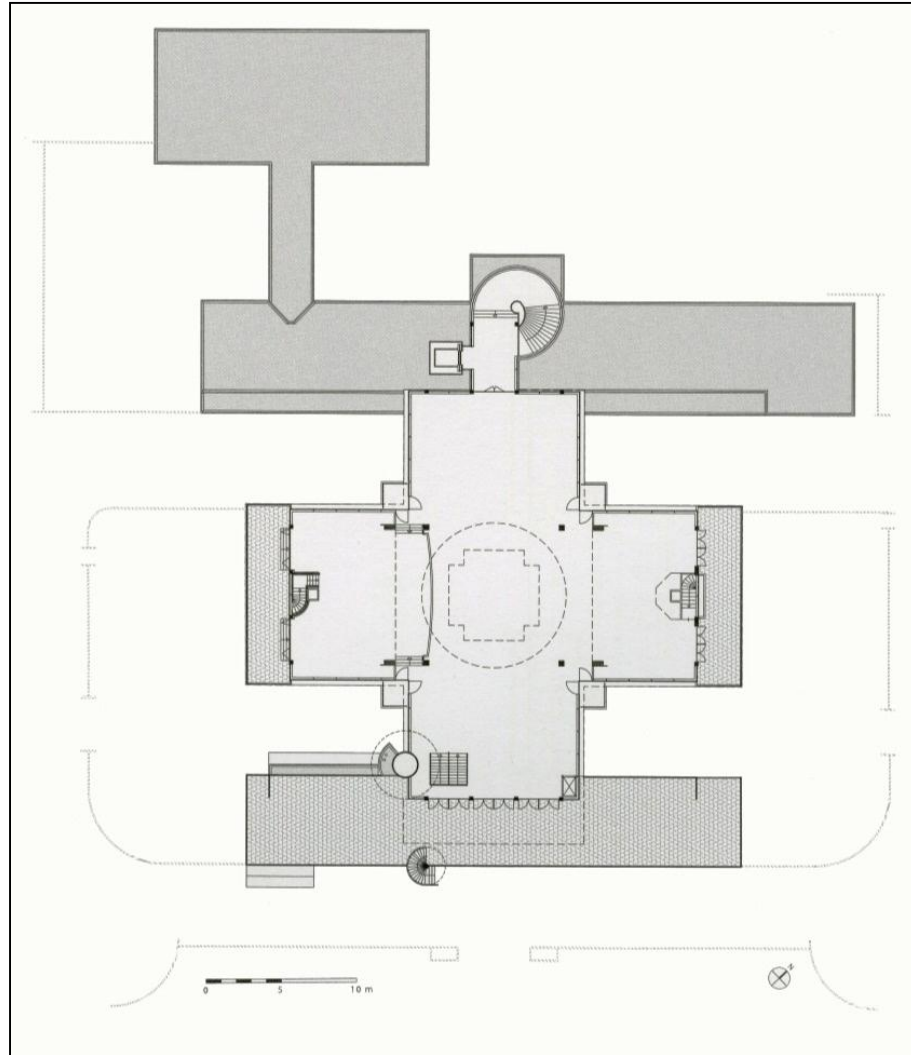


Figure 6.3. Second Floor Plan of Central Building. Paul Meurs, *Sanatorium Zonnestraal: The History and Restoration of a Modern Monument*, (Rotterdam: NAI Publishers, 2003): 263.

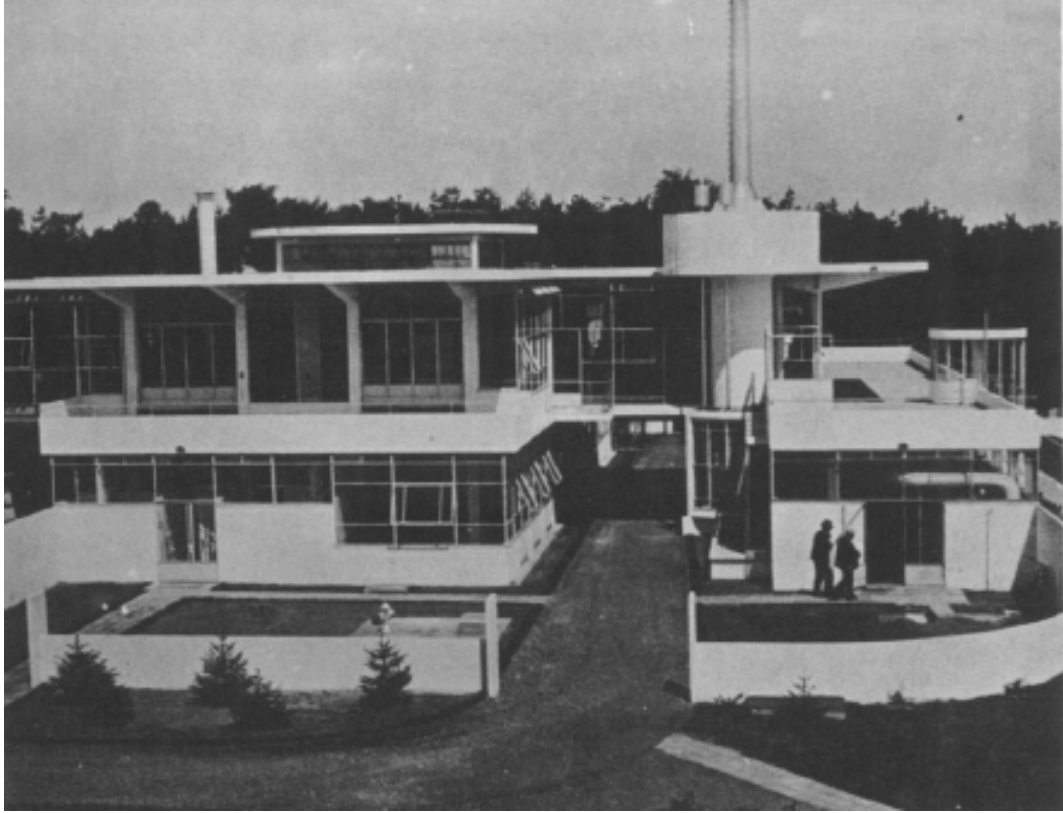


Figure 6.4. Central Building. Robert Vickery, "Bijvoet and Duiker," *Perspecta* 13/14 (1971): 147.

