

“The Utopia of Therapeutics”

Championed by U-M’s William Herdman, electricity in the 1800s was used to treat a host of ailments. BY JAMES TOBIN

IF A STRANGER BLUNDERED into William James Herdman’s quarters in the University of Michigan Medical Department at the turn of the 20th century, he might have mistaken the place for the electrical laboratory of Thomas Alva Edison. It certainly didn’t look like a doctor’s office.

Here were voltaic and galvanic cells; rheostats and dynamos; electrodes and transformers; generators and vacuum tubes; induction coils and soldering guns. These were the materia medica of Professor Herdman’s required course in electrotherapeutics, and students learned their use in detail.

William Herdman (M.D. 1875) wrote, “Every form of electric modality that has any distinctive physiological or therapeutic effect is studied in the laboratory as to its methods of generation, control and application to the patient. We believe this to be the only practical way for imparting the kind of instruction required for the practice of electrotherapeutics.”

Herdman had earned a four-year literary degree at Michigan in 1872, then the two-year medical degree, whereupon he joined the department as a demonstrator in anatomy. In that time before specialization ruled medicine, he moved quickly from anatomy to nervous diseases,

founding the program in that area, the forerunner of today’s Department of Neurology. According to the late Horace Davenport, noted historian of the Medical School, Herdman was never a great neurologist. But in the related field of psychiatry he made a major contribution: He persuaded the state legislature to provide funds for Michigan’s first psychiatric hospital, a research facility that would serve the state’s asylums for the mentally ill.

Yet Herdman’s great passion was electrotherapeutics. With John William Langley, professor of physics, chemistry, electrical engineering and metallurgy, he founded an electrotherapeutics lab in the early 1880s, and when Langley retired in 1888, Herdman became its chief.

He was under the spell of a fascination with all things electrical that had enchanted the West for many years. In the century before Herdman entered college, one major electrical discovery and invention had followed another — Benjamin Franklin’s proof that lightning was electrical; Luigi Galvani’s discovery of electrical connections between nerve cells; Allesandro Volta’s development of the battery; Michael Faraday’s invention of the electric motor, to name only a few. This central force in the universe was promising to remake industry. Surely, physicians believed, it could be harnessed for healing, too.

So physicians of the 1800s tried electricity on practically everything. It was administered by a bewildering

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variety of methods. Among them, wrote Sidney Licht, a physiatrist who chronicled the history of electrotherapeutics, were simple friction, aided by flannel wraps and a metal rod; the “electric bath,” the “electric breeze,” the “electric feather,” and a “most heroic method” called “commotion” — a direct application of powerful current that made some patients feel better and in others induced “spitting of blood ... convulsions, loss of sight” and occasionally death.

At one time or another between 1800 and 1900, electricity was credited with the effective treatment of a long list of ailments from smallpox, gout, arthritis and indigestion to asthma, nephritis, tuberculosis and constipation; even diabetes, cancer and plague were treated with electric current. It was tried as an anesthetic and a vector for drugs. No wonder that electrotherapeutics helped to inspire Mary Shelley to write *Frankenstein* (1818), about the experiments of a dedicated doctor who believed he could fabricate a human being out of spare parts and a jolt of the “ethereal fire.”

