The Early Days of Radiation: Homeopathic Shadows

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Roentgen's discovery of x-rays in 1895 and Curie's discovery of radium in 1898 caused great excitement in medicine. Within months, doctors in Europe and America were experimenting with these new tools for diagnostic and therapeutic purposes. A flood of papers appeared in medical journals and presentations were given at congresses. Expectations of radiation were high. Amidst this gadarene rush, doctors and patients were unaware of the immense harm that could be caused by such promising treatments which seemed capable of treating otherwise fatal cancers. Eventually, recognition of the risks was impossible to deny as patients developed serious complications, and many doctors and laboratory personnel – the so-called martyrs of medicine – acquired serious burns, limb disfigurement, and tumors from excessive amounts of radiation. Death was not unheard of, as graphically illustrated in the case of Mihran Kassabian, an Armenian immigrant who was one of the first to use x-rays in medicine. Kassabian died at the age of 40 from metastatic cancer in his hands caused by radiation exposure when he served as a military doctor in the Spanish-American War. Another example is the case of Emil Grubbé (*vide infra*), who endured over 90 operations for cancerous burns from heavy exposure to radiation. Despite serious disfigurement, Grubbé at least lived to the age of 85, although paying a high price.

There were many pioneers in the early days of radiotherapy, including Kassabian and Piffard in the United States, Freund and Schiff in Austria, and Finsen, Stenbeck, and Sjögren from Scandinavia, to name a few. Among the contributors, four homeopaths can be counted: Emil Grubbé, Francis Benson, William Dieffenbach, and John Mallory Lee.

Emil Grubbé: First to Use X-Rays in Medicine or Teller of Tall Tales?

The contradictions of Emil Grubbé are evident in the following characterizations: "a reputation for accuracy and honesty which were characteristic of his life throughout" and "vain, boastful, incompletely truthful" (Fig. 8.1).

Who was the real Emil Grubbé? What were his contributions to medicine? In its obituary column, the *British Medical Journal* (*BMJ*) wrote that Grubbé "soon gained a reputation for accuracy and honesty which were characteristic of his life throughout" and enumerated several prestigious awards and the offices he held [1]. By contrast, other authoritative sources have described Grubbé as "difficult and often mean-spirited … [a man of] relentless bitterness and contentiousness … vain, boastful [and] incompletely truthful … personally despicable, given to confabulation" [2, 3]. Grubbé was nothing if not a self-promoter and wrote on one occasion, "From a purely historical standpoint, I promise that [my next] paper will be one of the most momentous in X-Ray literature" [4]. In another publication that same year, Grubbé (retroactively) asserted a series of claims in radiology [5]. An article in *Science* refers to him rather cautiously as being "probably the first American to treat a patient with x-rays" [6].

Such inconsistency gives reason to pause and ask about the real person behind the mask. Among homeopaths, it is accepted that Grubbé was the first person to treat cancer with radiation, and this is likely true, although there is enough doubt that the true facts demand critical appraisal.

Emil Grubbé was born in Chicago in 1875 and the son of German immigrants. He went to work at the age of 13 as a bottle washer and errand boy in a local drug store and then left to work at Marshall Field's department store, where Mr. Fields was impressed enough with Grubbé to urge that he pursue his interests in science and medicine. To prepare for medical school, it was necessary for Emil to obtain further education, so he enrolled at a local normal school, supplementing his income by night watchman work. At the age of 20, in 1895, Grubbé entered the Chicago Hahnemann Medical College, where he was simultaneously given a faculty appointment in physics and chemistry. Grubbé completed his medical training in 1898 and remained on the Hahnemann faculty for several decades, holding the titles of professor and chair of the departments of electrotherapeutics and radiography until 1919 [7]. According to Orndorff,

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Fig. 8.1 Emil Grubbé. First to use radiation in medicine (Image by permission of Radiological Society of North America. Author Benjamin H. Orndorff [8])

