



Bringing Light to the World: John Harvey Kellogg and Transatlantic Light Therapy

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Abstract

As the late nineteenth century gave way to the twentieth, the world was embracing a modern marvel—the incandescent light bulb. Light by fire was quickly becoming passé, and everyone wanted the new symbol of technology and progress in their homes and workplaces. But one man saw the light bulb from a very different perspective. Dr. John Harvey Kellogg, most noted for his invention of cornflake cereal, was an American health reformer who always strived to be on the cutting edge of technology. Already using electricity in various ways at his world-famous Battle Creek Sanitarium in Michigan, Kellogg saw the new electric light bulb as a means to better health through light therapy. Light therapy, or phototherapy as Kellogg referred to it, was nothing new. Doctors in Europe, such as Auguste Rollier in Switzerland (the Sun Doctor) and Niels Ryberg Finsen in Denmark, were already running successful light therapy programs in their clinics by the time Kellogg came on the scene. Regularly positioning himself as a node in a transatlantic network of health reform, Kellogg, upon visiting both institutions to examine their practices, modified and implemented their programs through his Sanitarium. One of the most noted inventions to come from this transatlantic exchange was Kellogg’s Light Cabinet or the “Light Bath.” Put on display at the 1893 World’s Fair in Chicago, it soon attracted the attention of foreign investors and doctors, and the German *Kelloggische Lichtbad* was soon found for sale across Germany and Europe. Kellogg’s practice of intercultural transfer led to a full circle of transatlantic exchange as an idea originally from Europe, after modification in America, was exported to its place of origin as something new.

Keywords Transatlantic · Intercultural transfer · Transnational · Cultural exchange · John Harvey Kellogg · Health reform · Light therapy · Phototherapy · Heliotherapy · Infrared sauna · Light bath

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Introduction

In the present-day world of consumerist food products, the name Kellogg conjures a vast array of cereal and foodstuffs designed to provide nutrition and “healthy” alternatives to meat and fat-heavy breakfasts. Yet, John Harvey Kellogg, the chief mover of health reform in the United States whose corn flake cereal and meatless protein substitutes pioneered the now international health-food market, is largely overshadowed by his own food legacy. To the larger public, outside of academic circles and health reform history enthusiasts, Kellogg is little more than a brand name on a cereal box. Perhaps, then, it is of no surprise that many of Kellogg’s other health reform practices receive little to no attention, and are, in many cases, not even considered in basic studies of his work. Such is the case of light therapy. While receiving a brief recognition in a single previous study, Kellogg’s foray into light therapy has never received a full analysis, nor has light therapy in general received much in the way of historical attention.¹ And while the impact of light therapy is lasting in American and European society and continues to be used for therapeutic purposes today, not much has been written on it in the way of historical scholarship. There are plenty of medical books relating to the methods and implementations of the therapeutic uses of light, along with such topics as radiology and surgical lasers, but there are very few practitioners who are aware of the rich history of transfers that were the foundation of modern medical uses of light.

Delving into a study of Kellogg’s health reform work presents many of the same challenges. Though Kellogg’s achievements were numerous and groundbreaking, only three major works on Kellogg have been published in the last fifty years.² In 1970, Richard W. Schwarz wrote, *John Harvey Kellogg, M.D.*, the first full biography of Kellogg, and for the last five decades, Schwarz possessed the monopoly on Kellogg’s life with few deviations from his original text. After over four decades of academic silence, Brian C. Wilson published *Dr. John Harvey Kellogg and the Religion of Biologic Living*. Wilson’s work was not meant to be an exhaustive biography of Kellogg, nor was it so much concerned with all aspects of his health reform. As an historian of religion, Wilson saw Kellogg “as an important example of an overlooked category of theological discourse: the doctor as theologian.”³ Wilson’s work sought to emphasize the religious context of Kellogg’s health reform and exemplified the underlying spiritual foundations of his work. Medical historian Howard

¹ See Howard Markel, *The Kelloggs: The Battling Brothers of Battle Creek* (New York: Pantheon Books, 18), 187. Works concerning the history of light therapy are few and far between, even within the more general context of health reform history. The few sources of secondary literature available (one being in German) are considered later in the text.

² There was an earlier work entitled *Cornflake Crusade* published in 1957. Though this was more an overall narrative of health reform (predominantly of health foods), the author, Gerald Carson, centered it around Kellogg. The text is meant to be less a historical work and more a popular narrative. As Carson noted, his work was intended for pleasurable reading and not an academic audience. See, Gerald Carson, *Cornflake Crusade* (New York: Rinehart & Company, Inc., 7).

³ Brian C. Wilson, *Dr. John Harvey Kellogg and the Religion of Biologic Living* (Bloomington, Indiana: Indiana University Press, 26), xiii.



Markel published the most recent work on Kellogg, *The Kelloggs: The Battling Brothers of Battle Creek*, in 2017. Originally meant as an exposé of the relationship between the Kellogg brothers (John Harvey and Will Keith) and their feud over their cornflake invention, Markel deviated somewhat to cover more aspects of John Harvey's health reform principles.

Both of these contemporary studies are inherently biographic in their approaches, yet this is not surprising given both authors focus on Kellogg's life and work as a whole. Indeed, Kellogg's life, his conflicts, his personality, and his inventions (especially his cornflakes) make for an excellent story. But a constant problem has developed when considering the history of Kellogg within the larger theme of health reform—the continual contextual interpretation of Kellogg as an American character in an American story of American ideas.

My work removes Kellogg from this limited context and places him within a transatlantic perspective. In placing Kellogg within the context of transatlantic history, we may more accurately understand the scope and function of his health reform principles.⁴ More importantly, Kellogg's life and work are presented in a more suitable format. Portraying Kellogg as an American character in an American story, perpetuating American ideas, simply ignores the blatant connections and influences of Europe upon him and the wider topic of health reform. With his network of health reform spanning the transatlantic world—and with intentions to expand to a global health movement—Kellogg can no longer be solely located within an American milieu.

Light therapy, and Kellogg's attempts to utilize its various forms and functions, serves as an excellent topic in which to recontextualize him within the transatlantic networks of his day, and Kellogg's facilitation of transfers in ideas and technology between Europe and America makes him a characteristic example of an agent of intercultural transfer. Intercultural transfer is predicated on the recognition that cultural ideas and phenomena are the result of constant cultural contact and borrowing in the form of transfer, and is an excellent tool for writing in the transatlantic context, as it provides a method for documenting the connections between different cultures and rejects the national paradigm so often found in historical narratives.⁵ These transfers do not occur at the level of the state or nation, and instead depend on individual actors. These actors are termed *agents of transfer*, and take the form of professionals and the leisure travelling class.

This study of Kellogg's work in the area of light therapy thus serves two purposes. The first is to demonstrate Kellogg as an agent of transfer and to highlight the various light therapy techniques and technologies that he transferred between

⁴ For examples of transatlantic contexts see Thomas Bender, *A Nation Among Nations: America's Place in World History* (New York: Hill and Wang, 3); Ian Tyrrell, *Transnational Nation: United States History in Global Perspective Since 1789* (New York: Palgrave Macmillan, 25); and Colin G. Calloway, Gerd Gemünden, and Susanne Zantop, eds., *Germans and Indians: Fantasies, Encounters, Projections* (Lincoln, Nebraska: University of Nebraska Press, 6).

⁵ For an in-depth study on the methodology of Intercultural Transfer see Thomas Adam, *Intercultural Transfers and the Making of the Modern World: Sources and Contexts* (New York: Palgrave Macmillan, 1).



Europe and the United States. I will also focus on Kellogg's use of infrared light technology and trace its transfer back to Europe in the form of a light bath. Second, I aim to elucidate the history of light therapy as an understudied phenomenon in transatlantic health reform, and to call more attention to this much-overlooked area of medicine.⁶

An ancient yet modern practice

The ancient Egyptian *Book of the Dead* begins with a singular praise of the sun god: "Adoration of Rā when riseth he in horizon eastern of heaven....Thou risest, thou shinest....Ascribe praise to Rā, the lord of heaven, the Prince, Life, Strength, Health, creator of the Gods....The gods [are] rejoicing [when] they see Rā in his rising; his beams flood with light the countries. Advanceth the majesty of this god venerable."⁷ The cult of the sun is perhaps the oldest and ubiquitous of all recorded religions. Civilizations from antiquity, such as Sumer and Egypt, venerated the giver and mover of life, as did later cultures such as the Incas and Aztecs. What is interesting in the Egyptian context is the secondary name of Rā; along with being "Life" and "Strength," Rā is also literally called "Health." Depictions of Rā as the sun-disc (Aten) also personify sunrays as hands of blessing and healing, with some holding ankhs (the symbol of life) out to supplicants.⁸ The use of the sun as a healer, both physically and symbolically, is therefore ancient in its inception.