Framing the courtyard, the architects created two additional pavilions, Pavillion Ter Meuien (1928) and Pavillion Dresselhuys (1931). Each pavilion (see Fig. 6.5) features a one-story center, containing nurses' stations and common rooms, which connected two larger, rectangular ward wings. A corridor ran along the northern elevation of each wing and connected patient rooms that faced south to capture natural light. Balconies and terraces wrapped around the exterior perimeter of south elevations, providing each patient room with an exterior space for taking the cure. Glass-enclosed cylindrical stairs connected wards on both levels and created access to rooftop decks. These buildings housed the wards of semi-ambulant patients, each ward containing twenty-five dormitory rooms each.

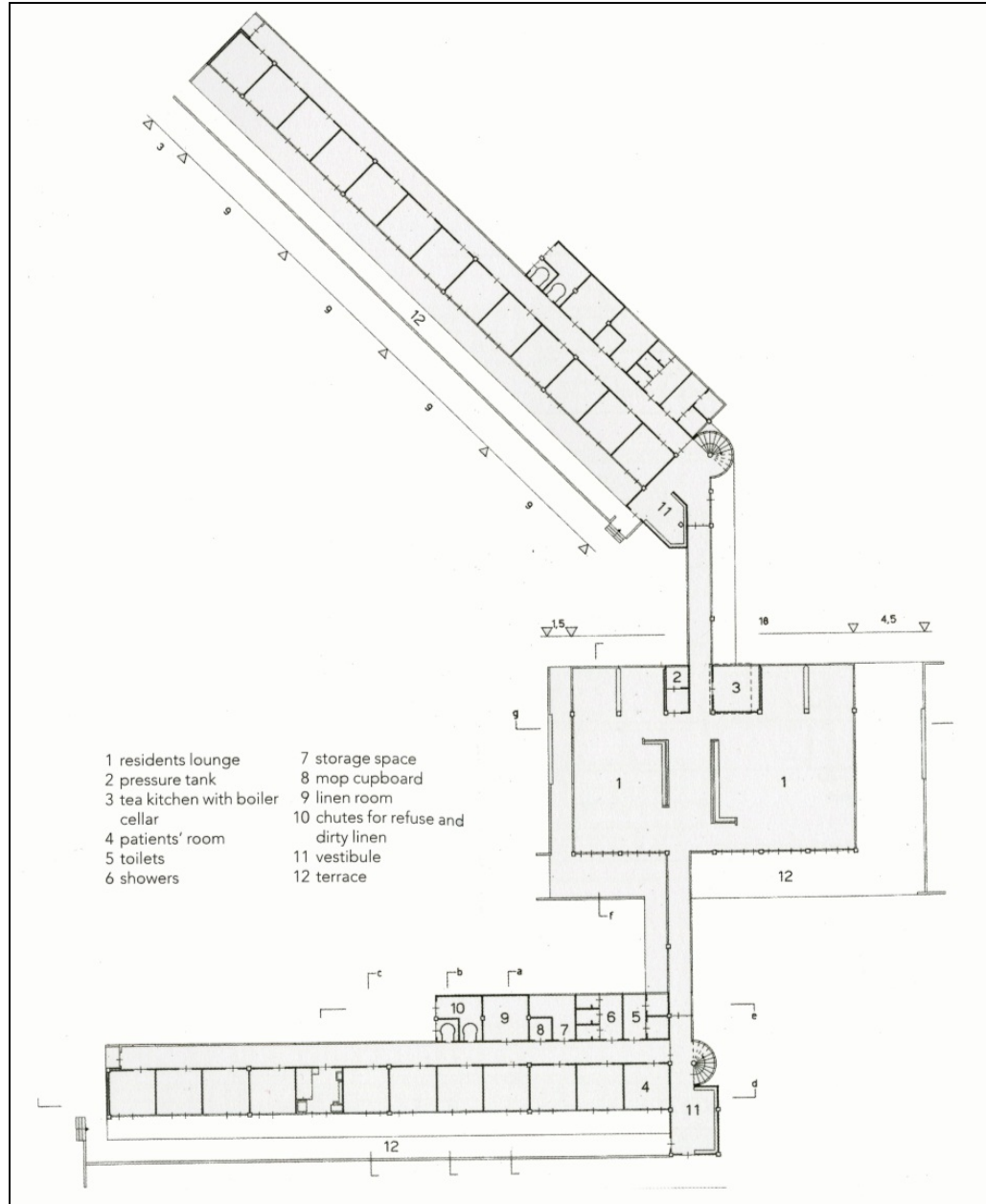


Figure 6.5. First Floor Plan of Ter Meulen Pavilion, 1928. Paul Meurs, *Sanatorium Zonnestraal: The History and Restoration of a Modern Monument*, (Rotterdam: NAI Publishers, 2003): 258.

The color pallet promoted the institution’s sanitary appearance while complementing the structure’s stark architecture. The architects chose a soft yellow color for interior spaces that covered most of the wall, with the top one-fourth of the wall and ceilings painted white to

create a calming effect. An impermeable material called “frotolite” which was similar to linoleum lined the walls and floors of the kitchen, bathrooms, and cloakrooms—its light yellow color complementing the warm yellow hues of the walls. The floors were light brown, wood-patterned linoleum flooring. Natural linen curtains over windows minimized direct light. Outside, the bright white color of the building’s concrete exterior promoted its modern design and the blue shade of the steel window frames blended into the reflection of the sky.

Duiker’s plan reflected a limited budget but also his belief that a cure for tuberculosis would be discovered within a few decades and make sanitariums obsolete. He chose the buildings’ reinforced concrete frame for its sanitary qualities and because it was also cost effective. By designing a three-meter cubed module for the main building and the ward buildings, the limited width of concrete supports allowed the framework to be removed in one week rather than the typical four-week curing period. This met the needs of the project’s compressed six-month construction schedule and reduced costs.³ The predicted thirty-year lifespan of its operable steel-frame windows met design objectives and was less expensive than wood windows. To cut costs, linoleum flooring covered only the center of rooms where foot traffic was greatest. Hard plaster coated the remainder of the floor space. Plaster was inexpensive, readily available, and could withstand frequent disinfecting.