Grubbé's laboratory at the Hahnemann Hospital formed the nucleus of the first medical school department to teach radiology [8]. Grubbé also founded the first radiation clinic in Chicago and may have been one of the first to establish a continuing medical education (CME) program when he created 2-week courses in radiation physics and the therapeutic use of radiation. He claimed to have taught over 7,000 physicians how to use x-rays over the course of his career. He conducted a busy private practice of radiology and published nearly 100 papers. With increasing age, Grubbé suffered severely from the effects of radiation-induced dermatitis and anemia sustained from his early experiments, and he endured over 90 operations to remove skin cancers and damaged tissue; eventually, he lost his left arm and part of his jaw and face and died from metastatic skin cancer in 1960. Grubbé's severe disfigurement resulted in divorce and social isolation: it would not be unusual for him to greet visitors from behind a screen to block his disfigurement from view. For his professional accomplishments, Grubbé was recognized with honorary membership of the Institute of Medicine, the Walter Reed Society, and the American Cancer Society, as well as presidency of the National Society for Physical Therapeutics.

The Discovery of X-Rays and Its Impact on Grubbé

By the time of Roentgen's discovery in 1895, Grubbé had already gained experience (or so he claimed) with gases and manufacture of the Crookes' vacuum tube, from which radiation could be generated by the passage of electricity through the tube. So when Roentgen took the first x-ray picture in November 1895 and reported it one month later, the medical community was abuzz with interest and for Grubbé it presented a special opportunity, even before he had completed his medical studies. From previous work with the Crookes tube, Grubbé had already sustained severe dermatitis by putting his arm too close to radiation from the tube. On January 27, 1896, he sought advice from Dr. Cobb, a Hahnemann faculty member, who examined him in the presence of three other colleagues, Drs. Gilman, Ludlam, and Helphide, each of whom gave different suggestions. Dr. Gilman had no particular remedy in mind but, in accordance with the homeopathic principle of *similia similibus curentur*, commented that "any physical agent capable of doing so much damage to normal cells and tissues might offer possibilities, if used as a therapeutic agent, in the treatment of pathologic conditions in which pronounced irritative, blistering, or even destructive effects might be desirable," such as cancer, lupus, and ulcer [5]. Thereupon, Drs. Ludlum and Halphide referred two patients to Grubbé for radiation treatment. The first patient, Mrs. Rose Lee, had incurable breast cancer and the second patient, Mr. A. Carr, had advanced lupus vulgaris. Both patients were treated immediately, on January 29 and 30, respectively, with Grubbé noting that he used a lead shield to protect his patients from harmful effects of x-rays in other parts of the body, a precaution he introduced as the result of his own x-ray-induced burns. So rapidly was treatment undertaken that it had not been possible to set up a suitable office and the radiation was administered in a factory, but by the end of February 1896, Grubbé (who was still a medical student) opened a "properly equipped laboratory for the diagnostic and therapeutic use of x-rays and electric currents." This facility was fully operational, ironically enough, by April Fool's Day (April 1) 1896. Of course, this proved the beginning of a very prosperous (if not preposterous) radiological career for Grubbé. While Grubbé's claim to be the first to use radiation for treating cancer is probably valid, there is a need to account for some puzzling gaps.