The scientific use of light to heal the body in modern times, however, was predominantly an invention of nineteenth-century health reformers; and while the religion of the ancient Egyptians was far from most of the minds of practitioners of light therapy, they were nevertheless participating in an ancient practice of looking to the sun for health. In his 1910 work, *Light Therapeutics*, Kellogg summed up the short history of light therapy (also called phototherapy or heliotherapy) yet also recognized its ancient roots:

Heliotherapy, or the use of sunlight as a curative means, is one of the oldest of natural healing agents....It is only within the last twenty years, however, that the physiological and therapeutic effects of light derived from natural and

⁶ The recent pandemic has restarted discussions among many in the medical community on the use of light therapy as a treatment for viral and bacterial infections. For an example of some of these studies, see Chukuka Samuel Enwemeka, Violet Vakunseh Bumah, and Daniela Santos Masson-Meyers, "Light as a Potential Treatment for Pandemic Coronavirus Infections: A Perspective" *Journal of Photochemistry & Photobiology, B: Biology*, 207, no. 111891 (June 8). Online Access through U.S. National Library of Medicine and the National Institutes of Health: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7194064/>.

⁷ E. A. Wallis Budge, trans., *The Egyptian Book of the Dead: The Papyrus of Ani in the British Museum* (5; repr., New York: Dover Publications, Inc., 1967) 1–3.

⁸ For some depictions of the representation of sunrays in ancient Egyptian art, specifically during the reign of Pharaoh Akhenaten, see Lorna Oakes & Lucia Gahlin, *Ancient Egypt: An Illustrated Reference to the Myths, Religions, Pyramids and Temples of the Land of the Pharaohs* (London: Hermes House, 20), 380–381.



artificial sources have been made the subject of careful scientific study. Within this period numerous investigators have devoted themselves to the study of this subject, and the extended researches [sic] that have been made have resulted in the development of a new class of therapeutic methods, principles and measures which constitute the science of phototherapy.⁹

This new method of treating the sick always seemed to balance on the edge of scientific medicine and natural-healing faddism. Many of the inventions practitioners of light therapy created were ridiculed while others gained acceptance and are still used today—radiation therapy for cancer and surgical lasers for eye surgery came from the same movement as tanning beds and colored-light therapy. New understandings in the physics of light, along with the harnessing of electricity and artificial light, allowed for these new inventions, and Kellogg and others were quick to utilize the latest technology in light production.

Kellogg's exploration and implementation of light therapy is a prime example of transatlantic intercultural transfer. Not only did Kellogg study the publications of European practitioners, he also spent time at their clinics studying their ideas and observing their methods firsthand. By observing the techniques of the physicians Kellogg visited, along with his own methods, we can recreate the transfers of light therapy principles across the Atlantic. To do this I have selected three European individuals with whom Kellogg studied: Leopold Freund (1868–1943), Auguste Rollier (1874–1954), and Niels Ryberg Finsen (1860–1904). These three physicians represent distinct areas within light therapy—X-ray therapy and radiotherapy, heliotherapy, and actinotherapy (artificial-light therapy), respectively, and thus provide a broad scope for better understanding transatlantic light therapy. In order to facilitate a clearer narrative of transfer I will first discuss the three European medical doctors and their interactions with Kellogg. After this, I will explore Kellogg's experimentation in infrared light and its transfer back to Europe.

The use of light therapy in health reform was relatively modern; and while the use of the sun for healing purposes was ancient in context, there was little continuity between ancient practices and nineteenth- and twentieth-century light therapy. The beginnings of European light therapy date at least to the eighteenth century. Auguste Rollier noted that while “heliotherapy received a certain amount of attention” in “classical times,” it was not until the late eighteenth century that it in any way was revived.¹⁰

Thus, the sources for light therapy are necessarily limited to a few historical monographs and a plethora of medical manuals from the nineteenth and twentieth centuries. But this does not limit my study. The medical manuals on the light therapy of Freund, Rollier, and Finsen, combined with Kellogg's, provide more than enough evidence for the narrative of transfer between them, especially the introductions to these works, which provide personal information about the authors; such as their

⁹ J. H. Kellogg, *Light Therapeutics: A Practical Manual of Phototherapy for the Student and the Practitioner* (Battle Creek, Michigan: The Good Health Publishing Co., 16), 9.

¹⁰ A. Rollier, *Heliotherapy* (London: Henry Frowde and Hodder & Stoughton, 22), 1.



motivations, education, and personal experiences. Given that the major sources of light therapy are medical manuals and journals, discussion of the transfers of light therapy practices are bound to be technical in nature. With that in mind, we need to review the terminology surrounding the light spectrum as it was utilized in light therapy.

The light spectrum consists of wavelengths of light rays that range from long to short. These wavelengths are more easily understood in the context of visible light, which is perceivable to human eyes. The visible-light spectrum ranges from the longest wavelengths of light (red light) to the shortest wavelengths (violet light). For the moment, let us focus on the red-light end of the spectrum. Light rays with wavelengths longer than visible red light are ultra-red lights and are not visible to the human eye. These include infrared (IR) light, microwaves, radar, radio waves, and broadcast bands. At the violet-light end of the spectrum, light rays with shorter wavelengths than visible violet light are in the ultra-violet light group and are also not visible to the human eye. These include ultraviolet (UV) light, X-rays, gamma rays, and cosmic rays.

Health reformers isolated light rays in the ultra-violet end of the light spectrum as having the most bactericidal effects. Radiotherapy and X-ray therapy utilized these rays as did actinotherapy in that it was the artificial recreation of ultraviolet light. These ultra-violet light rays were termed chemical rays or actinic rays. Kellogg's experiments in infrared light utilized the ultra-red end of the spectrum. He determined that infrared light rays (or as he called them, thermic or heat rays) were excellent for therapeutic uses since they could penetrate the body deeper than any other light. Heliotherapy is more complex as the sun encompasses the entirety of the light spectrum. Sunlight could be utilized for the bacteria-killing ultraviolet light in its rays and could also offer soothing heat from the infrared light that penetrated earth's atmosphere more than shorter wavelengths of light.

While the language of light therapy is necessarily technical, Kellogg and his contemporaries translated these scientific ideas into cultural phenomena. As a result, light therapy created new ideas about sunbathing, lighting in homes and public spaces, and even natural light in architecture. Our first narrative of transfer, however, begins where much of Kellogg's education in Europe took place: Vienna.

Freund, Radiotherapie, and Kellogg

The events of history are not often kind to individual figures and their work, and Leopold Freund was certainly one of the victims of historical circumstances. Not much is known about Freund or his work outside of academia and medicine (specifically the field of radiology), and even those sources are more likely to be German or Austrian in origin. As a result, one of the sole biographical sources concerning Freund's life was a dissertation at the University of Vienna in 1980, in which its author, Judith Bauer-Merinsky, focused on the effects of the 1938 German annexation of Austria on the medical faculty of the University of Vienna. Due to his Jewish



heritage, in 1938 Freund was dismissed from the university faculty and, according to Bauer-Merinsky, had to leave Austria with his wife and go to Belgium (Brussels).¹¹ After the beginning of the Second World War, German forces occupied Brussels and Freund was again exposed to persecution and emigration.¹² He died not long after in Brussels on January 7, 1943, of colon cancer.¹³

Nazi persecution of Freund likely attributed to the lack of documentation of his life. Not only would the Nazi government have seized his assets, many of his personal writings were also likely destroyed through the devastation of war, Nazi purges of Jewish literature, and forced migration. Knowledge of him was predominantly preserved through his publications, which were numerous. Researcher Dieter Kogelnik noted that Freund's medical publications included over 100 papers "of which he was the sole author" and that he wrote "the world's first exhaustive 417-page textbook solely devoted to radiotherapy."¹⁴ Bauer-Merinsky placed the number of publications at over 340.¹⁵

Freund was distinguished for his scientific documentation proving the therapeutic uses of *Radiotherapie* and *Röntgentherapie* (radiation radiotherapy and X-ray therapy) in treating skin tumors and moles. According to Bauer-Merinsky, Freund was considered the founder of X-ray therapy as he was the first to use X-rays in the treatment of skin diseases and later lower-lying organs.¹⁶ Freund's foundational experiment began on November 24, 1896, and involved treating a five-year-old girl for a hairy nevus (a hairy mole that resulted from a birth defect) that covered the entirety of the girl's neck, shoulders, and back. The procedure was successful, albeit with scarring, and the patient lived into her eighties.¹⁷

For his work, Freund was celebrated and esteemed throughout the medical community and was honored with seven Austrian and foreign awards for services in war and peace.¹⁸ He was also nominated for the Nobel Prize in 1906. Nils Hansson, Michael Martin, and Heiner Fangerau recently detailed the previously unknown account of Freund's nomination for which his colleague, Ernest Finger, wrote an extensive nomination letter that "portrayed Freund as a contemporary hero in medicine."¹⁹ Finger, a professor of dermatology at the University of Vienna, extolled the virtues of Freund's work as Hanson, Martin, and Fangerau noted, it occurred at a

¹¹ Judith Baur-Merinsky, "Die Auswirkungen der Annexion Österreichs durch das Deutsche Reich auf die medizinische Fakultät der Universität Wien im Jahre 1938: Biographien entlassener Professoren und Dozenten" (PhD diss., Universität Wien, 2), 59. Available at Universitätsbibliothek Medizinische Universität Wien, <https://repositorium.meduniwien.ac.at/obvumwhs/content/titleinfo/2466614>.