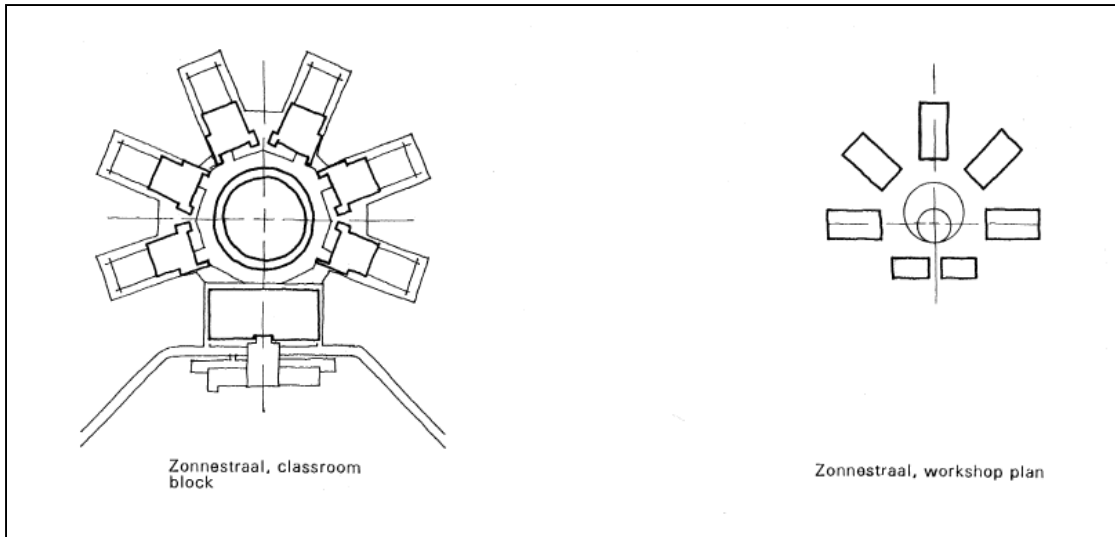


Figure 6.6. Zonnestraal School. Robert Vickery, "Bijvoet and Duiker," *Perspecta* 13/14 (1971): 145.

Because tuberculosis typically attacked adults in their early twenties, sanitariums introduced occupational therapy during the 1920s as part of the treatment to provide these patients with trade skills that would allow them to rejoin the workforce after their recovery. Built between 1921 and 1934, the architects designed the Zonnestraal School (see Fig. 6.6) as a sunburst, much like the plan of the sanitarium.⁴ The five occupational therapy workshops and the exercise room radiated away from a central courtyard. As with the design of the ward buildings, radiating wings enabled ventilation and natural light. At Zonnestraal, the male-only patients learned carpentry, forging, and metalworking. The sanitarium also required patients to maintain the campus, painting steel window frames and landscape the grounds. The patients also managed a nursery, apiary, and pig farm. An open-air theatre, canteen, and kiosk provided entertainment to the isolated men, while the garden allowed them to grow their own food. Physicians claimed these activities not only stimulated patients' minds and prevented the

patients from becoming restless or depressed, but also provided exercise for semi-ambulant and ambulant patients.

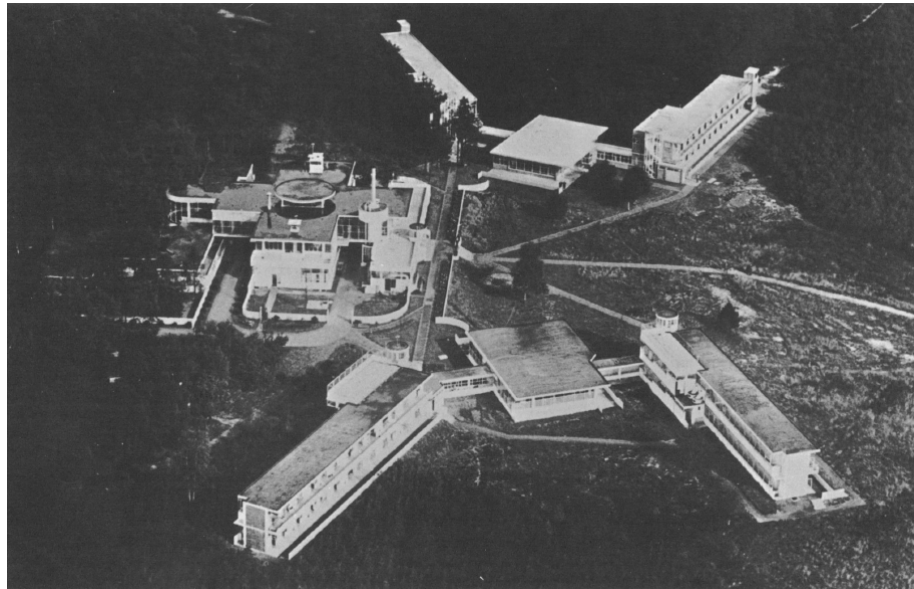


Figure 6.7. Aerial view of Zonnestraal Sanitarium. Robert Vickery, “Bijvoet and Duiker,” *Perspecta* 13/14 (1971): 145.

After World War II, the replacement of open-air treatment with chemotherapy led to the decline of Zonnestraal Sanitarium. In 1957, the sanitarium became a general hospital and several alterations to Duiker’s original design accommodated its new use.⁵ Renewed interest in the origins of modern architecture led to its rediscovery in the 1960s, and architectural critics and historians praised it as a monument to modernism. In 1982, the Dutch government commissioned Henket and de Jonge to create a conservation plan for the abandoned site, hoping public recognition would view it as a preservation prototype.⁶ In 1995, the World Heritage Fund designated the sanitarium as a historic landmark for its contributions to the modern architectural movement of the early twentieth century.⁷

Though Zonnestraal was the first sanitarium to embody the principles of modern architecture, architect Alvar Aalto’s Paimio Sanitarium in Finland set a new precedent for

modern hospital design. A leading modernist architect of the twentieth century, Aalto visited Zonnestraal Sanitarium in the summer of 1928 and was inspired by Duiker and Bijvoet's design.⁸ Much like the Dutch architects, Aalto embraced the clean, straight lines of modern architecture and utilized many of the same materials to create his much larger Paimio Sanitarium in 1929.

Believing that the hospital was an "instrument of healing," Aalto was sensitive to the needs of the building's occupants in his design.⁹ After receiving the commission for the sanitarium, Aalto spent several months in a hospital as a patient, which allowed him to study hospital functions, operations, and design. This influenced his vision for Paimio Sanitarium, and the architect designed private dormitories to be viewed from a horizontal position, rather than a vertical one. The architect studied the treatment of tuberculosis, patient routines and attitudes



Figure 6.8. Paimio Sanitarium. William H. Jordy, "PSFS: Its Development and Its Significance in Modern Architecture," *Journal of the Society of Architectural Historians* 21, no. 2 (May 1962):82

towards sanitariums, and worked with doctors and patients to better understand their needs. While this may seem customary today, most architects of the early twentieth century did not welcome feedback nor did they make any effort to accommodate the needs of building users.