Firstly, it is odd that neither he nor his faculty supervisor made any effort to present or write up such epochal results, although in 1902 he did publish a series of seven treated cases [9]. (It is of interest that Grubbé stated in his paper that he was seeing 70 patients a day, "which we believe to be the largest number of daily x-ray treatments yet reported by any individual.") He opened his 1902 report as follows: "Realizing that the reporting of immature results … has been the bane of current medical literature, we have deferred giving for publication our experience with the x-rays in the treatment of malignant diseases because we wished to give the remedy the test of time." Grubbé elaborated further by pointing out that (1) the first patients both died within a few months, (2) he was still a medical student, and (3) he had no access to medical journals. Even if one grants some validity to these reasons, it is surprising that he failed to capitalize academically on Mrs. Lee and Mr. Carr as he obtained further encouraging findings in the ensuing months. It is perhaps even stranger that Grubbé's faculty colleagues failed to pursue an opportunity that could have brought credit to an establishment that had been described as a "third-rate medical school." It makes one wonder exactly what kind of relationship the medical student Grubbé had with his teachers. By failing to claim credit at the time, Grubbé left himself open to a rival claim from Dr. H. P. Pratt, another Chicago physician, who asserted that in April of 1896, he was the first to apply x-rays for treating cancer. It was not until 1933 that Grubbé came forth, explaining that his long silence in this regard was due to the fact that he could furnish no supporting documentation in the form of referral letters or patient notes, all of which he thought had been destroyed in a fire [4]. In 1933, however, Grubbé discovered the two referral letters in a partially burned container that he thought had been completely destroyed. It was in the wake of this discovery that Grubbé published a paper and a book claiming priority in applying x-rays for cancer therapy [10]. While some literature accepts this claim [11], other reports are more circumspect. For example, the above cited *BMJ* obituary asserts that Grubbé "probably" was the first, and a biography published by the Chicago Radiological Society describes him as "one of the earliest radiation therapy specialists in this city and perhaps in the United States" [7]. The most exhaustive account comes from Paul Hodges [12], a former chairman of the Radiology Department at the University of Chicago, and himself a distinguished radiologist, who was commissioned to write Grubbé's biography. For this, Grubbé himself can be thanked, since he bequeathed his estate to the University of Chicago with the stipulation that the university publish his life story. It is likely that what was written differed from what Grubbé had in mind, but Hodges' biography is well regarded and considered frank yet fair [3, 13]. Hodges asked the FBI to analyze the two referral letters from Ludlam and Halphide to Grubbé; their analysis showed that the handwriting was authentic, leading Hodges to conclude that Grubbé was the first to employ x-rays for therapeutic purposes, but others are still unconvinced [14, 15].

It can be concluded that Grubbé was an early enthusiast of radiation and that even before completing medical training, he had acquired requisite skills that allowed him to seize an opportunity provided by his Hahnemann colleagues – perhaps he *was* the first to apply radiation for treating cancer. Whether he was the first to use protective lead shielding is not proven, although that too is one of his claims. There is little doubt that Grubbé was a leader in the emerging field of radiation therapy. But some of his claims were far-fetched, such as alleged worldwide travelling when he was a medical student, his supposed discovery of platinum in Idaho (where only traces have ever been found), his manufacture of synthetic diamonds, and his claim to be first with fluoroscopy and likewise with the therapeutic use of radioisotopes all are "palpably erroneous" according to Hodges. Perhaps Grubbé's initial use of radiation was based on homeopathic reasoning, but it is sadly ironic that Grubbé had already been exposed to excessive and destructive doses of radiation from which he eventually died. It is not known whether he ever used homeopathy in his practice or if he followed homeopathic dosing guidelines in the use of radiation.

Francis Benson

Francis Colgate Benson (1870–1941) was a senior surgeon at Hahnemann where, in 1894, he had obtained his medical degree. He developed an interest in radiation as it gained a foothold in American medicine, was one of the first to use radium in the United States [16], and became known as "a pioneer in the adaptation of radium to medical purposes," as well as for "organizing this country's first separate [general hospital] department for the use of radium in medicine and surgery" [17]. He also gave the first complete course in the use of radium at a medical college.

Benson was a man of other interests, including the collection of medieval manuscripts and early bibles, which still appear from time to time on the auction market. Unusually for an American, he was also an aficionado of cricket, writing a collection of verses in praise of the game [18]. In reference to the cricket field at Haverford College, Benson wrote in his poem *The Field*:

> Could you imagine this whole earth could yield
> A spot more beautiful than our old cricket field?
> Ring'd round with immemorial elms it lies
> A fair green lawn.

An unsung figure nowadays, Benson deserves a spot in the history of medicine for his pioneering work with radium.

William Dieffenbach

Although he was once well known in New York circles and beyond, William Hermann Dieffenbach is now largely forgotten (Fig. 8.2). Dieffenbach (1872–1937) trained at the NYHMC, received his medical degree in 1900, and remained on the faculty throughout his career, holding variously professorships of mechanotherapy, bacteriology, and hydrotherapy. He became known for his work in radiotherapy, hydrotherapy, ultrashort wave therapy, electrotherapeutics, mechanotherapy, and the homeopathic proving of radium.