¹² Ibid.

¹³ Ibid.

¹⁴ H. Dieter Kogelnik, "Inauguration of Radiotherapy as a New Scientific Specialty by Leopold Freund 100 Years Ago," *Radiology and Oncology* 42, no. 3 (March 17): 209.

¹⁵ Baur-Merinsky, "Biographien entlassener Professoren und Dozenten," 60.

¹⁶ Ibid., 59.

¹⁷ For a complete and detailed explanation of Freund's experiment, see Kogelnik, "Inauguration of Radiotherapy as a New Scientific Specialty by Leopold Freund 100 Years Ago."

¹⁸ Baur-Merinsky, "Biographien entlassener Professoren und Dozenten," 59–60.

¹⁹ Nils Hansson, Michael Martin, and Heiner Fangerau, "The Nobel Prize Runner-up Leopold Freund and the Origin of Radiotherapy," *Radiology and Oncology* 119, no. 3 (June, 11): 552.



time when “radiotherapy was about to revolutionize medicine as a whole, not least because of the promising results on psoriasis and skin cancer,” but “it had not yet reached its full potential.”²⁰

The X-ray itself was the product of Wilhelm Röntgen (1845–1923), who stumbled across the invisible light rays while experimenting in Munich, Germany, with *Crookes tubes* in 1895. A Crookes tube was an elongated cylindrical glass tube with a partial vacuum in which was placed cathode (negative) and anode (positive) electrodes. When a high electric current passed through the gas (in this case air) inside the tube, it sped up the ions and electrons in the gas and produced light in the form of an electric discharge, much the same as a light bulb but without the filament. At the same time as producing these discharges of visible light, a certain amount of radioactivity was released in the form of invisible light, X-rays. Röntgen was not the first to produce X-rays, as others had experimented with Crookes tubes before him, but he was the first to identify them and denote their use for producing images on photographic plates. The type of light produced depended on the gas inside the tube. For example, modern neon and florescent lighting are descendants of Crookes tubes with gases such as helium, neon, argon, krypton, and xenon within them. Because of his discovery, in many languages in Europe and the world, X-rays were often referred to as Röntgen rays (hence X-ray therapy was referred to as *Röntgentherapie*).²¹ The term X-ray simply came from the fact that Röntgen did not know what to call his discovery, and annotated them as X-radiation.

In 1898, two years after Freund’s groundbreaking experiment, Marie Curie, working in Paris, discovered the radioactive element Radium. Radium itself—the radioactive element used in radiotherapy—had a surprisingly long and deadly history before its use in medicine. In his work *Deadly Sunshine* David Harvie traced the discovery of radium to fifteenth-century Bohemia (Freund’s home country) and the numerous mining towns of the area, specifically the town of St. Joachimsthal (present day Jáchymov, Czech Republic).²² Miners, excavating gold, silver, copper, and bismuth, often complained of “a mysterious respiratory illness” that often caused death, and began to fear that mountain dwarves and demons were punishing them for stealing from the mountain by giving them *Bergsucht* (mountain sickness).²³ The miners’ illness was localized to a shiny black substance in the ore called *Pechblende* (pitchblende), the substance in which Curie discovered and isolated radium. Almost 100 years before Curie, in 1789, a German apothecary named Martin Heinrich Klaproth, isolated and discovered the element Uranium in the *Pechblende* from St.

²⁰ Ibid. Psoriasis is a skin condition where an excessive amount of dead skin cells builds up at the surface of the skin to form itchy, and sometimes painful, red patches.

²¹ For a more detailed description of the technical aspects of X-rays, and an excellent account of their history along with radiation therapy, see Richard F. Mould, *A Century of X-rays and Radioactivity in Medicine: With Emphasis on Photographic Records of the Early Years* (Bristol, United Kingdom: Institute of Physics Publishing, 19).

²² David I. Harvie, *Deadly Sunshine: The History and Fatal Legacy of Radium* (Stroud, United Kingdom: Tempus, 12), 20.

²³ Ibid., 17.



Joachimsthal. Thus, the miner's *Bergsucht* was most likely lung cancer as they were constantly inhaling radioactive dust and gas during their excavations.

The discovery of radium set off a frenzy of experimentation and medical trials. Richard Mould noted that suggestions for the uses of radium were far reaching and almost miraculous in nature, scientists hoped that “radium might help restore sight to the blind,” and “baths of radium-bearing water were recommended for use at home.”²⁴ Harvie described radium as a “medical slapstick” and observed that it was used both externally and internally in patients.²⁵ The discovery of the less radioactive noble gas radon (which was produced when radium decayed) increased efforts to bring sick patients into contact with radium. Radon's half-life (time for radioactive decay to take place) of about 3.8 days was far less problematic than radium's approximate half-life of 1600 years. Thus, radon could be “safely” left in a patient. Harvie noted that such internal measures involved “controlled inhalation, ingestion, [or] injection,” and that an “entire industry devoted to impregnating other items with radium,” through radon, developed in the early twentieth century.²⁶ Radon-infused water was sold for drinking and bathing, and inventions to saturate people's food and clothing “with the health-giving magic of radium in the comfort of their own home” flooded the market.²⁷

Hoping to profit from the radium craze, radium hot springs and spas were built not only in Europe—such as the still-operating Radium Palace Hotel in Jáchymov—but also in the United States; examples of which were Curie Spring in Springdale, Colorado, Saratoga Springs in New York, and Mount Clemens in Michigan.²⁸ Such hotel spas and springs became immensely popular with their wealthy clientele, who were convinced, through no small amount of charlatanism, that eating, drinking, and inhaling radium, as well as dressing and bathing in it, would cure a multitude of health woes as well as rejuvenate them. On its surface such treatments would have seemed well suited to Kellogg's Battle Creek Sanitarium in Michigan as many patients regarded it as a kind of health resort integrated with a hospital. But Kellogg was far more cautious and less taken with radium treatments, due no doubt to his familiarity with Freund's work on the subject.

In 1903, Freund published *Grundriss der Gesamten Radiotherapie* (Comprehensive Outline for Radiotherapy) in which he defined radiotherapy as a broad term utilized for any use of radiation for therapeutic purposes and noted that radiation was classified into two groups: electromagnetic radiation (radiation of electrical energy), heat radiation, light, and ultraviolet radiation, and cathode rays, such as X-rays, the Becquerel rays (gamma rays), and the radiations of radium and polonium.²⁹ He noted that all such radiations, by virtue of the physical properties inherent in them,

²⁴ Richard F. Mould, *A Century of X-rays and Radioactivity in Medicine: With Emphasis on Photographic Records of the Early Years* (Bristol, United Kingdom: Institute of Physics Publishing, 19), 21.

²⁵ Harvie, *Deadly Sunshine*, 107.

²⁶ *Ibid.*, 107–108.

²⁷ *Ibid.*, 108.

²⁸ *Ibid.*, 108, 216.

²⁹ Leopold Freund, *Grundriss der Gesamten Radiotherapie: Für Praktische Ärzte* (Wien: Urban & Schwarzenberg, 10), 1.



had the capacity for therapeutic treatment, but his focus never strayed from the medical perspective and the use of radium in the context of faddist spa treatments was not even considered.³⁰ The next year *Grundriss der Gesamten Radiotherapie* was translated into English and sold in the United States.