The design for Paimio Sanitarium supported the fresh air treatment, but also accommodated the needs of consumptive patients and medical staff. Much like other

sanitariums, the hospital complex contained communal spaces such as dining halls, day rooms, and libraries. Hospital and semi-ambulant patients were organized into wards that contained nurses' stations, storage rooms, and small dining halls. The plan also included medical and administrative offices, exam and operating rooms, and x-ray labs. Taking into consideration Finland's cold weather, Aalto also created a communal rest hall for patients that allowed them to take their daily cure indoors.

The final design of Aalto's masterpiece took the shape of a stark, modernist high-rise set against its wooded natural surroundings. Four wings connected by a central passage organized hospital functions (Fig. 6.9). Oriented south-southeast, the six-story patients' wing extended into the south-facing seven-story open-air wing and consisted of exposed slabs that created covered balconies. A third wing attached to the central building by a passageway on an east-west axis and enclosed a centralized entry courtyard between it and the main building to the south. The single-story heating plant and housekeeping wing connected to this center wing as well. As in the plan of Zonnestraal Sanitarium, radiating wings provided greater access to exterior views, fresh air, and sunlight. Detached from the main building, Aalto designed a fan-shaped sauna and two-story terrace houses for medical staff.

Similar to Duiker and Bijvoet's design, Aalto employed a concrete pillar frame structure (see Fig. 6.10). With the exception of the open-air wing that featured an exposed concrete structure, brick encased the hospital building. At the time of its construction, the seven-story pavilion was the largest monolithic concrete structure in Finland. It was also unique in that most designers avoided open-air spaces because of Finland's cold climate.¹⁰ Steel frame double-glazed windows, complete with cloth awnings on the central building for needed shade, filled the space between structural concrete pillars.

Visitors approached the site from the west, circling a looped driveway in the center courtyard formed by the six-story patients' wing and the central building. The main entrance was located in the passageway between these two wings, and visitors entered the sanitarium by walking through the canopy referred to as "Aalto's lung."¹¹ To the south, the passageway connected perpendicularly to a corridor connecting south-facing patients' quarters. The corridor continued around the northeast corner of the ward building and extended into the open-air wing. This floor plan was mimicked on all six levels. North of the passageway, a lower wing housed communal spaces, such as lounges and a dining hall as well as medical offices. The final two wings served as utility spaces, reserved for housekeeping and the heating plant.

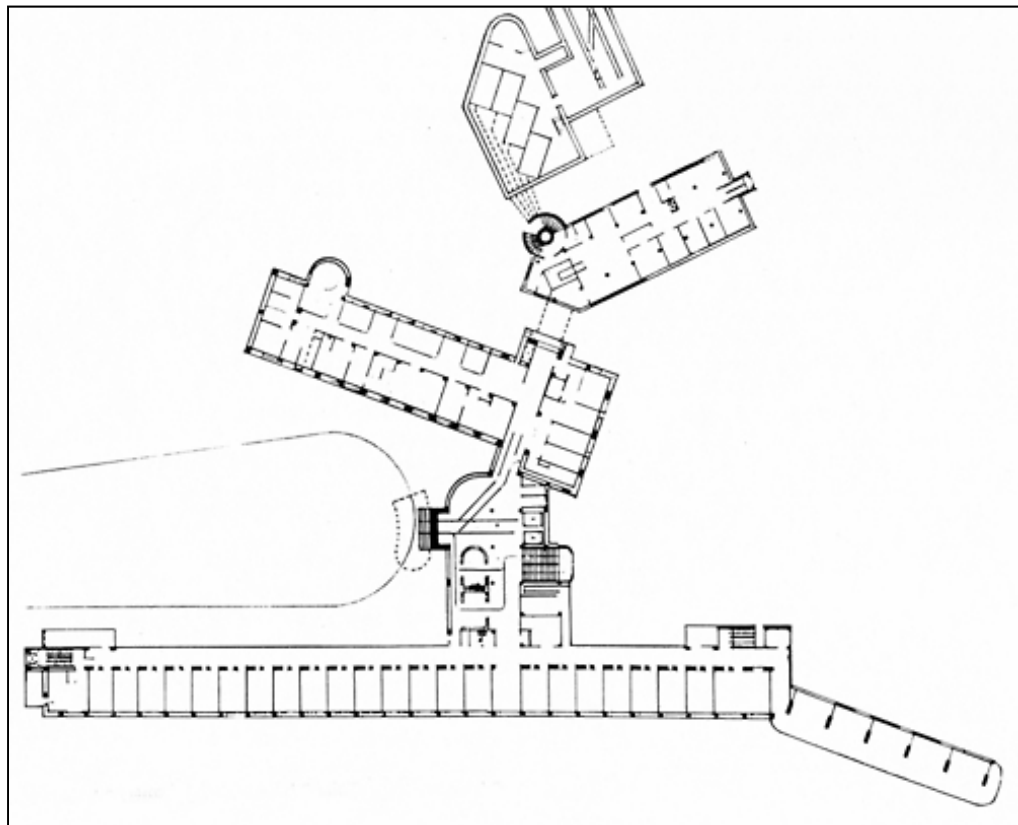


Figure 6.9. Plan for Paimio Sanitarium. Alexander Tzonis, ed. *The Architectural drawings of Alvar Aalto 1917-1939* (New York: Garland Publishing, Inc., 1994 :169.

Sensitive to both the psychological effects and durability of interior walls, Aalto carefully chose paint colors not only for their mood-enhancing abilities but also their resilience to dirt. In patients' dormitories, soft earth tones juxtaposed the darker tones of ceilings for a tranquil effect. To create a cheerful mood, communal spaces featured white, grey, and yellow walls. Since walls tend to become dirty at hand-level, Aalto chose to paint a grey strip along handrails to conceal dirt and staining. Yellow rubber flooring in corridors and in stairwells complemented the soothing color scheme.

The architect carefully designed the interior not only to exude tranquility, but also to ensure sanitation. Covered in yellow linoleum, floors sloped away from windows to avoid dust accumulation and cupboards were suspended from above the floors to facilitate cleaning beneath them. The corner windows of day rooms faced different directions to allow for varied sun exposure and airflow as well as to provide a greenhouse space for plants. Each patient also had his own washbasin in his shared dormitory.

Sympathizing with the needs of Paimio's patients, Aalto custom-designed the smallest details to ensure patient comfort. Having been annoyed himself by bright ceiling lights during his hospital stay, the architect chose to install ceiling lights behind patients' heads to limit glare. Special door pulls prevented sleeves from being caught by fitting the pivoting handle into a track.¹² Discovering from patients that their roommate's hand washing often woke them, Aalto created splash-proof and noiseless sinks. Sundecks on the end of each floor saved weak patients from a labor-intensive trip to the ground floor or roof deck in order to access nature for their daily cure.

