

The Fowler home and general store in Wellsburg, West Virginia, built in 1848.

Detail of Fowler Store postcard. Meadowcroft Rockshelter and Museum of Rural Life.



RADIO X

GUARANTEED
NOT TO CONTAIN ANY

POISONOUS DRUGS

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Among the dusty bottles and medicine remedies from the Old Fowler Store a little tin box labeled “Radio X” caught the attention of the curator as she sorted through the old proprietary medicines from the turn of the 20th century. Was it really radioactive? What was it used for? Where did it come from?

Frequently, historical societies and museums acquire artifacts from physicians and pharmacies for their collections, including pharmaceutical agents. Some concerns for these rare, perishable objects include proper handling of materials to prevent decomposition or damage, historical accuracy, documentation of ingredients, and safety precautions for staff and museum visitors when these unknown materials are displayed. Meadowcroft Rockshelter and

Museum of Rural Life, a site of the History Center, in Avella, Pennsylvania, preserves the history of life in Western Pennsylvania over the past 16,000 years, which includes an archaeological site and a recreated 19th-century village.

In 2003 this historical site contacted the RA Lawrence Poison and Drug Information Center regarding a large collection of pharmaceutical agents that had been stored for an unknown length of time, but most likely for 80-100 years, in a 19th-century pharmacy. The museum was interested in knowing the chemical composition, uses, dates of production, and safety issues



This tin of Radio X tablets was found in Fowler's pharmacy supplies and claimed to unclog the ducts of the gallbladder. Photo Bonnie Sanford.

related to storage and display of these pharmaceuticals. Of particular concern was a little tin box labeled "Radio X."

The poison center sent two consultants to the museum to review the collection. Fifty-nine separate types of preparations were catalogued, most of which were purported to improve digestive problems, energy problems, colds, other respiratory problems, headaches, gynecological problems, children's

illnesses, and other miscellaneous ailments. One tin of "Radio X" pills emitted 400cpm beta particles, with a background count of 50-100cpm, which is the normal background radiation found in nature at this location. Other preparations found in the pharmacy contained mercury, narcotics, and anticholinergics.

Meadowcroft Museum acquired this

large collection of old pharmaceutical agents from the Fowler Store, which was established around 1850 by John Fowler and located in the lower left portion of his 16-room brick house in Wellsburg, West Virginia. Bordered by the states of Ohio and Pennsylvania, the store was conveniently situated close to a route used by drivers moving cows, sheep, pigs, and turkeys across the toll pike from Pennsylvania into Ohio.¹

Three generations of Fowler family members owned and operated this building as it served as an inn, pharmacy and post office, and general store. Items sold in the store included dry goods, groceries, notions, medications, clothing, farming tools, hardware, and supplies. This establishment ceased operation in the 1930s, and the building was sold in 1965. It currently operates as an inn and restaurant under the name Drover's Inn. In 1966, Meadowcroft Museum purchased the contents of the store and recreated its late 19th-century interior based upon Fowler's account books and records.² The original contents are on exhibit at the museum and shed light on the evolution of late 19th-century health practices before the federal government began regulating medicines and treatments. This display also glimpses the application of medical treatments by homemade or regionally made remedies versus the practice of medicine by doctors using a rigorous scientific method.

The remedies displayed at Meadowcroft Museum have a range of ingredients found in multiple preparations. Many were questionable and contained ingredients no longer in use. However, numerous ingredients are still employed medically, such as atropine, morphine, iron, nitroglycerine, quinine, and digitalis. Several products are no longer in common public use because of serious health effects: arsenic, strychnine, and phosphide. Because some preparations were either controlled substances or could pose



The recreated Fowler General Store is housed in Meadowcroft's Museum of Rural Life. Photo Bonnie Sanford.



serious harm to the public, the poison center advised the museum to store/exhibit Radio X, strychnine, narcotics, and anti-cholinergic preparations in one of three ways: behind locked display containers, in the wrappers only, or sealed in permanent Lucite displays.