In 1908, Kellogg was less certain of the use of radiation therapy, stating in *The Battle Creek Sanitarium System* that the X-ray had found “its place in the armamentarium of the institution” and was “daily proving itself of service in an increasing variety of ailments,” but that the full scope of X-rays in therapy could not “as yet be fully defined.”³¹ By the time he published his work *Light Therapeutics* in 1910, Kellogg notably shifted his focus toward X-rays and strong radioactive therapeutic treatments. While he employed the use of radium treatments to some extent, he was much more interested in treating patients with more natural chemical or actinic rays and thermic rays.³² While Kellogg also made use of X-ray therapy, he did not include X-rays in his description of chemical rays, although they could have been placed in the group just above ultraviolet light. Kellogg was aware of Freund’s work, but lamented that Freund had not recognized the uses of thermic radiation in therapeutic practices: “Until recently, the attention of investigators has been almost wholly directed to the effects of the actinic rays. Freund goes so far, indeed, as to exclude the thermic rays from the therapeutic field, thereby showing a lack of information concerning the exceedingly valuable curative effects of the heat rays when applied in appropriate cases with a correct technique.”³³

While it is possible that Kellogg and Freund met, given Kellogg’s visits and studies at the University of Vienna, the nature of their relationship is unclear although they certainly knew of each other’s work. Freund cited Kellogg in his own work and noted Kellogg’s work in light therapy.³⁴ Kellogg’s preference for more natural sources of light (meaning those outside of radioactive elements) was perhaps due to his close relationships with Rollier and Finsen, but it could also have been from a pervading fear of the dangers of radioactive elements. Mould noted that ideas of protective measures against overexposure to radium and X-rays in Britain did not culminate into applied policy until 1921, and it would not be until 1934 that the United States first considered a national “principle of maximum tolerance dose of X-rays.”³⁵ Without proper safety standards, X-ray and radium therapy could be extremely dangerous for both patient and doctor, as learned from the example of Marie Curie, who died in 1934 from radiation poisoning of her bone marrow. While Freund’s work produced excellent results, it should be noted that he himself died of colon cancer, and one cannot eliminate his years of study and handling of X-rays

³⁰ Ibid.

³¹ J. H. Kellogg, *The Battle Creek Sanitarium System: History, Organization, Methods* (Battle Creek, Michigan: Gage Printing Co. LTD., 15), 89.

³² See Markel, *The Kelloggs*, 187.

³³ Kellogg, *Light Therapeutics*, 11.

³⁴ Freund, *Grundriss der Gesamten Radiotherapie*, 367.

³⁵ Mould, *A Century of X-rays and Radioactivity in Medicine*, 21.



and radium without a full knowledge of the protective measures necessary to prevent tissue damage as a factor in his demise.

In any case, Kellogg aided in the successful transference of X-ray and radiation therapy from Europe to the United States through his endorsement—albeit not full-throated. For the transference to work, however, terms had to be changed. Americans were happy to submit themselves to treatments of radium and X-rays, but few were aware of their European origins. Terms such as *Röntgentherapie* and *Radiotherapie* were changed to X-ray therapy and radiation therapy. Such changes were necessary for an American public that was becoming more nativist and prejudiced, meaning that most outside the medical field in the United States would not remember the work of Freund. In the end, even Kellogg further simplified light therapy into the two distinct categories of chemical and thermic rays in an attempt to create a language that was more palatable to practitioners and patients alike.

Rollier, heliotherapy, and Kellogg

High in the Swiss Alps, the village of Leysin, Switzerland played host to an unusual experiment in nineteenth-century therapeutic practice. Visitors to the alpine village enjoyed sweeping vistas of green hills and snow-capped mountains, and in the winter months could take up the sport of snow skiing. But tourists might have been stunned to see an odd sight on the snow-covered slopes during the alpine winter—children skiing without clothes. Although wearing white loincloths, these children were otherwise naked in the cold air of the alpine winter not only skiing but ice skating, hiking, exercising, and even having school classes in desks outside in the snow, but, more importantly, in the sun.

This was not the fun play of children nor was it a local tradition. Such children were not students; they were patients of *La Cure de Soleil*—Heliotherapy—and they were under the care of “the Sun Doctor” himself, Auguste Rollier. Rollier began practicing heliotherapy at his clinic in Leysin in 1903. Originally a surgeon, Rollier studied under the noted Professor Theodor Kocher in Berne. With a promising career as a surgeon ahead of him, it seemed odd that Rollier abandoned his training in pursuit of heliotherapy. Richard Hobday suggested that Rollier became interested in heliotherapy because a close friend whose hip and knee joints were removed due to tuberculosis of the bone committed suicide.³⁶ Hobday noted that the suicide “left a deep impression on the young doctor,” and Rollier was determined to find a more adequate cure for tuberculosis other than debilitating surgeries.³⁷ Rollier chose Leysin as the site of his clinic in the hopes that the climate and cold mountain air would have a positive effect on his fiancée, who was herself suffering from pulmonary (lung) tuberculosis.³⁸

³⁶ Richard Hobday, *The Healing Sun: Sunlight and Health in the 21st Century* (Scotland: Findhorn Press, 13), 100.

³⁷ *Ibid.*

³⁸ *Ibid.*



Tuberculosis was the scourge of the nineteenth and early twentieth centuries. Although pulmonary tuberculosis was a common form of the disease (and the most recognizable to modern memory), many suffered from infections of tuberculosis in their bones, joints, and skin. This non-pulmonary form of the disease, which affected children more than adults, was mostly bovine tuberculosis contracted via infected milk. Tuberculosis not only ate away at the bones and skin of children, leaving open sores and deformed bones, it also caused malnutrition and a wasting away of the body. Theories on how to treat the disease were far-ranging, but a specific consensus of its cause developed toward the late nineteenth century. Linda Bryder noted that, medical treatments aside, tuberculosis “was regarded as a disease of civilization, the treatment of which required a return to Nature.”³⁹ Tuberculosis was not the only disease to be attributed to the pitfalls of civilization. In general, Kellogg and other reformers would also lay feeble-mindedness (a condition that encompassed a number of physical and mental disabilities) at the feet of civilization with its over-industrialized and crowded cities and its disregard for the natural world.

Most agreed that tuberculosis, as a disease of densely populated cities with unhealthy living quarters, could be conquered through a return to natural living. Across the globe social reformers embraced movements and developments that brought city dwellers into nature. This was the era of the creation of public parks, allotment gardens, and outdoor sports such as football (soccer). In Britain, according to Bryder, this translated to the open-air school movement in which schools were designed in a pavilion style to facilitate proper ventilation especially “for those suffering from pulmonary tuberculosis,” which was “primarily a disease of adults.”⁴⁰ Unfortunately, the bone and skin tuberculosis of children was not aided through better ventilation, and, more often than not, children died from tuberculosis as a result of malnutrition, secondary infections from their open sores, weakened immune systems, and radical surgeries that left them limbless and exposed to recurrences of the disease.

Rollier was aware of these challenges and set out not to simply treat the disease in its various forms in children but to cure it as well. Acutely aware of the contextualization of tuberculosis as an effect of civilization and the calls for cures within nature, he employed the most natural of all elements, cold air and the sun. Hobday noted that Rollier was not the first to utilize the healing powers of the sun, and that Dr. Oskar Bernhard (also of Switzerland) was the first to “use sunlight to heal first wounds and then tuberculosis.”⁴¹ But while Bernhard’s success gained him notoriety, it was Rollier “who popularized heliotherapy.”⁴²

Rollier’s method of heliotherapy was first introduced in published format in 1915. Entitled *La Cure de Soleil*, it was later translated into English in 1923 under the title *Heliotherapy*.⁴³ In his work, Rollier’s first concern was with the overall well-being

³⁹ Linda Bryder, “Wonderland of Buttercup, Clover and Daisies: Tuberculosis and the Open-air School Movement in Britain, 1907–39,” in *In the Name of the Child: Health and Welfare, 1880–1940*, ed. Roger Cooter (London: Routledge, 4), 73.

⁴⁰ Ibid.

⁴¹ Hobday, *The Healing Sun*, 96.

⁴² Ibid., 99.