Paimio Sanitarium's design was further enhanced by custom furnishings built to accommodate patient care. Apart from mobile tables, common in hospitals today but

revolutionary in the early twentieth century, Aalto's most famous furnishing was the Elastic Paimio chair. The architect developed its scroll-shape, with a 110-degree angle for the chair back, so as to ease breathing of the reclining consumptives.¹³ Moreover, the front curve of the armrest supported weak patients as they stood up from the chair. Unlike standard reclining cure chairs that featured a footrest to elevate the patients' feet away from drafts, Aalto's chair did not contain a footrest because Paimio residents took their cure in the communal rest hall indoors rather than outside, as was customary at most sanitariums. Aalto also created slats along the chair back to cool patients' necks as they reclined in his plywood seat. Working with technical director Otto Kornhonen of the Huonekalu ja Rakennustötehdas, a Turku furniture factory, the duo chose lacquered natural birch plywood, believing it would be "warmer and more user-friendly than steel."¹⁴ Moreover, plywood was easier to clean and disinfect than other materials and was also cheaper than hardwood.

Much like Zonnestraal Sanitarium, the increased use of chemotherapy treatment led to alterations of the Finish Paimio Sanitarium. No longer relying on the open air treatment, the sanitarium enclosed the open-air wing in 1963. In 1971, the sanitarium was converted to a hospital.¹⁵ The structure has undergone a number of alterations, leaving only a few communal spaces and a single wing untouched. Despite these renovations, however, Paimio Sanitarium remains a modernist monument and became a World Heritage Site in 2005.¹⁶

In sanitarium design, modern architecture created a greater connection between interior spaces and the curative abilities of the outdoors through glass curtain walls and French doors. The simple horizontality of modern design produced flat roofs that doubled as sun decks and terraces. New mass-produced materials such as steel and sheet glass reduced construction costs as well as provided cleaner, more durable surfaces that could withstand regular

disinfection. The lack of architectural ornamentation allowed for better sanitation as well, by preventing dust buildup. American sanitarium design adopted these European trends, as is evident in the Silvercrest Sanitarium in New Albany, Indiana.

In 1938, the Indiana General Assembly announced its plans to build the Southern Indiana Tuberculosis Hospital. In the heart of the U.S. tuberculosis “black belt,” the sanitarium provided much-needed public health care to the region’s many consumptives.¹⁷ The state accepted the Floyd County Tuberculosis Association’s (FCTA) proposal for a new state hospital to be located in New Albany due to the existing day camp that the association had established there in 1936 and the FCTA’s offer to donate the site to the state.¹⁸ Moreover, the site’s natural surroundings and hilly topography provided picturesque views and ensured proper drainage away from the sanitarium campus. The city provided access to water, sewage, gas, light, and power utilities. Located across the Ohio River from Louisville, New Albany had no shortage of railroads, including the New Albany and Salem Railroad, allowing for the transportation of consumptives and supplies to Silvercrest Sanitarium.



Figure 6.10. Silvercrest Hospital, New Albany, Indiana. Courtesy of New Albany Floyd County Public Library.

Designed by Indianapolis architects D.A. Bholen and Sons, the \$773,000 institution was a Public Works Administration project.¹⁹ The 115,000 square-foot main building contained individual patient rooms (rather than shared ward dormitories) that categorized patients by the severity of their illness.²⁰ Moreover, it contained many of the same spaces suggested by the 1921 *Notes on Sanitarium Construction*, including medical and surgical wards, administrative offices, as well as communal rooms and utility spaces. Dedicated on National Hospital Day in August 1940, the 150-bed tuberculosis sanitarium was one of two state-supported hospitals devoted entirely to tuberculosis research and treatment in Indiana.²¹

The five-and-one-half story Main Building faced northeast, overlooking the city of New Albany. As seen in Figure 6.10, the limestone central bay protruded to create a formalized entrance with a steel canopy above the lobby entry doors.

The remainder of the building was clad in light, tan brick with steel-frame double-hung windows. Providing space for patients taking the cure, sunrooms at the end of each floor faced northwest and southeast to maximize sun exposure (see Fig. 6.11). Wrapped in glass block, these rooms had groupings of double-hung steel-frame windows on the east and west elevations, with ribbon windows on the south elevation. The building had a T-shape plan with an adjacent, perpendicular three-and-one-half



Figure 6.11. Sunroom. Photo courtesy of Greg Sekula.

floor faced northwest and southeast to maximize sun exposure (see Fig. 6.11). Wrapped in glass block, these rooms had groupings of double-hung steel-frame windows on the east and west elevations, with ribbon windows on the south elevation. The building had a T-shape plan with an adjacent, perpendicular three-and-one-half

story wing to the west, similar the Main Building in style and materials. The sanitarium embodied the Art Moderne style, with its streamlined horizontality, curving bays along its northwest and southwest elevations, use of glass block and ribbon windows, and steel windows and doors.

The T-shaped plan provided greater exterior exposure that allowed for natural light and ventilation while providing space for sanitarium functions (see Fig. 6.12). The first level contained administrative offices for medical staff as well as an x-ray laboratory and dental office. Communal rooms, such as the patient and employee cafeteria, were on the first floor, while utility spaces, such as the kitchen, dietary department, and laundry rooms, were on the lower level. The floor plans of the second through fifth levels contained patient rooms and small patient dining halls, reserved for critically ill patients. Nurses' stations and offices as well as linen closets were conveniently located close to patients' rooms. Much like Aalto's Paimio Sanitarium, sun rooms at the end of each floor ensured that weak patients did not have to travel great distances to gain access to natural light and fresh air. Occupational therapy rooms, such as the sewing room, were also located in the main building. In 1964, the sanitarium commissioned Walker, Applegate, Oakes and Ritz to design a Protestant chapel in a first floor sunroom. According to Silvercrest Sanitarium's Dr. Geyer, religion allowed patients a mental escape from their hospital surroundings.²² On the third floor, clinical and surgical departments provided care for patients.



Figure 6.13. Photo of physician's cottages courtesy of Greg Sekula.



Figure 6.14. Photo of Nurses' Home courtesy of Greg Sekula.



Figure 6.15. Photo of Hotel courtesy of Greg Sekula.

As part of the overall campus plan, additional pavilions provided staff housing and accommodated institutional functions. North of the hospital, the original design for the sanitarium included a three-bedroom superintendent's house. In 1952, the sanitarium commissioned New Albany architects Hawkins and Walker to design two three-bedroom residences for the sanitarium doctors (Fig. 6.13) northwest of the Main Building. They also created plans for the Nurses' Home (Fig. 6.14) directly east of the Main Building that contained fifteen individual rooms.²³ The same year, the institution built five "hotels" on a north-south axis northwest of the Main Building. Each hotel (see Fig. 6.15) contained four two-bedroom units, organized around a shared living room, kitchen, and bath. Used by sanitarium staff, these structures featured an exterior porch as well as a carport. Despite

the sanitarium constructing these buildings nearly a decade after the initial opening of Silvercrest Sanitarium, they mimicked the sanitarium's Art Moderne design.