Human beings have brewed and stewed medicinal recipes made from plants, insects, animals, and minerals, searching for relief or the “cure all” for just about any ache, disease, or physical deformity that has afflicted humankind. In fact, skeletal remains found from a paleo-human culture in north eastern Brazil revealed diseases such as osteoarthritis, head louse, dental problems, and intestinal parasites. Pollen samples from these sites strongly suggest the use of plant materials to alleviate symptoms of intestinal parasite infestation.³

Europeans coming in contact with Native Americans introduced diseases such as small pox, influenza, measles, and diphtheria, which spread rapidly in epidemic proportions. Many North American Indian tribes relied on spiritual healers who practiced medicine by combining the use of herbal preparations with spiritual rituals and religious ceremonies. These traditional healers wanted to achieve a harmonious balance or “wholeness” by uniting a community of people with nature and the spiritual world: the belief that every plant, animal, and object on earth is a spirit, and that illness stems from an imbalance with nature and the spiritual world. These healing practices, many of which are still in use today, included the use of herbs, teas, sweat lodges, and smudging (which used the smoke of sacred plants) along with healing rituals and ceremonies.⁴

During the mid-19th century in Washington Pennsylvania, Dr. F.J. LeMoynes was practicing medicine and dispensing medicinal recipes he concocted from home

grown plants and herbs. Many of these preparations contained sugars and berries that were perhaps used to mask the bitter or unpleasant taste of the plants or herbs.⁵ Southwestern Pennsylvanians during this time also relied on “home remedies or cures,” which had been passed down through generations, some originating with family members who had immigrated to America. Many people could not afford to pay a physician for care and drug treatment, and so relied upon the use of “folk medicine” to relieve conditions ranging from warts, stomachaches, baldness, freckles, and even more serious conditions such as asthma and high blood pressure. Whiskey served as the main ingredient for many of these medicines. For some folks, medicine had to taste bad to be effective, so onions and garlic (which also possess effective antibiotic properties) were


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Pierre and Marie Curie discovered radium in 1898.
The Pittsburgh Press, February 10, 1991.

added to make patients’ eyes and noses water.⁶

The medicine collection at Meadowcroft Rockshelter and Museum of Rural Life also contained a wide spectrum of tonics, elixirs, and salves. Small cardboard boxes had medicine bottles bearing the name and face of a “Dr. Munyon,” filled with cures for the bladder, bowels, nerves, kidneys, heart, and even a remedy for the crying baby. “Dr. Miles,” “Dr. Henry Baxter,” “Dr. Fenner,” and “Dr. Daniels” had cures for nearly every ache and pain imaginable. There was even a pill called “The Little Pink Pill for Pale People,”—most likely a cure for anemia.⁷

Patented medicines became popular in the late 19th century. Lydia Pinkham of Lynn, Massachusetts, brewed a vegetable compound in the cellar of her home, which claimed to “Cure Female Weaknesses” or “Female Complaints.” One of Pinkham’s patented elixirs, distributed in a brown bottle, was advertised using her image along with testimonials from cured, satisfied customers.

Pinkham claimed to improve ovarian function and to cure ailments such as amenorrhea, dysmenorrhea, uterine prolapse, and pelvic congestion. Many women desperate to avoid dangerous 19th-century surgical procedures turned to her remedy hoping for a cure.

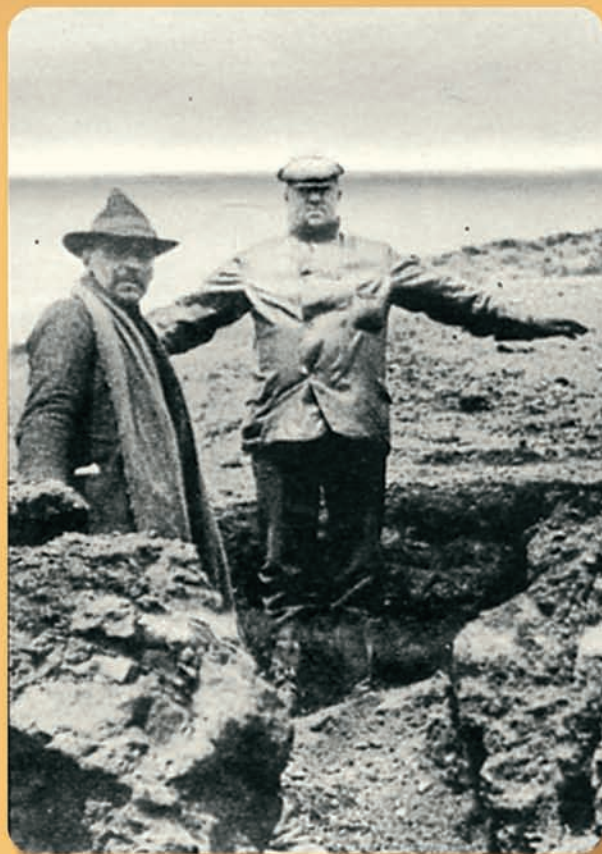
In 1906, the United States Government passed the Federal Food and Drugs Act, prohibiting “adulteration and misbranding of foods and drugs.” Labels were required to plainly state ingredients, and medicines could not contain hazardous or filthy, decomposed substances. In 1938, an amendment tightened up the standards and prohibited false therapeutic drug and cosmetic claims. The FDA also required factory inspections for all drug, food, and cosmetic companies.⁸