Dieffenbach spent many years in medical administration. In 1918, he was the president of the Medical College and Hospital for Women under turbulent circumstances, which resulted in his suing of four female doctors for slander and libel [19]. The women concerned had made allegations that Dieffenbach eliminated the women's medical college in order to procure the building for the NYHMC. In reality, the women's college had been unable to recruit adequate numbers of students due to World War I and was barely viable. Other offices to which he held included membership of the board of trustees of the Community Hospital, presidency of the medical board and acting president of Broad Street Hospital, vice-president of the New York Homeopathic Medical College, and president of the American Institute of Homeopathy. In 1927, Dieffenbach served as chairman of the endowment committee at a critical time in the history of the New York Homeopathic College and led a successful $1,000,000 fund-raising effort that staved off financial disaster [20].

Dieffenbach quickly achieved fame for his leadership in using radium for nonoperative cancer. His interest in x-ray therapy began shortly after Roentgen's discovery of x-rays. Under the direction of William H. King, dean of the New York Homeopathic College, the first public x-ray therapy clinic was opened at NYHMC in 1900. Encouraging results with x-rays for intractable skin diseases had been reported by Freund and Schiff in Vienna, which caused Dieffenbach to try this approach in the treatment of uterine fibroma. He published the case as the first x-ray-induced cure of fibroma in 1904 in the *North American Journal of Homeopathy*. His 1925 description about this publication is of interest: "The case was published in Dr. E. H. Porter's *North American Journal of Homeopathy* twenty years ago, but being from homeopathic sources has never secured the credit due as the first case of fibroid treated by means of the x-ray. With improvement of apparatus the therapeutic results from many countries soon developed an extensive literature" [21]. As a good homeopath, Dieffenbach stressed in this review the necessity of individualizing the radiation dose and was opposed to the giving of radiation at a standard dose as some were doing. He said that "all these … methods are fallacious, if not dangerous, for they fail to take into consideration the personal and biological equation of the individual patient and tissues treated." He then gave examples of different factors to take into account. He thought that the administration of x-rays should be in accordance with the Arndt-Schulz principle (see Chap. 16), just as some had claimed for drugs, and gave several examples of medical conditions that responded to low-radiation doses. Dieffenbach was critical of the use of "knockout doses" of radiation in cancer, as they sometimes proved too much for the patient. Other points of interest in his 1925 review include reference to Dieffenbach's special method of treatment for rectal cancer and of the fact that in 1910 his group had reported on the first ten cases of inoperable bladder cancer treated successfully through an incision with a dose of 2,200 mg hours of radium exposure.

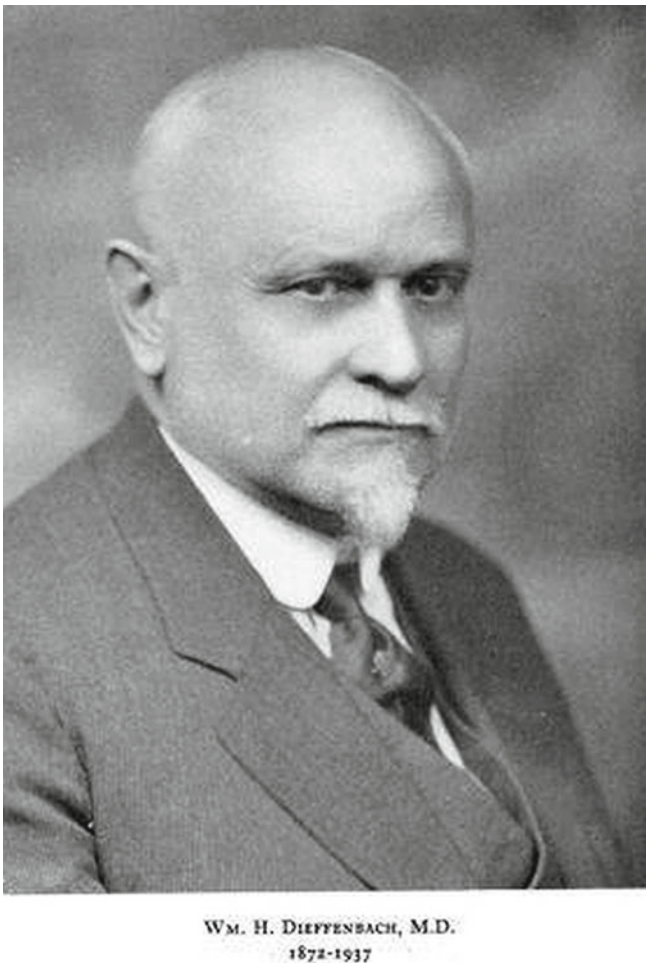

Fig. 8.2 William Dieffenbach. New York homeopath and radiation specialist (Courtesy of Sylvain Cazalet, Homeopathe International, Montpellier, France)