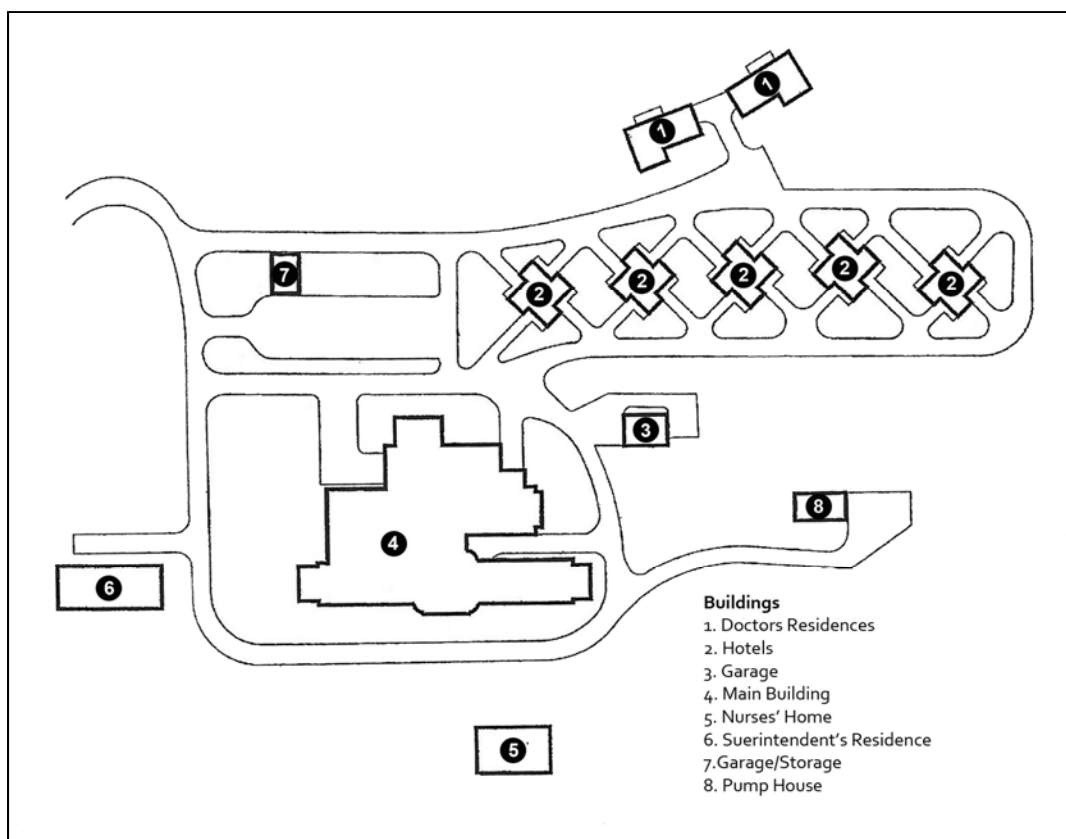


Figure 6.16. Site plan of Silvercrest Sanitarium, courtesy of Indiana Landmarks-Southern Regional Office.

As with its like its European predecessors, Silvercrest Sanitarium's role as a tuberculosis hospital became obsolete as drug treatment replaced the fresh-air cure. According to the sanitarium's 1958 annual report, the institution lamented that there was not enough state funding to help offset the costs of the expensive antibiotics used to treat tuberculosis.²⁴ Because of the limited availability of funds to purchase drugs, Silvercrest continued to rely on the fresh-air cure and traditional surgical treatments to cure consumptives. By the 1970s, however, the development of tuberculosis clinics, providing short-term care and treatment to consumptives, replaced the need for large institutions such as Silvercrest. The Indiana State Tuberculosis Hospital closed in 1972.²⁵ From 1974 through 2006, the Silvercrest Children's

Development Center used the former sanitarium to provide short-term care for children with multiple handicaps. In 2007, Indiana Landmarks partnered with local preservation groups to save the campus from demolition and found a developer to reclaim the site.²⁶ Currently, plans are underway to convert the former tuberculosis sanitarium into elderly housing.

From 1926 through the mid-twentieth century, sanitariums designed in the modern style incorporated mass-produced materials such as steel, sheet glass, and reinforced concrete that allowed architects to produce well-lit and ventilated structures that aided in the overall treatment of consumption. Duiker and Bijvoet's Zonnestraal Sanitarium in the Netherlands set a precedent in modern hospital design that Aalto further expressed in his design of Paimio Sanitarium in Finland. Careful planning allowed these European architects to engineer overhanging eaves that doubled as balconies and terraces. Moreover, the radiating wings of these institutions created greater exterior exposure that permitted the use of large banks of windows. The strong horizontality of these first modern European sanitariums influenced the design of the 1938 Silvercrest Sanitarium. These institutions featured steel windows, linoleum flooring, and ceramics that met the sanitary requirements of treating contagious disease. Modern architecture lent itself to sanitarium design in Europe and the United States as it shared the core values of tuberculosis treatment: fresh air, sunlight, and sanitation.

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1. "Estate Sunburst," Landgoed Zonnestraal, <http://translate.google.com/translate?hl=en&sl=nl&u=http://www.zonnestraal.nl/&ei=5Y0QT5bzOO6rsALLz-XdAw&sa=X&oi=translate&ct=result&resnum=7&sqi=2&ved=0CEIQ7gEwBg&prev=/search%3Fq%3Dzonnestraal%2Bsanatorium%26hl%3Den%26biw%3D1441%26bih%3D687%26prmd%3Dimvns> (accessed 16 Jan. 2011).
 2. Ibid.