During the era of backyard medicinal breweries, Pierre and Marie Curie discovered radium in 1898 while working with uranium and identifying other atomic constituents of pitchblende. Physicians of the late 19th and early 20th centuries recognized that radioactive substances had potential uses in the practice of medicine, from visualizing bones (X-rays) to treating cancer. Early uses included treatment of skin problems (such as moles, warts, psoriasis, eczema, and acne), tuberculosis, hoarseness, blindness, lupus, spasms and paralysis, superficial or accessible cancers, and esophageal strictures. In addition, radiation was thought to be bactericidal, a good analgesic for neuralgia, and also effective in removing hair. Various products containing radium or other radioactive substances were advertised to improve digestion and clean teeth as well as cure blindness, arthritis, cancer, and high blood pressure. Such products included elixirs, face creams, toothpaste, hair tonics, candy bars (sold as “rejuvenators”), contraceptive jelly, and “liquid sunshine,” or radium water. Although some of these products actually contained radium or other

sources of radioactivity, many did not.⁹

In the late 19th century a “Radio-Active cure all” craze took hold, and companies like The Radium Remedies Company of Pittsburgh, advertised and manufactured pills claiming to contain radium (most likely between 1898, when radium was discovered, and 1906 when the Pure Food and Drug Law was passed). Some of these radioactive products were available until the 1920s as they could escape the attention of the F.D.A. if sold locally and for limited usage. The package insert contained in the Radio X tin states that the Radio X tablets are guaranteed by the Radium Remedies Company to “not contain any poisonous drugs.” Although promoted specifically to unclog the ducts of the gallbladder—the supposed root of most illness—the tablets also were used to “purify the Blood, clear the Complexion, perfect Digestion and regulate the Stomach and bowels...” Directions included specific instructions for men, women, and children.¹⁰

Many companies at this time advertised radioactive contents in their products, but it’s important to note that few truly contained radioactive ingredients. The sparse availability of radium coupled with the prohibitive cost caused manufacturers to stretch the truth on their ingredients, and it was highly unlikely that 19th-century pill poppers would have had a means to test the radioactive content of their drugs. The Radio X tablets found in the collection at Meadowcroft Museum were field-tested with



Joseph and James Flannery established the Standard Chemical Company, which introduced radium to Western Pennsylvania.

The Pittsburgh Press, February 10, 1991.

a Geiger counter and showed 400cpm (50-100cpm is normal background radiation). This radioactivity appeared to be composed of primarily large and small radioactive particles (helium nuclei and electrons) as a sheet of paper blocked some and thick paper or a book blocked any further counts. An attempt was made to identify the isotope, but one Radio-X pill was not enough to provide accurate analysis. Radio X most likely contained primarily Radium -228 (Ra 228), which decomposes rapidly, taking approximately 28 years for most of the radium to disappear. This would explain the weak radioactivity found and the inability to identify the isotope in the one pill sample available.

Radium was known as early as 1905 to cause ulceration, hair loss, burns, scarring,

and inhibition of rapidly dividing tissue (tumors, experimental embryos, and others).¹¹ Reports of skin effects may have led to advertisements addressing complexion, such as acne, eczema, and warts, and reports on nervous effects may have led to advertisements on neuralgia, nervousness, palpitations, numbness, and weakness. Of the various patent or quack radioactive preparations, Radio X seems to have been a unique, radium-containing product sold in a limited area (Southwestern Pennsylvania), which may have also contained other substances.