⁴³ See, A. Rollier, *La Cure de Soleil*, (Paris: Baillière & Fils, 21).



of his patients who were predominantly children. Noting the power of the sun to improve the mental mood of his patients, Rollier extolled the general virtues of sunlight in relation to medicine:

Subjective phenomena rarely receive the attention they merit in our text-books on surgery, and the reader...is apt to overlook, or at best to under-estimate, the importance of the mental condition of the patient...The close relationship between sunshine and happiness is so obvious that it hardly requires emphasis. Anyone who has seen the splendor of a typical winter's day in the Alps with its brilliant sunshine and the still, cold air will realize what a stimulating effect it has. The intense heat of the sun is tempered and rendered wonderfully bracing by the action of the dry, cold air on the whole surface of the body.⁴⁴

Rollier observed that children were particularly responsive to such an environment, and that with the mixture of sunlight and cold air their mood improved along with their appetite, sleep, and digestion—all of which led to a better “clinical condition.”⁴⁵ More specifically, heliotherapy in the form of “sun-baths” sought to increase a patient’s metabolism. Rollier noted that while “a large number of vital reactions” were increased through “the absorption of radiant energy by the blood,” the exact mechanisms for how the blood carried and utilized sunlight were unknown; meaning much of his work was through trial and observation.⁴⁶

Rollier’s choice of an elevated alpine location (his clinic at Leysin was approximately 4100 ft. above sea level) served a dual purpose. The cold mountain air was clean and kept patients’ bodies from overheating, but the altitude also provided more exposure to the unfiltered ultraviolet rays of the sun. A. Rosselet, a physician under Rollier, noted that if one considered “the only factor of importance in heliotherapy, viz., the sum of the radiations received by the patient, the superiority of high altitudes so far as direct irradiation is concerned is plainly evident...0.75 per cent. of the total energy given out by the sun reaches an altitude of 6,000 ft., while only 50 per cent. reaches sea level.”⁴⁷ While the altitude of Rollier’s clinic provided higher quality air and more powerful sun irradiation, the effects upon his tuberculosis patients could be devastating in their weakened conditions. To facilitate safety within his treatments, Rollier adopted a policy of acclimation.

Rollier advocated strict individualized treatments at his clinic as each patient’s needs were invariably different. Upon arrival at the clinic, patients were immediately given a complete physical examination to determine their overall wellness and ability to acclimate to the altitude, air, and sun. Patients were exposed to the cold air first and in small increments of time. This was done by opening their windows and allowing fresh mountain air to fill their room for regulated periods as prescribed by the attending physician. While such precautions may have seemed drastic, tuberculosis

⁴⁴ Rollier, *Heliotherapy*, 4–5.

⁴⁵ *Ibid.*, 5.

⁴⁶ *Ibid.*

⁴⁷ A. Rosselet, “The Scientific Basis of Heliotherapy,” in A. Rollier, *Heliotherapy* (London: Henry Frowde and Hodder & Stroughton, 22), 175.



patients were often fragile and susceptible to infection. As trivial as cold mountain air might have seemed, a drastic change in body temperature could have been life threatening. Once patients were adjusted to the air, they began a slow acclimation to the sun. This was accomplished through two methods: covering patients with a white sheet or shade and exposing certain portions of the body to sunlight for short lengths of time or rolling the patients' beds part way out their balcony doors. The idea was again to not allow the patients' bodies to be overcome with radiation from the sun. Rollier noted that this process was essential in that "the technique of heliotherapy resolves itself into the application of the sun-bath in gradually increasing doses carefully graduated according to the subjective and objective reactions presented by the patient."⁴⁸ The patient was to be monitored every minute and careful record taken in order to prevent overheating and possible burning.

Rollier's results were beyond remarkable; tuberculosis of the skin, bones, and face—the bacteria unable to withstand the irradiation from the sun—were healed with great success. Rollier filled his book with images of patients before and after treatment and in some cases showed individuals ten to fifteen years after their treatment. The curing of tuberculosis was no small feat, for according to Rollier most all "or nearly all, children (95%)" would contract tuberculosis "before reaching adolescence."⁴⁹ The drive to reform society for the sake of the innocent children and humanity's future placed Rollier on the same level of health reform as Kellogg. Rollier often repeated one of Kellogg's favorite idioms: "*Mens sana in corpore sano*" (a healthy mind in a healthy body).⁵⁰

Kellogg's relationship with Rollier is evinced predominantly in Kellogg's visit to the Leysin clinic sometime in the early 1900s, while at the clinic, Kellogg either took or purchased photographs of Rollier's methods for reference and attempted to recreate a heliotherapy clinic at the Battle Creek Sanitarium.⁵¹ Not long after his visit to Rollier's clinic, Kellogg wrote a lecture entitled "Sunlight: The Health Giver," in which he stated that Rollier had recently demonstrated sunlight "to be equally as valuable for the treatment of lung tuberculosis as for the treatment of tuberculosis of the bone, skin and other structures."⁵² He continued to note that the children at Rollier's clinic spent "nearly all the time in the open air, and with very little clothing in the wintertime."⁵³

A major limitation for Kellogg in the practice of heliotherapy was his location. The town of Battle Creek, Michigan was hardly a substitute for the alpine climate and elevation of Switzerland—where Kellogg noted the "ultra-violet rays of the sun

⁴⁸ Rollier, *Heliotherapy*, 20.

⁴⁹ A. Rollier, *Heliotherapy: With Special Consideration of Surgical Tuberculosis*, trans. G. de Swietochowski, 2nd ed. (London: Oxford University Press, 23), 248.

⁵⁰ *Ibid.*, 257.

⁵¹ For Kellogg's collection of photographs of Rollier's clinic see, John Harvey Kellogg, Photographs: Leysin, Switzerland (Dr. Rollier's clinic), Box 19, John Harvey Kellogg Papers.

⁵² John Harvey Kellogg, Sunlight: The Health Giver, "Natural Living," Box 10, John Harvey Kellogg Papers.

⁵³ *Ibid.*



are very intense”—but he nevertheless attempted to implement the same practices as Rollier.⁵⁴ There was a Seventh-day Adventist Sanitarium in the Rocky Mountains of Colorado, but after Kellogg’s removal from the denomination he lost control of it. To overcome the issue of elevation he turned to technology, but still endorsed the lifestyle heliotherapy advocated. Patients, especially children, were encouraged to play and learn outside in the sun while wearing the same white loincloths utilized at Rollier’s clinic.⁵⁵ Kellogg also noted the importance of fresh air and sunshine in his publications and mirrored Rollier’s system of air and sunbaths. In describing the methods at his sanitarium, Kellogg wrote that fresh air had “always been a dominant feature” in his work, and that utilizing “the sun as a curative agent” was an ancient practice.⁵⁶ He also noted that it was “evident that little good effect” could come from sunlight when the body was “almost completely covered with clothing.”⁵⁷ Kellogg wrote that it was “necessary that the ordinary clothing be removed, so that nearly the whole surface of the skin may be exposed to the actinic rays.”⁵⁸

An area of disagreement between Kellogg and Rollier was both Rollier’s emphasis of an ancient pagan foundation for heliotherapy and his support of nudity as a natural state for humanity. Rollier, who tied his heliotherapeutic methods to those of ancient pagans and their sun cults, also seemed to invoke Nature as a deity when he wrote that the sun was “an incomparable weapon which Nature” had placed in everyone’s hands.⁵⁹ When commenting on his use of loincloths on children, Rollier noted that there was “considerable prejudice against the reduction of clothing” in his methods and that he rejected notions of indecency as he did not see anything “more decent than the naked body of a child bronzed by the sun.”⁶⁰

Kellogg may have accepted the ancient utilization of the sun in healing, but he categorically opposed the concept of Nature as a deity. In 1940, Kellogg wrote “Philosophy of Life,” and noted that “a nebulous force called Nature was invented” to explain the “marvelous display of life” in the world.⁶¹ Kellogg questioned how the “anomalous invention” of Nature had become “endowed with creative attributes and personality, [and] deified,” and, without any philosophical basis, had “become the false God of Christendom.”⁶² He further observed that the “Nature God idea was inherited from heathenism,” and that even so it was “still a feature of the religious faith of many Christians, both Catholic and Protestant.”⁶³

⁵⁴ Ibid.

⁵⁵ To see photos of Kellogg’s recreation of a sun clinic at the Battle Creek Sanitarium see, John Harvey Kellogg, Photographs, Battle Creek Sanitarium (New) Physical Fitness Program, Box 19, John Harvey Kellogg Papers. For a photograph of Kellogg himself sun-bathing see, John Harvey Kellogg, Photographs: Travels, California, 1928, Box 19, John Harvey Kellogg Papers, Bentley Historical Library, University of Michigan, Ann Arbor, Michigan.

⁵⁶ Kellogg, *The Battle Creek Sanitarium System*, 107.

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ See Rollier, *Heliotherapy*, 2nd ed., 1–4; Rollier, *Heliotherapy*, 2nd ed., 256.