Dieffenbach reported in 1904 that he had cured five cases of cancer with radium coatings on celluloid rods inserted directly into the affected parts: this work gained publicity in the national press [22]. The use of gelatin-radium rods was introduced to Dieffenbach by William King in 1902,

but initial results were unsatisfactory and produced dangerous cardiac arrhythmia. Improvements were obtained when a celluloid material was used to enhance the diffusion of radium into diseased tissue [23].

Although Dieffenbach worked in a homeopathic college and published mainly in the homeopathic literature, he interacted with allopathic colleagues, including Henry Piffard, a prominent authority who had begun his own experiments in 1902 and who made important suggestions to Dieffenbach on the delivery of radium. One measure of Dieffenbach's stature can be gauged by the fact that he was invited by President Roosevelt to represent the United States at the First International Congress on Radiology and Ionization, held in Liege, Belgium, in 1905. This invitation had been extended by the Belgian government [24]. Another national representative was Ernest Fox Nichols, a world-famous physicist and future president of Dartmouth University who, with Gordon Hull, conducted experiments to measure the radiation pressure of light. It has been said that the Nichols-Hull experiments are one of the most significant experiments of all time in American physics [25]. Dieffenbach, who served as vice-president of that congress, was in exalted company. He was one of several physicians who presented their experiences with the therapeutic use of x-rays and radium, and his talk was published in full in the *North American Journal of Homeopathy* [23]. Apparently, Dieffenbach's presentation led to greater uptake in radium therapy among European than American doctors [26]. It is of interest that on the same panel, Mihran Kassabian, from Philadelphia, gave a talk in which he drew attention to his disfigurements from years of exposure to radiation. Dieffenbach was fortunate to escape the predations that had affected Grubbé and Kassabian. Whether it was related to Dieffenbach's greater caution or greater awareness of the danger is a matter of conjecture, but as pointed out below, his homeopathic proving study had warned him that doses higher than the 6X dilution were unsafe.

In describing the history of the Flower Hospital Cancer Clinic, Helmuth gave all the credit to Dieffenbach for the use of radium in treating nonoperative malignancies. "I want to state before you all, that the whole credit of this discovery or original research belongs to Dr. Dieffenbach and I have been only the man who has practically given the injections, done the mechanical part of the work," said William Tod Helmuth. He went on to explain that the two men had been deluged with enquiries, but "that, as you know, this is absolutely new and original, and as a consequence we are not yet prepared to give any great or positive statistics" [27].

In 1914, Dieffenbach reported on 16 cases treated with radium, x-rays, and/or surgery [28]. The paper was summarized by Steinke in the *International Abstract of Surgery*, which noted that Dieffenbach had owned to more failures than cures and urged for greater cooperation between surgeon, physician, and radiologist, with more use of postoperative radiation [29].

Other innovative work included the administration of x-rays to chicken eggs, which gained wide coverage in the press and in popular publications [30]. In these studies, Dieffenbach claimed that short-term radiation resulted in many more chicks hatching out as females, which could therefore increase egg-laying yield. However, when x-rays were given for several hours, deformities appeared which, Dieffenbach said, normally require many generations over the course of evolution. Although enthusiastic about his findings, it is not known how much further Dieffenbach took them.

Dieffenbach put radium to the test in the form of homeopathic proving; in this venture, he was joined by two homeopaths who are mentioned elsewhere, Copeland and Crump, and by others. The test methodology was considered to be rigorous by the standards of the time and was undertaken using 30x, 12x, and 6x potencies. Even at such low doses, all subjects reported joint and muscle symptoms as well as increased white blood cell counts. The homeopathic 6x dose produced such severe symptoms that the authors warned against its medical use. Concurrently and independently in Europe, Professor William His and many others began to use radium to treat arthritis and gout, bearing out the findings in Dieffenbach's proving [31].