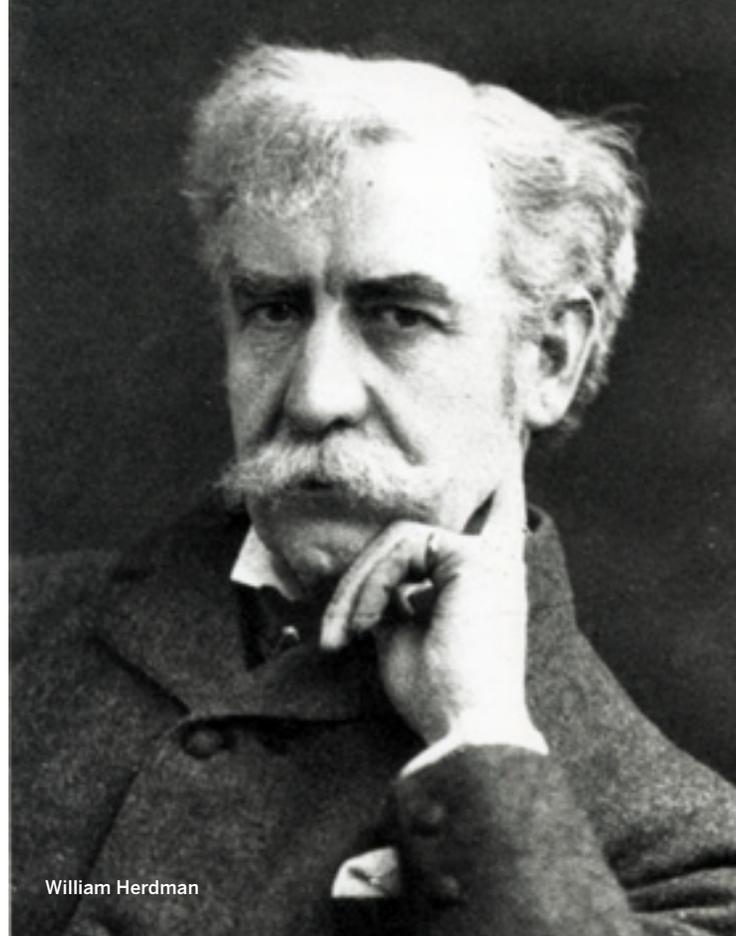
The very variety of treatments raised doubts about electrical medicine, and quacks and charlatans bedeviled its progress, especially in the U.S. In the early days of the republic, “celestial beds” and “metallic tractors” were all the rage until they were exposed as frauds, and even many treatments regarded as legitimate were soon discredited. By the Civil War, “to announce oneself as a believer in electricity as a remedy of positive value was a hazardous thing” in the profession, a contemporary observer noted.

Yet by the 1870s, devices became more reliable and affordable, and electrotherapeutics made a comeback, even among scientist-physicians at major medical schools.

The renewed promise came partly from physicists, who were beginning to crack the locks on nature’s deepest mysteries. This was the attraction for William Herdman. If the electron was the fundamental structure of all matter, then it seemed to Herdman, and to not a few others, that every variety of disease must be, at its base, a disintegration of electrons. If medical science could only master “the many forms of radiant energy now at our disposal,” Herdman declared, and apply those rays to diseased tissue without harming healthy tissue, “then the Utopia of therapeutics would be realized.”

Yet neither Herdman nor his colleagues in the National Society of Electro-Therapeutics, which Herdman served as president, could ever get the elaborate paraphernalia in their labs to deliver solid clinical results. The inflated promises could not be kept; within two years of Herdman’s early death at 58 in 1906, the electrotherapeutics lab was closed and Herdman’s course discontinued.

Of course, electricity would go on to be applied in fields from physical medicine to cardiology. But as a “Utopia of therapeutics,” it was a bust.



William Herdman

Insight does not always produce progress. Some corners cannot be turned. In the early 1960s, the computer pioneer Ted Nelson visualized an interface like the World Wide Web, but he fell far short of developing it. Years later, Nelson put it this way: “I mistook a clear view for a short distance.” Possibly the work of William Herdman and other acolytes of electrotherapeutics will one day be described the same way. [M]

Sources include William James Herdman and Frank W. Nagler, *A Laboratory Manual of Electrotherapeutics* (1898); Herdman, “Radiant Energy and Ionization: Their Relation to Vital Processes and Their Derangements,” *Journal of Advanced Therapeutics* (November 1905); Sidney Licht, “History of Electrotherapy,” in Sidney Licht, ed., *Therapeutic Electricity and Ultraviolet Radiation* (1959); Edward Shorter and David Healy, *Shock Therapy: A History of Electroconvulsive Therapy in Mental Illness* (2007); and Horace W. Davenport, *Not Just Any Medical School: The Science, Practice, and Teaching of Medicine at the University of Michigan, 1850-1941* (1999).