⁶⁰ Rollier, *Heliotherapy*, 1st ed., 154–155.

⁶¹ John Harvey Kellogg, Philosophy of Life June 5, 1940, Lectures 1939–1940, Box 7, John Harvey Kellogg Papers.

⁶² Ibid.

⁶³ Ibid.



Kellogg also rejected full public nudity as a method of sunbathing. While he did accept that the removal of most clothing was essential for better skin circulation and sun absorption, he always upheld strict practices of modesty. In *Light Therapeutics* he laid out the rules of modesty for his outdoor gymnasium while sunbathing:

Several patients of the same sex may be treated at once in such an inclosure [sic], the demands of modesty being satisfied by the scantiest of bathing attire. Male patients commonly wear very small trunks, jock-bands, or narrow loin cloths....When it is desired to expose the entire skin surface, and this is always an advantage,—tight screens may be placed about the patient in such a way as to protect him from observation while permitting the sun’s rays to fall directly upon his uncovered body.⁶⁴

Even while Kellogg admitted that sunbathing nude was the best way to absorb the sun’s rays, he always required that the “demands of modesty” be met.

However taken Kellogg was with Rollier’s method, he did not cite him in *Light Therapeutics*. Though this could have been due to the fact that Rollier’s book, *La Cure de Soleil*, was not published in English until 1923. It is also possible that Kellogg did not visit Rollier’s clinic until after *Light Therapeutics* had been published in 1910. In either case, Rollier was left out of Kellogg’s compendium on light therapy, which focused almost entirely on Finsen and Kellogg’s technique in actinotherapy and his own therapies utilizing thermic rays. Kellogg was more than willing to transfer Rollier’s methods of sunbathing to his sanitarium, but he modified it to fit the sensibilities of his guests. Few would have accepted a fully public, nude sunbath—for them or their children. On top of everything else, Kellogg’s sanitarium lacked both the climate and the altitude to appropriately treat patients utilizing Rollier’s method even though Kellogg still saw value in the natural lifestyle promoted in Rollier’s sunbath. The real issue for Kellogg was how to bring the full healing power of the sun to his patients, a challenge already being addressed by a doctor in Denmark.

Finsen, actinotherapy, and Kellogg

While heliotherapy could produce excellent results in tuberculosis patients, there were several limiting factors that mitigated its popularity in the medical field. For one, the sun was not always guaranteed to shine. In cities, such as London, the true issue was air pollution, which blocked out the sun. One also could not easily practice heliotherapy at will as weather dictated where physicians could practice. Another issue was the lack in elevation. Ultraviolet light (or the chemical rays) was the main combatant of tuberculosis bacteria and the most sought-after light within the spectrum of solar radiation. Rollier noted that the Alpine region of his clinic was ideal not only because of its clean air, which was free from dust and pollution that might block the light, but also because it provided the best access for utilizing ultraviolet light. He pointed out that “the atmosphere absorbs roughly 60% of the total amount

⁶⁴ Kellogg, *Light Therapeutics*, 74–75.



of the solar radiation, whereby short wave rays [ultraviolet light] are kept back most of all.”⁶⁵ This meant that even in his clinic, Rollier could only harness about 40% of the sun’s total power, implying that if one practiced heliotherapy at a lower altitude the ultraviolet light would be further reduced and less beneficial.

Researchers were working on finding a way to create artificial light that would be equal in quality to the sunlight in high altitudes. In the Kingdom of Denmark, the young physician Niels Finsen attempted to recreate the light of the sun using nineteenth-century technology. Finsen was born on the Faroe Islands in the North Atlantic (then, part of the Kingdom of Denmark) and attended medical school at the University of Copenhagen. After he graduated in 1890, he started to research the effects of light on the human body. These experiments were personal at first, as Finsen himself suffered from Niemann-Pick disease (a disorder in which fatty lipids are accumulated in organs such as the lungs, liver, spleen, brain, and bone marrow), which could cause difficulty in eating and walking, bouts of recurrent pneumonia, trouble sleeping, and extreme muscle contractions. Finsen noted marked improvement of his overall wellbeing and determined that ultraviolet radiation had the ability to therapeutically affect the body as well as destroy bacteria. In 1896, he opened the Finsen Institute in Copenhagen to further research light therapy and treat people primarily for skin and bone tuberculosis.

Kellogg was a recurrent visitor to Denmark as the Seventh-day Adventists had built a branch sanitarium at Skodsborg (a seaside town just north of Copenhagen) in 1898. Kellogg first visited the Skodsborg Sanitarium in 1899 and then proceeded to tour the Finsen Institute during his stay. He marveled at Finsen’s work and wrote in an undated manuscript: “The streets in the vicinity of the Institute almost swarmed with people who had lost ears and noses through tuberculosis disease, or whose faces bore huge sores that had resisted every other mode of treatment. In the Institute we were shown scores of persons whose once ghastly features had been restored to healthy comeliness by the miracle-working sunlight.”⁶⁶ Kellogg was so impressed with Finsen’s work that he not only contracted Finsen to develop a light clinic at the Skodsborg Sanitarium, but also had the superintendent of Finsen’s Institute, Axel Reyn, lecture at the Battle Creek Sanitarium and eventually set up his own light clinic as part of the sanitarium’s features.

Finsen understood that many men and women in the nineteenth century could not afford to travel to the Swiss Alps or other areas where solar ultraviolet radiation was more accessible. Even though Rollier’s clinic would not be established for another seven years, Finsen recognized that the sun’s rays at most lower elevations were not powerful enough to give quick and unobtrusive results. This was perhaps the main difference between Finsen and Rollier. Rollier’s treatment was more of a lifestyle reform in that it demanded vast amounts of time in the sun and a change of diet and living. Finsen’s goal was more practical and focused on meeting patients with a clinical fix for their tuberculosis. Most could not afford to leave their vocations and

⁶⁵ Rollier, *Heliotherapy*, 2nd ed., 22.

⁶⁶ John Harvey Kellogg, *Sunlight: The Health Giver*, “Natural Living,” Box 10, John Harvey Kellogg Papers.



families to convalesce in the sun for months on end or even a year. Finsen's method was far more convenient for those who needed treatment for their tuberculosis but did not have the money or time to devote themselves to heliotherapy. To accomplish this, Finsen experimented with different technologies and exchanged theories with Kellogg.

In *Light Therapeutics*, Kellogg noted that he first used lenses and concave mirrors to concentrate the sun's rays in 1883.⁶⁷ Later in the text he also explained that Finsen used the same technique but that both of them experienced the same "embarrassment which arises in the employment of concentrated light," which was "the great intensity of the calorific ray [heat rays], which renders the application intolerable after the first few seconds."⁶⁸ Much like an ant under a magnifying glass, patients suffered extreme burns from what was basically a much larger version. Kellogg credited Finsen for overcoming this potentially dangerous side effect: "He [Finsen] filtered out the calorific and luminous rays by passing the solar rays through a blue solution made by dissolving copper sulfate in dilute ammonia water...the purpose being to obtain the highest degree of activity of the chemical rays while reducing the action of the heat rays to the point of tolerance."⁶⁹ Kellogg noted that the patient felt no pain through this method and was given the equivalent of an "intense sunburn."⁷⁰ Using this method Finsen was able to treat patients with skin tuberculosis (also called *lupus vulgaris*) with great success.⁷¹

This method, while successful, was still limited by climate and seasons. Kellogg noted that while he was at Copenhagen, Finsen informed him that they achieved more satisfactory results "during the summer season, when patients were treated by the solar rays, than during the winter season" when they were treated indoors with an arc light (an artificial light that passed electricity through gas much like a Crooke's tube).⁷² Finsen observed that arc lamps, while powerful enough to recreate the ultraviolet, chemical rays of the sun, were not able to concentrate the light appropriately, thus requiring a new technology to make arc lights more effective. Finsen recorded his new method in his 1901 work, *Phototherapy*:

The rays of the electric light being divergent, instead of parallel like the sun's rays, it is obvious that the apparatus required to concentrate this light necessitates a construction quite different from that which I have just described [his sun lenses]. This apparatus...consists of two cylinders fitting like the parts of a telescope, and each containing two plano-convex lenses. The lenses Nos. 1 and 2, turned towards the source of light, cause the divergent rays of the arc light to become parallel. Between lenses Nos. 3 and 4, which render convergent the rays made parallel by lenses Nos. 1 and 2, there is a layer of distilled water (10

⁶⁷ Kellogg, *Light Therapeutics*, 84.

⁶⁸ *Ibid.*, 84–85.

⁶⁹ *Ibid.*, 85.