Joseph and James Flannery are responsible for bringing radium products and production to Western Pennsylvania. Pittsburgh natives and early 20th-century funeral directors, they were self-taught metallurgists. They initially patented a staybolt in 1903 for use in locomotives and developed vanadium steel, a better steel alloy. (In fact, vanadium steel was used in Scandinavian swords, Ford's Model T cars, and the Panama Canal). The brothers obtained mining rights in Peru in 1905 for rich deposits of vanadium, and also secured mining rights in Paradox Valley, Colorado. They successively established Flannery's American Vanadium Company, which became the Vanadium Corporation

of America and the Colorado Chemical Mining Company.¹²

In 1911, these companies were organized and incorporated as the Standard Chemical Company of Pittsburgh for the purpose of mining and refining radium. The Flannerys' sister had developed cancer, and the brothers put all their energies and talents into producing the miracle healer: radium.¹³

European pitchblende was not available to the Flannerys, as the Austrian government had monopolized all sources of the ore, but carnotite ore was one source found in the mountains of Colorado. They used diamond drills to sample bores from the surface to deep in the earth to locate likely veins of radium-rich ore. Joseph Flannery established a concentration mill at the Colorado mine site; burros brought ores from the mountains to the mill and carried supplies back up. From there, sacks weighing 70 pounds each were transported by wagon or truck 65 miles to Placerville, Colorado, then by narrow gauge railroad to Salida, Colorado, and from there over 2,000 miles to the refining plant in Canonsburg, Pennsylvania, just outside of Pittsburgh.¹⁴

Three hundred men were employed at the Colorado concentration mill, 200 at the

Canonsburg refinery. Raw materials utilized in this refining process included 10,000 tons of distilled water, 1,000 tons of coal, and 500 tons of chemicals—which produced a residue in which radium was more concentrated.¹⁵

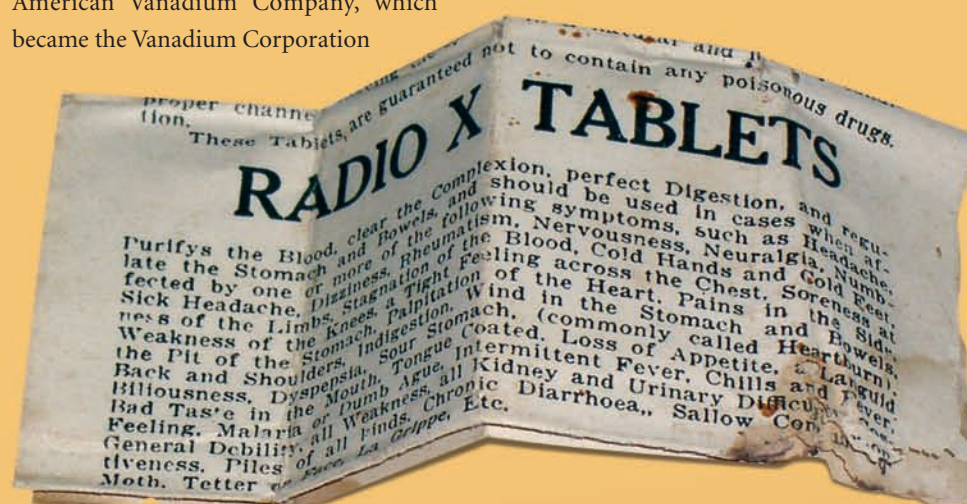
From Canonsburg, this radium-containing residue was sent to the company's Radium Research Laboratories in Pittsburgh, presumably the Flannery building in Oakland, where it underwent successive fractional crystallizations to produce the chloride and bromide salts of radium. These salts would have been 95 percent pure.¹⁶

The Standard Chemical Company produced its first salts in 1913 with a total yield of 2.1 grams, but by April 1921 it had produced a total of 71.8 grams or over half the world's total radium supply!¹⁷

Radium was measured and sold by the gram for medical uses, each gram priced at \$120,000—each milligram \$120.¹⁸ The average physician who used radium had 50 to 250 milligrams on hand. Due to the unusual popularity of radioactive products at this time and the high cost of radium, many companies simply falsely claimed to have radium in their products. How were physicians to know that what they had purchased was what they had been promised?