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3. Wessel de Jonge, "'Zonnestraal': Restoration of a transitory architecture. Concept, planning, and realization in the context of its authenticity," (paper for the Proceedings of the Seventh International DOCOMOMO Technology Seminar, Vyborg, Russia, 18-19 Sept. 2003): 3.
 4. Robert Vicery, "Bijvoet and Duiker," *Perspecta* 13/14 (1971): 144.
 5. De Jonge, 5.
 6. "Zonnestraal Sanatorium," World Monuments Fund, <http://www.wmf.org/node/2088> (accessed 16 Jan. 2011).
 7. Ibid.
 8. Eija Rauske, "Paimio Sanatorium-Sanatorium in Paimio," in *Alvar Aalto in Seven Buildings: Interpretations of an Architect's Work* (Helsinki, Finland: Museum of Finnish Architecture and Contributors, 1998): 13.
 9. Juhani Pallasmaa and Tomoko Sato, eds., *Alvar Aalto through the eyes of Shigeru Ban* (London: Black Dog Publishing Limited, 2007): 109.
 10. Rauske, 12.
 11. Ibid.
 12. Pallasmaa and Sato, 116.
 13. Margaret Campbell, "From Cure Chair to Chase Lounge: Medical Treatment and the Form of the Modern Recliner," *Journal of Design Theory* 22, no. 4 (1999): 336.
 14. Pallasmaa and Sato, 200.
 15. Diana Anderson, "Humanizing the Hospital: Design Lessons from a Finnish Sanatorium," *CMAJ* 182, no. 11 (10 Aug. 2010): E537.
 16. Ibid.
 17. The "black belt" spanned southern Illinois, Indiana, and Ohio and included most of Kentucky and Tennessee.
 18. "Mary's World;" "Plans Under Way for Sanatorium," *New Albany Tribune*, 9 September 1938, in "Hospitals—Silvercrest" Clippings Folder, New Albany Floyd County Public Library, New Albany, IN.
 19. Ibid.
 20. Ibid.
 21. The other was the Indiana State Tuberculosis Hospital in Rockville. Silvercrest Sanitarium, *Annual Report Southern Indiana Tuberculosis Hospital July 1, 1957 to June 30, 1958* (New Albany, 1958) in "Annual Report Southern Indiana Tuberculosis Hospital July 1, 1957 to June 30, 1958" Clippings Folder, Indiana State Library, Indianapolis, IN; "Mary's World."
 22. Betty M. Sharp, "Plan for Protestant Chapel at Silvercrest is Advancing," *Courier Journal*, 21 March 1964, in "Hospitals—Silvercrest" Clippings Folder, New Albany Floyd County Public Library, New Albany, IN.; Silvercrest Sanitarium, *Annual Report Southern Indiana Tuberculosis Hospital July 1, 1964 to June 30, 1965* (New Albany, 1958) in "Annual Report Southern Indiana Tuberculosis Hospital July 1, 1957 to June 30, 1958" Clippings Folder, Indiana State Library, Indianapolis, IN.
 23. "\$200,000 Construction Program Due to Begin at Silvercrest Soon," *Courier Journal and Times*, 2 Jan. 1952, in "Hospitals—Silvercrest" Clippings Folder, New Albany Floyd County Public Library, New Albany, IN.
 24. *Annual Report Southern Indiana Tuberculosis Hospital July 1, 1957 to June 30, 1958*.
 25. "To Begin Shipping Out Silvercrest Patients," *Courier Journal*, 3 April 1972, in "Hospitals—Silvercrest" Clippings Folder, New Albany Floyd County Public Library, New Albany, IN.

26. "Critical Condition," *Indiana Preservationist* (April 2007), in "Silvercrest" Clippings Folder, Indiana Landmarks-Southern Regional Office, Jeffersonville, IN.

Chapter 7: Conclusion

Late-nineteenth century social reformers, anti-tuberculosis associations, and state laws promoted the development of tuberculosis sanitariums intended to isolate consumptives and prevent the spread of infectious disease. Borrowing from European health resorts, prison architecture, and Kirkbride insane asylums, the first U.S. sanitariums favored large porches and windows to expose patients to natural light and ventilation. Evident in the design of Duiker's Zonnestraal Sanatorium in 1928 and Aalto's Paimio Sanatorium in 1929, modern architectural design enabled sanitariums to provide ample sunlight and fresh air to their patients. The lack of architectural ornamentation and the incorporation of hygienic materials, such as metals and plastics, met sanitation demands. Nineteenth century European health spa and sanitarium design largely inspired American sanitarium architecture. Then in the U.S., tuberculosis hospitals, such as Silvercrest Sanitarium in New Albany, Indiana, adopted progressive architectural styles, such as Art Moderne, that embodied the values of modern architecture with its strong horizontality, use of glass walls, and streamlined ornamentation.

Though the European health spa culture was not wholly adopted in the United States, American sanitariums did adopt a number of European sanitarium features in the design of tuberculosis hospitals. Communal rooms such as day rooms, billiards rooms, and libraries provided space for patients to interact. Sun rooms, porches, and terraces lined with wooden and metal cure chairs provided a communal experience for those taking the cure. Patients and staff gathered regularly in the sanitarium dining room as well. Many sanitariums also had cafeterias and formal dining halls for guests. Private balconies adjacent to patients' rooms and wards

gave the institution the look of European health spas, as did the Mediterranean-like rooftop decks first used in Davos, Switzerland.

Unlike health spas, however, tuberculosis sanitariums provided health and medical care. Attempting to prevent the spread of infectious diseases, sanitariums avoided dust-collecting upholstered furnishings and carpets, common in health spas, and instead provided wood and metal-frame furnishings for their durability and sanitary qualities. While health spas offered recreational activities to entertain their guests, European and American tuberculosis sanitariums provided occupational therapy to build professional skills that allowed patients to rejoin the workforce upon their release. Baths and pools were popular at health spas for their healing abilities; however, these were uncommon at tuberculosis sanitariums because standing water could collect tuberculosis germs. Thus, physicians recommended showers over baths to their patients.

By 1925, the efforts of state and local anti-tuberculosis associations and the national sanatorium movement had led to the construction of 466 public and private tuberculosis sanitariums in the United States.¹ Borrowing from radial prison plans and Kirkbride's asylum organization, these institutions categorized consumptives into three groups: critically ill patients, semi-ambulant patients, and recovering ambulant patients. Isolating the diseased, these public tuberculosis sanitariums treated consumption with the fresh air cure and hydrotherapy.

These first sanitariums maximized natural light and ventilation, which physicians believed improved the health of the consumptive, while ridding interior spaces of germs. As seen in Figure 7.1, the main building of the sanitarium often featured radiating wings that enabled the progression of patients from one ward to the next as their health improved. Because treatment required patients to spend up to eleven hours daily taking the cure, most

tuberculosis sanitariums featured expansive porches, covered balconies, and terraces that could accommodate bulky cure chairs. Semi-ambulant and ambulant patients resided in cure cottages that had evolved from early nineteenth century garden structures and participated in occupational therapy that sanitarium staff held in screened, open-air pavilions. Even the design of staff housing reflected this outdoor lifestyle.