⁷⁰ *Ibid.*

⁷¹ The term *lupus vulgaris* should not be confused with the modern autoimmune disease Lupus, which can cause inflammation in such areas of the body as the face, organs, and joints.

⁷² Kellogg, *Light Therapeutics*, 86.



litres [sic]). At the end of the apparatus is attached a very flat cylinder, closed at its two extremities by flat glasses, and filled with an ammoniacal solution of sulphate of copper (light filter)...Besides this, each apparatus is provided with several light filters of different strengths, as the degree of temperature borne by each patient is very variable.⁷³

The new invention, referred to as the *Finsen Lamp*, quickly became a huge success. Since arc lamps isolated the chemical, or actinic rays, the therapy using artificial lights in place of the sun was dubbed *Actinotherapy*. Because of his work and success in curing patients of *lupus vulgaris* with his invention, Finsen was honored not only with his induction into the Knights of the Order of Dannebrog by King Christian IX of Denmark in 1899, he was also nominated and won the 1903 Nobel Prize in Physiology or Medicine for his work.

Although Kellogg recognized the value of Finsen's creation, he was not quite convinced that actinotherapy was the best method for curing skin tuberculosis. In *Light Therapeutics* he wrote that Finsen's method for treating *lupus vulgaris* was "almost wholly superseded by the X-ray method," which provided "far greater rapidity of action, greater certainty and a penetrability much greater than that of the actinic rays."⁷⁴ Kellogg, however, was not willing to abandon Finsen's method entirely and stated that it was still "effective in cases of superficial infection," leaving "less scar and less deformity than any other method."⁷⁵ He also noted that X-ray therapy only destroyed the bacteria involved and that it did nothing to "improve the patient's resisting power," nor did it assure against a "recurrence of the same disease."⁷⁶ With this in mind, Kellogg decided to blend Finsen's actinotherapy method with X-ray therapy. He sought to first kill off the bacterium with X-rays and then strengthen the patient's "resisting power" with actinotherapy.

But if Kellogg intended to use X-rays for the initial elimination of *lupus vulgaris*, he hardly needed a large, immobile Finsen Lamp installed at the Battle Creek Sanitarium. Instead, Kellogg modified and repurposed the arc lamp to suit his needs as well as that of his patients. He described his new lamp in *Light Therapeutics*:

After examining all the therapeutic arc lamps offered on the market in this country and Europe, and finding all more or less objectionable because of inconvenience in use or unreasonably high price, the author had constructed under his supervision a lamp which, after several years of service in the Battle Creek Sanitarium, in hundreds of other sanitariums and hospitals, and in the offices of private physicians, has proved to be eminently satisfactory.⁷⁷

Kellogg's arc lamp met the American values of mobility, convenience, and comfort. The device was small enough to be portable and was aided in its mobility by

⁷³ Niels R. Finsen, *Phototherapy*, trans. James H. Sequeira (London: Edward Arnold, 1901), 66–67. See accompanying photo on page 66. To see a photograph of Finsen's lens device, see page 65.

⁷⁴ Kellogg, *Light Therapeutics*, 192.

⁷⁵ *Ibid.*

⁷⁶ *Ibid.*

⁷⁷ *Ibid.*, 87–88.



the addition of castor wheels to its four legs. This feature allowed for the convenient placement of the arc lamp in any position a physician might require. One more additional feature was a fan to keep patients cool during treatment. Kellogg noted that the fan was placed so that “a strong current of air falls upon the [skin] surface to which the application is being made.”⁷⁸ As Kellogg’s arc lamp was used to strengthen a patient’s immune system after X-rays had already destroyed the threatening bacteria, there was no need to focus the arc lamp rays as Finsen had through his telescopic attachment. The arc light’s rays were directed, via a reflective hood, onto a general portion of the patient’s body, which was draped with white sheets to protect other areas from unnecessary exposure.

The relationship between Finsen and Kellogg fostered a remarkable occurrence of intercultural transfer, in which both individuals shared their knowledge and borrowed from each other’s techniques in a relatively short amount of time. Kellogg’s modification of Finsen’s method brought actinotherapy out of Europe and placed it in the American context of health reform to be used in tandem with Freund’s X-Ray therapy. Finsen died early in 1904 from complications with his lifelong illness, and with his death Kellogg lost a valued transatlantic partner in light therapy. Finsen’s methods continued not only in Denmark but in the United States as well, under Kellogg’s direction. But there was one area of light therapy where Kellogg felt his transatlantic colleagues were lacking. Indeed, he felt that they had totally, and unfairly, overlooked a vital part of the light spectrum—the healing thermic rays of infrared light.

Kellogg and infrared light therapy

When Kellogg published *Light Therapeutics* in 1910, it was marketed as a light therapy manual for physicians and the public but also served as a showcase for one of Kellogg’s more unique inventions. The subtitle of the book read *With Special Reference to the Incandescent Electric-Light Bath*, and a fairly good portion of the work focused on the new invention including prominent illustrations. Kellogg’s light bath (also called light cabinet) was designed to be his contribution to light therapy. In his preface of *Light Therapeutics*, Kellogg left no doubts as to his goals of self-promotion:

This work does not profess to be an exhaustive treatise on the subject of light therapy. It is intended rather to serve as a practical manual for the clinical use of the electric-light bath in its various forms, and in its various applications, general and local. An effort has also been made, in a small way, to correlate the electric-light bath to those other forms of rational physiotherapy which naturally and profitably associate themselves with this newest of physical curative measures.⁷⁹

⁷⁸ Ibid., 70.

⁷⁹ Kellogg, *Light Therapeutics*, 3.



But the light bath went against most understanding of how to therapeutically utilize the light spectrum at the time, and it went back and forth in public estimation as a medical novelty and therapeutic device.

Kellogg's earlier criticism of Freund and other practitioners of light therapy was that they had completely ignored—or worse—dismissed thermic, infrared rays as having no legitimate therapeutic value. He was resolute in his belief that infrared light was just as useful for health as ultraviolet light and stated that his work undertook “for the first time...to present as adequate account of the therapeutic properties of the thermic as well as the actinic rays of light.”⁸⁰ Kellogg's belief that thermic rays were useful for therapy was predicated on the fact that infrared light could penetrate the human body more than any other type of light in the light spectrum. While the light could not kill bacteria, it served more as a tool for overall well-being: increasing circulation, removing toxins through sweat, and stimulating deep tissue.

Infrared light, thermic rays, and heat rays were all used to describe the therapeutic rays Kellogg implemented in his light bath. The utilization of this light went beyond mere applications of heat to the body, and Kellogg understood the dynamics of thermic rays quite well. He noted that thermic rays were “not heat in the ordinary sense, but a form of energy which is capable of being converted into heat, and which becomes heat when brought in contact with an opaque body,—that is, a substance which offers resistance to the passage of the rays.”⁸¹ In other words, infrared light was invisible to the eye, but could pass through significant layers of the human body. Once the light rays came into contact and met resistance with the skin and the tissues beneath it, they generated energy in the form of heat. The process was comparable to holding one's hand over an incandescent light bulb. As infrared light rays, projected from the bulb, passed into and sometimes through the hand, heat was generated. The same principle applied to infrared rays in sunlight, which, more than any other rays, were able to reach the earth, thus generating heat.

Utilizing the most modern technology available, Kellogg built his light bath using the incandescent light bulb. At the time of its construction in 1891, there was no way of isolating infrared light, so Kellogg theorized that the light bulb was the best way to expose his patients to thermic rays. While the light bulb produced visible white light, it gave off infrared rays as well, and Kellogg devised a rather ingenious way to efficiently use the light bulb for therapeutic purposes. In *Light Therapeutics* Kellogg provided a detailed account of how to construct his light bath, which utilized incandescent light bulbs for their infrared light production:

In floor dimensions this cabinet is 43 inches square, with a height, including base insulators, of 54 inches. The exterior form is square, while the mirrors of the interior are set in octagonal form, thus giving the strongest possible construction. The lamps are arranged in vertical rows between the mirrors, thus securing the very best dispersion of the light....The eight mirrors of the interior finish are each 13 x 42 inches, excepting the door mirror, which is

⁸⁰ *Ibid.*, 11.