Other Activities

Hydrotherapy was a fashionable form of treatment for all kinds of medical disorders, especially for neurosis, where it formed a prominent part of the programs offered at health spas. Dieffenbach placed high value on the benefits of this treatment, which he used in his practice and taught to medical students. His book, *Hydrotherapy: A Brief Summary of the Practical Value of Water in Disease for Students and Practitioners of Medicine* [32], was well reviewed [33, 34]. Dieffenbach served on the hydrotherapy committee of the American Electrotherapeutic Association. One of Dieffenbach's students was Benedict Lust, the father of naturopathic medicine, who was already a believer in hydrotherapy as a student and who transmitted this enthusiasm to his teacher. The growth of hydrotherapy and physiotherapy in hospital practice was in part influenced by these two individuals [35]. Although hydrotherapy is rarely used in medicine today, one measure of how it was seen a century ago can be illustrated by the fact that Professor Emil Kraepelin, one of the foremost psychiatrists in the world, attributed the successful treatment of agitation to use of continuous baths [36].

In 1903, Niels Finsen became the first and so far only dermatologist to win the Nobel Prize for his therapeutic work with ultraviolet irradiation in treating lupus vulgaris.

UV light therapy quickly gained popularity and was applied more broadly for a range of conditions. In the 1920s, it became a well-established treatment of psoriasis, with reports by Alderson in 1923 [37] and Goeckerman in 1925 [38] generating much interest. This form of treatment, albeit with modifications, remains part of the armamentarium against psoriasis today. Dieffenbach also made early contributions to the literature about UV phototherapy, with a paper in 1925 recounting his experiences, which were by then extensive [39]. He was already using UV rays by 1915, including in tuberculosis as a means of preventing surgical amputation. Dieffenbach provided a long list of skin diseases as being amenable to this treatment, with detailed mention of a new technique for treating psoriasis at the special clinic he had set up at the Broad Street Hospital in New York. He noted how psoriasis often worsened in the winter and would respond well to UV light. Also, perhaps ahead of his time, he recommended a vegetarian diet for his psoriasis patients, saying "we strongly urge this technic to the profession." Of interest, modern medicine acknowledges the benefit of a vegetarian diet for psoriasis, as reported in 1983 by Lithell and colleagues [40]. It is believed that such a diet works by lowering the levels of proinflammatory arachidonic acid [41]. In 1936, Dieffenbach authored a book on ultraviolet wave therapy, under the somewhat grandiloquent title *Ultra Short Wave Therapy: A New and Important Medical Discovery* [42].

John Mallory Lee

For 50 years, the town of Rochester, New York, was a hive of homeopathy, boasting four homeopathic hospitals and the patronage of wealthy families, including the Sibleys and Watsons, founders of the Western Union Telegraph Company. As mentioned in Chap. 7, Charles Sumner held the position of a city health commissioner. Among the more entrepreneurial of the city's homeopaths was John Mallory Lee (1852–1926), who graduated from the University of Michigan Homeopathic Medical School in 1878 (Fig. 8.3). He settled in Rochester where, for the next 9 years, he practiced general medicine and rose to prominence in the local homeopathic community. Between 1889 and 1894, Lee attended the New York Polyclinic and Postgraduate School in order to be a surgeon. As a surgeon, physician, and expert in radiation therapy, Lee was unusually well trained, but besides his technical proficiency, he gained a reputation as a fine physician who was "distinguished by the degree of time and emphasis spent on careful listening and other factors that contributed to a relationship of sympathy and trust between doctor and patient" [43]. In short, he would have been seen as an outstanding example of what homeopathy stood for. In addition, Lee was remembered as a generous mentor.