In 1912, by common consent, Madam Curie prepared the International Radium Standard, which was deposited in Paris; duplicate preparations were placed in leading capitals of the world. The head of the Radium Research Laboratories of the Standard Chemical Company sent preparations to the Bureau of Standards at Washington for comparison with the duplicate of the International seals of the U.S. Government in order to provide physicians the best guarantees possible.¹⁹

Many prominent medical practitioners used radium to treat patients; for example, Dr. Howard Kelly of Baltimore purchased a



Radio X tablets claimed to "Purify the Blood, clear the Complexion, perfect Digestion, and regulate the Stomach and Bowels..." Meadowcroft Rockshelter and Museum of Rural Life.



Three generations of the Fowler family owned and operated businesses, including a pharmacy, in this building.
Meadowcroft Rockshelter and Museum of Rural Life.

full gram in 1914 for his own private radium institute in Baltimore. The fact that these practitioners used radium to treat patients did not convince some members of the University of Pittsburgh that radium was useful, however, and several members considered it quackery. Ultimately, the University of Pittsburgh and the hospital there rejected a gift from Standard Chemical Company of \$6,000 worth of radium in 1914.²⁰

From 1919-1929, Radium Remedies Company patented medicines that were made in the Flannery Building in Pittsburgh. It is unclear, however, if they distributed these medicines. The company had a general office on the North Side of Pittsburgh and a mailing address at Federal Street.

In 1922, the Canonsburg plant was at peak production, at about 18 grams per year. About that time rich radium deposits were discovered in the Belgian Congo with 40-50 percent uranium oxide compared to an average of one-and-a-half percent found in the carnotite ore from Colorado. In the late 1920s the Standard Chemical Company in Canonsburg closed due to financial pressures associated with competition from other international companies. There were over 200,000 tons of radioactive debris left, and it cost the D.O.E. \$43.2 million to clean up the site between 1983 and 1986.²¹

Soon people who had used radioactive preparations by inhaling, ingesting, or injection were found to have an increased risk of lymphoma, bone cancer, leukemia, and

aplastic anemia. External exposure caused an increased risk of cancer in all tissues and organs. Exposure from ingested or inhaled preparations also increased the risk of cancers. The Flannery staff of scientists routinely experienced severe radiation burns from handling the radium salts. Many chief scientists and workers at the Standard Chemical Company died from cancer and anemia. Joseph and James Flannery both died in 1920 of unknown causes.²²

In 1960, Dr. Samuel Clark, of M.I.T. and Argonne National Laboratory started looking at people who had survived injections of radium solutions. About 200 men and women

notified health officials that they had worked on the fifth floor of the Flannery building, which had been the site of a lab that manufactured a variety of radioactive products (patent medicines, tonics, waters, and luminous clock dial paint) and may have also had a clinic where patients were treated with radioactive tonics and injections. This building was decontaminated in 1958.²³

The effects of Radio X tablets on the population are unknown. No reports of their use have been found. However, products that truly contained radium have caused significant morbidity and mortality, ranging from simple burns and scars to invasive basal cell carcinomas to florid radiation poisoning. Current medical practice still involves the use of radiation in the treatment of many cancers—over a century after these results

were discovered. It is interesting to note how a new phenomenon, like radioactivity, is utilized and picked up by certain practitioners with the belief that it has curative powers. Sometimes such new phenomena are harmless and sometimes if used indiscriminately, they can cause harm as radium could and did.

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¹ From the Archival collection of Meadowcroft Rockshelter and Museum of Rural Life.

² Ibid.

³ *Palaeogeography, Palaeoclimatology, Palaeoecology*, © 2007 Elsevier B.V., all rights reserved. <http://www.sciencedirect.com/science/journal/00310182>. Accessed 9/22/07.

⁴ Ibid.

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⁷ Templeton, D. "Pittsburgh's link to a deadly cure," *The Pittsburgh Press*, Feb. 10, 1991.

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¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

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²³ *The Story of Pittsburgh: Radium*, Volume 1, Number 7, August 1921. First National Bank at Pittsburgh.

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Many scientists and workers at the Standard Chemical Company died from exposure to radium.

The Pittsburgh Press, February 10, 1991.