⁸¹ *Ibid.*



15 inches wide, and are of genuine first quality French plate glass. As little wood as possible is used in the interior construction, and this is heavily coated with fine white enamel so as to present a good reflecting surface....All conducting wires are covered with double braid as well as rubber insulation, and when covered in are enclosed in conduits. Thus danger from fire is absolutely eliminated. The forty-eight lamps of the interior are arranged in eight rows of six each, the lamps themselves being mounted in nickel-plated twin sockets. Each group of lamps is controlled by its own switch. Thus the operator may instantly throw in or out of use any group or all as he may wish, or any desired combination....With each cabinet is supplied fifty incandescent lamps, fuses, and everything ready for operation as soon as the current is supplied, including an adjustable stool with oxidized metal base and oak top.⁸²

Kellogg also provided a horizontal version of his light bath in which a patient could lay down on a small bed on rollers and be pushed into the cabinet. Both versions inundated the patient with thermic rays and treated Bright's disease (a general term for kidney disease, in which kidney inflammation could lead to heart problems) as well as apoplexy (the nineteenth-century term for a stroke), high blood pressure, and arteriosclerosis (the hardening of artery walls).

While it was obvious that Kellogg intended to sell his manufactured light baths, he did not prohibit others from building their own versions (hence the detailed description). The light bath was meant for all to experience, regardless of whether he profited from it. This openness allowed for the transfer of Kellogg's light bath into Europe, an event he chronicled in the opening of *Light Therapeutics*. Kellogg exhibited his light bath at the 1893 Chicago World Exposition during which an unnamed "visitor from Germany saw the bath, visited Battle Creek to become familiar with the technique of its use, and on returning to Germany began its manufacture and sale in that country."⁸³

Kellogg did not give the name of the interested German, and the other side of this story of intercultural transfer was lost until Niklaus Ingold recently published his work *Lichtduschen*, in which he illuminates the German side of the transfer of Kellogg's light bath or rather *Kelloggische Lichtbad*. Ingold identified the German agent of transfer as chemist Willibald Gebhardt (1861–1921). Gebhardt had originally immigrated to the United States to establish his legacy as an entrepreneur, but upon seeing Kellogg's light bath saw an investment opportunity for it back in Germany.⁸⁴ Gebhardt travelled to Battle Creek where Kellogg instructed him on the light bath's construction and operation, and in 1895 returned to Berlin determined to make his fortune. He sought to establish his business not only in Germany but also the Austro-Hungarian Empire. Soon after his return, Gebhardt bought into the famous spa town of Karlsbad where, according to Ingold, he hired an assistant and

⁸² Ibid., 202–203.

⁸³ Ibid., 3.

⁸⁴ Niklaus Ingold, *Lichtduschen: Geschichte einer Gesundheitstechnik, 1890–1975* (Zürich: Chronos, 14), 37.



a physician, and introduced Kellogg's light bath to medical professionals and businessmen.⁸⁵ One of these businessmen, Robert Otto, purposed a plan to mass-market the light bath as a therapeutic device and in 1899 formed the *Electricitätsgesellschaft Sanitas* (Sanitas Electricity Company), which built the *Kelloggische Lichtbad* along with X-ray machines and other equipment until the Second World War.⁸⁶

Ingold, who noted that money was not the full motivation for Gebhardt's interest in Kellogg's light bath, identified two main reasons for his immediate appreciation of Kellogg's work. The first was that Gebhardt had visited the spa of Arnold Rikli (a Swiss pioneer in light therapy) in 1887 and had experienced the healing power of light for himself.⁸⁷ Second, while completing his doctorate, Gebhardt studied under the German physician and physicist Hermann von Helmholtz (1821–1894), who taught him the principles of thermodynamic physiology.⁸⁸ Thermodynamic physiology taught Gebhardt that sunlight replenished the human body's life force with kinetic energy—much as a battery is recharged, so the human body was a battery recharged by the sun.⁸⁹

Whatever Gebhardt's motivations, Kellogg's light baths were an instant success in Germany. Kellogg recounted that, after Gebhardt returned to Germany and an endorsement from Kellogg's old professor at the University of Vienna (Wilhelm Winternitz), "Light Institutions" utilizing his light bath were formed in most of the major cities.⁹⁰ But his invention soon became even more famous through royal and imperial patronage. Kellogg proudly wrote that King Edward VII of England was "cured of a distressing gout at Hamburg" using his light bath, and that soon after he "had the bath installed at Windsor and Buckingham palaces."⁹¹ This, in turn, led Germany's Emperor Wilhelm II to install light baths in his palaces as well, and soon many "of the crowned heads and titled families of Europe" followed suit.⁹²

The example of Gebhardt's intercultural transfer of Kellogg's light bath back to Germany perfectly illustrates Thomas Adam's distinction of intercultural transfer from the models of "Europeanization, Americanization, and cultural diffusion in that it assumes that exchange processes always occur in both directions."⁹³ Kellogg predominantly gained his knowledge of light therapy principles from European practitioners but determined that their methods were not completely suited to his own. He thus modified both their inventions and techniques and, in the case of the incandescent light bath, added to the practice of light therapeutics as a whole. Once brought back to Germany, Kellogg's light bath represented the completion of a cycle of intercultural transfer that still impacts Europe and North America to this day. Modern infrared saunas, descendants of Kellogg's light baths, have recently enjoyed

⁸⁵ Ibid.

⁸⁶ Ibid.

⁸⁷ Ibid., 38.

⁸⁸ Ibid.

⁸⁹ Ibid.

⁹⁰ Kellogg, *Light Therapeutics*, 4.

⁹¹ Ibid.

⁹² Ibid.

⁹³ Adam, *Intercultural Transfers and the Making of the Modern World*, 5.



resurgence in the American market, and light bathing is still practiced in solariums across Europe.

Conclusion

In his “Sunlight” lecture Kellogg observed that in “excluding ourselves from the light, we are depriving ourselves of the benefit of the most powerful of all known vital stimulants.”⁹⁴ The intercultural transfer of light therapy practices between Europe and the United States shaped our relationship to the sun, artificial lighting, and medicine. A central theme of the “diseases of darkness” runs throughout Kellogg and his contemporaries’ utilization of light therapy as a mode of health reform, and the various technologies and practices used to combat these diseases brought people “into the light.” For Kellogg, this was both a physical realization as well as spiritual—the good, pure light shown into the body and triumphed over the evil, diseased darkness. In the wider cultural context, the imagery of a dark world juxtaposed with the light of progressivism.

Light therapy, much like anything else Kellogg did, had an undertone of salvation. The language of changing the body and communing with the divine combined into the practice of natural healing through God’s creation. While Kellogg was against the idea of Nature as a God, he more than embraced the notion that God could touch humanity through nature. This was not pantheism in that God was nature, but rather that God utilized nature to reach out to humanity. In this case—as in the context of the ancient Egyptians—the sun’s rays were once again envisioned as divine life-giving hands outstretched to soothe and heal humanity both physically and spiritually. God could touch humanity through sunlight. Although this emphasis separated heliotherapy from the other light therapy methods in Kellogg’s repertoire, this does not mean that Kellogg did not heavily utilize radiotherapy, actinotherapy, and his own infrared therapy.

Kellogg employed all forms of light therapy into a program that cured disease as much as it aided in overall wellness. While severe cases of tuberculosis and other diseases were treated with X-rays and actinic rays, patients were still taught and encouraged to sunbathe for the benefit of their physical stamina. Thus, Kellogg synthesized the European methods of Freund, Rollier, and Finsen into a new form of light therapy in the United States and added to the light therapy milieu with his incandescent light baths. The utilization of this full range of the light spectrum allowed him to approach the conditions of his patients individually and prescribe unique light therapy courses as needed.

To some it may seem strange that light therapy still enjoys a healthy existence in Europe while it is faced with near extinction in the United States. But this is perhaps due to the same cultural values that required Kellogg to modify Finsen’s arc lamp. Americans still value mobility, convenience, and comfort, and in a culture

⁹⁴ John Harvey Kellogg, *Sunlight: The Health Giver*, “Natural Living,” Box 10, John Harvey Kellogg Papers.



dominated by antibiotics, it is much easier to take a pill than to alter one's lifestyle to accommodate light therapy—especially heliotherapy. In many cases the acts of tanning and frequenting light spas are seen as leisurely activities more than a matter of health. Added to this, American health insurance companies generally stopped recognizing light therapy (excepting X-ray therapy and radiation therapy) as a legitimate source of treatment in the late 1970s. Pharmaceutical companies also moved against light therapy practices as it was impossible to monetize the sun. Remnants of the nature-cure movement still linger in society, but unfortunately their influence has revived anti-vaccination extremes just as much as they have promoted infrared saunas and heliotherapy. Nevertheless, as Rollier and his contemporaries noted, using light for healing is ancient in its foundations and deeply ingrained in cultural memory. We are unlikely to stop seeking out the sun and basking in its rays anytime soon.

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