Fig. 8.3 John Mallory Lee. Entrepreneur, early pioneer in radiotherapy, and second president of American Radium Society (Image by permission of Central Library of Rochester & Monroe County)

Lee was part of the group that founded the Rochester Homeopathic Hospital in 1887, and in 1898, he established the Lee Private Hospital and Training School for Nurses (Fig. 8.4). This hospital, which survived until 1962, was to become famous for its radiation program, developed by Lee. The facility prospered, expanding in bed capacity from 7 in 1898 to 51 in 1903. While it provided the community with medical, obstetric, and surgical care, it was as a center of radium and x-ray therapy that the hospital became best known. Lee envisioned a time when surgery would become "free from the knife." He set off in a new direction when he installed state-of-the-art equipment for delivering radium to treat cancer and forged an association with Dr. Gioacchino Failla, a New York physicist who had spearheaded the use of radium and deep-therapy x-ray for cancer. Failla was subsequently to become a world-renowned biophysicist and radiobiologist who made very significant contributions to the relation between radiation and cancer, both as treatment and cause. He also set up the first research program to develop

Fig. 8.4 Lee Private Hospital, Rochester, NY. Watkins Publishing Company, 1911 (Image by permission of Central Library of Rochester & Monroe County)

the medical applications of radiation, created the first radon generator, and led the way in determining the correct dose of radiation to apply. In 1922, the Lee Hospital was one of the 12 hospitals nationwide to install a new radiation emanation plant and deep x-ray therapy equipment. Dr. Failla assisted Dr. Lee in this venture. Lee designed special glass tubes (known as capillaries) to inject radium fluid into the tumor, and within a few years, these capillaries were being used across the nation [43].

As Dickson noted, with Lee being so widely respected as a physician, surgeon, homeopath, and radiotherapist, his hospital began to attract physicians for residency training. Lee was generous to his trainees and would facilitate their spending time with Dr. Failla in New York [43]. In 1918, Lee was elected as the third president of the American Radium Society in recognition of his accomplishments in the emerging field of radiotherapy. Like some other pioneers, Lee suffered from the complications of handling radium: he lost two middle fingers from radiation burns, but unlike Kassabian and Grubbé, at least, he did not succumb to malignancy.

References

1. Anonymous. Obituary. BMJ. 1960;2:609.
2. Frame PW. Tales from the atomic age. The legend of Emil H. Grubbé [Internet] Health Physics Historical Instrumentation Collection; 2011 [Cited 2011 Dec 31]. Available from: www.orau.org/ptp/articlesstories/grubbe.htm.
3. Anonymous. Commentary: The Book Forum. J Am Med Assoc. 1965;191:161.
4. Grubbé E. Who was the first to make use of the therapeutic qualities of the X-Ray? Radiological Review. 1933;XXII:184–7.
5. Grubbé E. Priority in the therapeutic use of X-Rays. Radiology. 1933;XXI:156–62.
6. Anonymous. Pioneer in x-ray therapy. Science. 1957;125:18–9.
7. Biography of Emil Grubbé [Internet]. Chicago Radiological Society: Naperville; 2012 [Cited 2012 Oct 30]. Available from: http://www.chirad-soc.org/crs.grubbe_bio.html.
8. Orndorff BH. In Memoriam. Emil Herman Grubbé. Radiology. 1960;75:473–4.
9. Grubbé EH. X-rays in the treatment of cancer and other malignant diseases. Medical Record. 1902;62:692–5.
10. Grubbé E. X-ray treatment: its origin, birth and early history. St. Paul/Minneapolis: Bruce Publishing Company; 1949.
11. Vujosevic B, Bokorov B. Radiotherapy: past and present. Archiv Oncology. 2010;18:140–2.
12. Hodges PC. The life and times of Emil H. Grubbé. Chicago: The University of Chicago Press; 1964.
13. Lowman RM. Review of The Life and Times of Emil H. Grubbé. J History Med. 1965;21:302–3.
14. Brecher R, Brecher F. The rays – a history of radiology in the United States and Canada. Baltimore: Williams and Wilkins Company; 1969.
15. Knight N, Wilson JF. A history of the radiological sciences. In: McLennan B, Gagliardi RA, editors. The early years of radiation therapy, vol. 1. Reston: Radiology Centennial Inc; 1996.
16. Obituary. Frank C. Benson, Jr., MD, ScD, FACS. Professor of Radiology [Internet]. Hahnemann Medical College Yearbook. 1941 [Cited 2012 Aug 1]. Available from: http://archive.org/stream/medic41hahn/medic41hahn_djvu.txt.
17. Federal Writers Project (Pa.). Philadelphia, A Guide to the Nation's Birthplace [Internet]. Philadelphia Historical Commission. Harrisburg: The Telegraph Press; 1937 [Cited 2012 Aug 1].