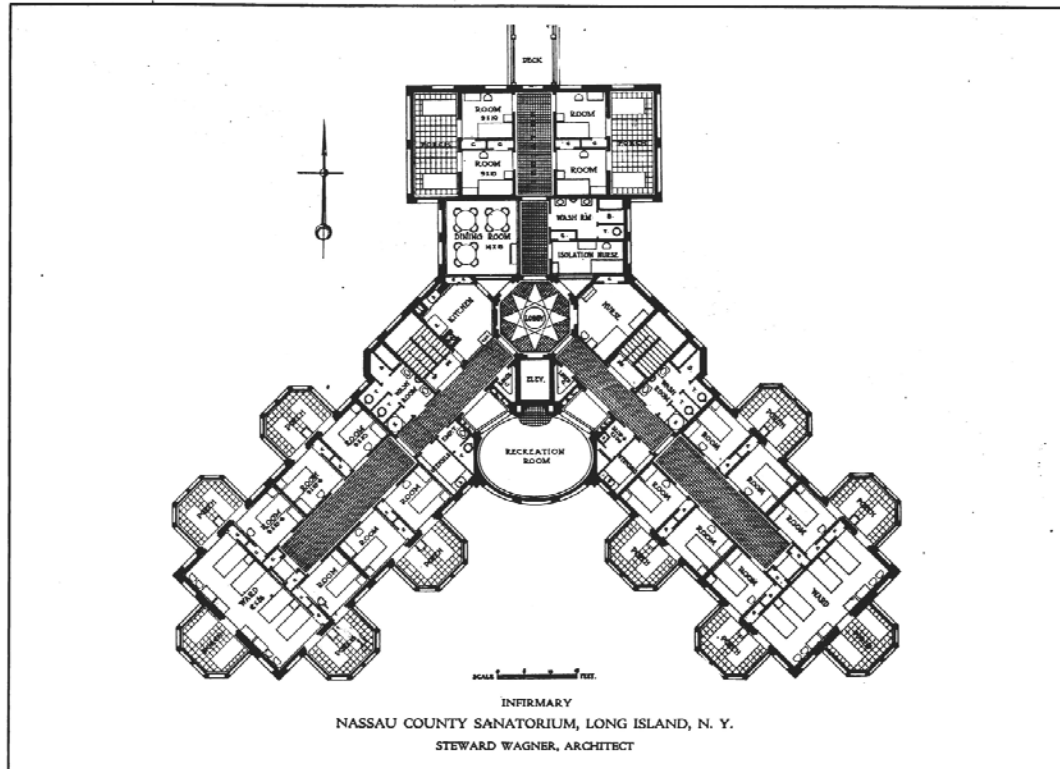


Figure 7.1. Suggested design for sanitarium ward wings. T.B. Kidner. "Sanatoria for Tuberculosis Cases." *The Architectural Review*. (January 1921): 20.

Sanitarium construction valued the sanitation quality of interior finishes. Though resorts such as Kneipp Springs Sanitarium (1905) featured terrazzo and wood flooring as well as ceramic tile, and porcelain bath fixtures, later sanitariums utilized twentieth century materials such as linoleum tile, formica, concrete and steel. Plaster was common in both the construction

of health spas and sanitariums as it could be easily scrubbed down and disinfected. As sanitarium architecture evolved, architectural ornamentation became progressively less decorative and reflected modernist tastes by the 1930s.

Though tuberculosis sanitarium design shared many of the same principles as the modern architecture movement, modern architecture had a significant impact on sanitarium design beginning in the 1920s. Day lighting and natural ventilation sanitized interior spaces and inspired the creation of glass walls, large windows, and doors opening onto wide outdoor patios. The need to avoid dust accumulation restricted ornamental architectural moldings and influenced the sleek, straight lines of modern design. The modernists popularized the use of transitional indoor-outdoor spaces that sanitariums had established as a necessary part of the structure being an “instrument in healing” tuberculosis.

With the introduction of triple-drug chemotherapy, the need for tuberculosis sanitariums greatly diminished after World War II. In 1954, there were 669 private (non-federal) tuberculosis

sanatoriums in the United States. By 1967, this number declined to 348 (Table 7.1). Prior to the war, sanitarium patients spent

Reasons for closure or conversion	Number of reasons reported ^a		Percent distribution	
	Total	Primary reasons	Total	Primary reasons
Total	438	218	100.0	100.0
Low tuberculosis occupancy rate	172	151	39.3	69.3
Difficulties of maintaining a qualified staff	39	4	8.9	1.8
Withdrawal of or inadequate financial support	34	6	7.8	2.8
Increased cost of operation	68	7	15.5	3.2
Unsatisfactory physical condition of facility	29	3	6.6	1.4
Failure to meet licensure standards	15	3	3.4	1.4
The availability of tuberculosis facilities elsewhere	45	30	10.3	13.8
All other reasons	36	14	8.2	6.4

Table 7.1. Reasons for closure of non-federal tuberculosis hospitals, 1954-1961. Anthony M. Lowell, “Tuberculosis Morbidity and Mortality and Its Control” in *Tuberculosis* (Cambridge, MA: Harvard University Press, 1969): 37.

months and, at times, years at these institutions with only the fresh air, sunlight, and prescribed diets to cure their illness. During the post-World War II decades, the increased use of surgical treatments as well as antibiotics decreased the length of the cure. By 1960, the average hospital stay was only six to eight months and greatly diminished the patient loads of these institutions. The expense of operating and maintaining these institutions burdened the counties they were built in, and the reduced patient load led to budgetary cuts in the 1950s and 1960s.

Coupled with drug therapy, the growing number of tuberculosis clinics and health departments following World War II also limited the spread of the White Plague. The visiting nurse program, x-ray screenings, and health lectures on sanitation improved personal hygiene, and informed the public of Koch's germ theory. Vaccinations also prevented others from contracting the disease; as a result larger institutions admitted fewer patients. As the patient load continued to diminish with the decline of the White Plague, hospitals and clinics were able to assume treatment of consumptives, prescribing drugs in place of the fresh-air cure.

As the White Plague continued to recede, the government withdrew financial support, which resulted in the closure of many state-funded sanitariums. Low occupancy rates also contributed to the closing of tuberculosis sanitariums. The costly maintenance and upkeep of the underutilized buildings and increased operating costs further accelerated the decline of the sanitarium movement. Finally, the outdated facilities prevented hospital accreditation and added to their downfall. By the 1970s, most U.S. tuberculosis sanitariums had closed.

1. Anthony M. Lowell, "Tuberculosis Morbidity and Mortality and Its Control," in *Tuberculosis* (Cambridge, MA: Harvard University Press, 1969): 34.

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