Available from: http://www.ebooksread.com/authors-eng/federal-writers-project-pa/philadelphia-a-guide-to-the-nations-birthplace-hci/1-philadelphia-a-guide-to-the-nations-birthplace-hci.shtml.
18. Benson FC. Songs of the cricket field and other verses. Philadelphia: James Clark Press; 1932.
19. Sues 4 Women Doctors. Trial begun in physician's action for alleged slander. The New York Times. 1922 Aug 16.
20. Dr. W.H. Dieffenbach dies suddenly at 71. Head of community hospital board of trustees for years – aided other institutions. The New York Times. 1937 Jan 14. p. 21.
21. Dieffenbach WH. Roentgen therapy – its present status and recent developments. J Am Inst Homeopath. 1925;18:13–26.
22. Five cases of cancer cured. Dr. Dieffenbach successfully treats the disease with radium. The Spokane Daily Chronicle. 1905 Oct 13. p. 3.
23. Dieffenbach WH. A new method for the therapeutic application of radium salts. N Am J Homeopath. 1905;LII:769–74.
24. Lockyer, Sir Norman. International Congress on Radiology and Ionization. Nature. 1905,72:611–2.
25. Chapman K. Symposium commemorates Wilder Laboratory's designation as historic site [Internet]. Dartmouth Now. 17 Sept 2012. [Cited 2012 Oct 1]. Available from: www.now.dartmouth.edu/2012/09/symposium-commemorates-wilder-laboratorys-designation-as-historic-site/.
26. Editorial. The radium treatment of cancer. N Am J Homeopathy. 1914;62:236–8.
27. Dieffenbach WH, Helmuth WT. Clinic at Flower Hospital. N Am J Homeopath. 1909;24:419–29.
28. Dieffenbach WH. Report on cancer patients treated with Roentgen or radium rays and remaining clinically cured after more than three years. J Am Inst Homeopath. 1916;IX:430.
29. Steinke CR. Report on cancer patients treated with Roentgen or radium rays and remaining clinically cured after more than three months Int Abst Surg. 1917;XXIV:162.
30. Fisher B. Amazing new jobs for X-rays. Popular Sci. 1928;113:31–2.
31. Cowperthwaite AC. Radium as an internal remedy. Pac Coast J Homeopath. 1916;XXVII:19–23.
32. Dieffenbach WH. Hydrotherapy: a brief summary of the practical value of water in disease for students and practitioners of medicine. New York: Rebman Company; 1909.
33. Book Reviews. Hydrotherapy. Am J Nursing. 1910;X:222–3.
34. Book Reviews. Hydrotherapy: a brief summary of the practical value of water in disease for students and practitioners of medicine. J Adv Ther. 1909;XXVII:396–7.
35. Dieffenbach, radiotherapy specialist dies. Naturopath and Herald of Health. 1937;XXXXI:126.
36. Pope C. Progress in physical therapeutics. Hydrotherapy. J Advanced Therapeutics. 1909;XXVII:37–8.
37. Alderson HE. Heliotherapy in psoriasis. Arch Dermatol Syphilol. 1923;8:79–80.
38. Goeckerman WH. The treatment of psoriasis. Northwest Medicine. 1925;24:229–31.
39. Dieffenbach WH. Practical office applications of the ultra-violet rays. J Am Inst Homeopath. 1925;18:802–5.
40. Lithell H, Bruce A, Gustafsson IB. A fasting and vegetarian diet treatment trial on chronic inflammatory disorders. Acta Dermato-Venereology. 1983;63:397–403.
41. Wolters M. Diet and psoriasis: experimental data and clinical evidence. Br J Dermatol. 2005;153:706–14.
42. Dieffenbach WH. Ultra short wave therapy – a new and important medical discovery. New York: Westerman; 1936.
43. Dickson RJ. The legacy of 179 Lake Avenue: a small private hospital's service to the community. Rochester History. 2008;70:1–21. [Internet]. [Cited 2012 December 29]. Available from: www.rochester.lib.ny.us/rochhist/v70_2007/v7011.pdf.