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The Bakken: A Library and Museum of Electricity in Life

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Abstract—*The Bakken: A Library and Museum of Electricity in Life* is located on the shores of Lake Calhoun in Minneapolis, Minn. The collections consist of some 12,000 rare and long–out-of-print books, journals, and ephemera, as well as several hundred original examples of medical electrical devices. The collections focus on the relationship between electricity and magnetism and living organisms, both intrinsic to life and as applied therapeutically. The collections are, however, much broader than this in several areas, and excellent secondary and reference materials are also available. Certainly, any research on anomalies relating to magnetism and electricity should begin here or at the Bakken website, http://www.thebakken.org. The Bakken has recently been thoroughly renovated and has expanded its science-education programs for young people.

Keywords: The Bakken — science museums — electrotherapy — magnetotherapy — bioelectricity — electrophysiology — animal magnetism — electricity — magnetism — history of medicine — history of science — special libraries

Introduction

It has been said that many great British institutions have been created as an afterthought. While neither British nor very large, The Bakken: A Library and Museum of Electricity in Life (Figure 1), located in Minneapolis, Minn., came into existence in much the same manner—as an afterthought. But more on this later.

The Bakken collections contain some 12,000 rare books and manuscripts dealing with electrotherapy, electrophysiology, biomagnetism, mesmerism, and neurology—in short, virtually everything of an historical nature that can be found on the subject of the natural and artificial wiring and electrification of living organisms. The books and manuscripts date from ca. 1270, the date of a manuscript of Vincent de Beauvais (the *Speculum Naturale*), to an approximate cutoff date of 1940.

The library contains a number of outstanding rarities: in addition to a half dozen or so scientific incunabula, there are copies of the first three editions of William Gilbert's *De Magnete,* the rare 1791 offprint of Luigi Galvani's *De Viribus Electricitatis,* a fine and complete copy of Robert Norman's *The Newe Attractive* of 1581, and a very rare first edition of Mary Shelley's *Frankenstein* (Figure 2). Many other volumes of comparable rarity and importance are in

Fig. 1. The Bakken: A Library and Museum of Electricity in Life. This photo, taken about 2 years ago, shows the rather considerable additions and renovations completed about that time.

the collection, most of which discuss biomagnetism or bioelectricity, but many are simply major classics in science, technology, and medicine.

Special collections include several superb Mesmer and animal-magnetism manuscripts and published works, as well as the surviving manuscript material of Albert Abrams, the father of the radionics movement. Over two hundred ephemeral items (advertisements, programs, broadsides, circulars, and instructional pamphlets of an electrotherapeutical character) and some three hundred trade catalogues round out this very colorful aspect of the collections.

There are also several complete, or nearly complete, runs of significant early journals including the *Philosophical Magazine,* the *Opuscoli Scelti,* the *Annalen der Physik,* and the Royal Society's *Philosophical Transactions* and *Proceedings.*

The Beginnings …

In 1969, Earl Bakken, then president of Medtronic, Inc., the major cardiac-pacemaker manufacturer in the United States, asked me if I could find "a few old medical electrical machines." I was a technical librarian at Medtronic at the time and had acquired something of a reputation for being able to find just about anything relatively quickly. I set about looking for these machines but had very little luck at the start. There was almost no market among antiquarians for medical electrical devices; hence, few were available, and those were of mediocre quality and desirability. I had, however, noticed that the Medtronic library contained some photocopies of original works by Giovanni Aldini

FRANKENSTEIN;

OR,

THE MODERN PROMETHEUS.

IN THREE VOLUMES.

Did I request thee, Maker, from my clay
To mould me man? Did I solicit thee
From darkness to promote me?——
PARADISE LOST.

VOL. I.

London:
PRINTED FOR
LACKINGTON, HUGHES, HARDING, MAVOR, & JONES,
FINSBURY SQUARE.

1818.

Fig. 2. Title page from very rare first edition of Mary Shelley's classic.

(the nephew of Galvani) and by G. B. Duchenne de Boulogne, the father of modern electrotherapy. It turned out that Earl Bakken had requested this material sometime before I was hired. Knowing this, I suggested to Earl that it would be possible to obtain the original first editions of these books and to build up a library that represented the history of developments in the use of

electricity in medicine and biology. This was agreeable to him, and I began collecting in earnest. There was little market in those days for this material, so several initial acquisitions were made at nominal cost. We were soon on our way to building a very nice library on "electricity in life."

The problem of locating old medical electrical instruments still remained. Fortunately, I became aware of the outstanding collections gathered by Bern Dibner and exhibited at the Burndy Library in Norwalk, Conn. (This material has since gone to the Smithsonian). I visited Mr. Dibner and was generously provided with several leads as to where I might start to search for old electrical machines. At first it turned out that dealers in rare books on science and technology were the best source. Very often those from whom they purchased their stocks of rare books also had a number of old pieces of equipment. When they heard that the Bakken Library represented a market for such items, the dealers began to pay attention and to notify me of the availability of such pieces—at a price.

The typical European rare-book dealer is a sophisticated and urbane connoisseur of elegant and beautiful things. Old electromedical equipment, rare though it may be, did not always excite the aesthetic sense of rare-book dealers, and they would half apologize to me for offering what they really considered to be borderline junk. Of the first two such items, one was a tabletop glass-plate electrostatic generator once owned by the famous 18th-century Swiss scientist, Horace Benedict de Saussure—the very one that appears as an illustration in Bern Dibner's book, *Early Electrical Machines.*

Nearly 2 years passed before I began to be offered significant early electrical devices in larger numbers. Meanwhile, of course, the rare-book collection had grown considerably, and what had begun as an afterthought was beginning to resemble a decent research library. I put my full energy into this activity, backed by generous funding from Earl Bakken. My goal was to put together a library where research could be done in the areas of electricity and magnetism in life without leaving the premises. Of course, this proved to be an unrealistic expectation, but with that ultimate carrot in front of my nose, I proceeded to gather together as much primary and secondary material as I could find. In the early 1970s there was little competition, and the collection grew rapidly.

Adventures ...

The acquisition of the electrical devices, however, was the greatest adventure. If one harbors even a small tendency toward superstition, it soon appears as though the machines (as well as the books) are seeking you as determinedly as you are seeking them. One concentrates on finding the object, then relaxes and does something else, and a few days later there is a phone call or a letter notifying you of the object's availability. The enthusiastic collector will recognize this phenomenon.

The two largest single lots of rare electrical devices to be added to the collection were gathered under unusual circumstances. In 1974, I received a call from a curator at the Smithsonian who informed me that there was a certain self-styled "Tropical Trader" in Miami who had a good collection of medical

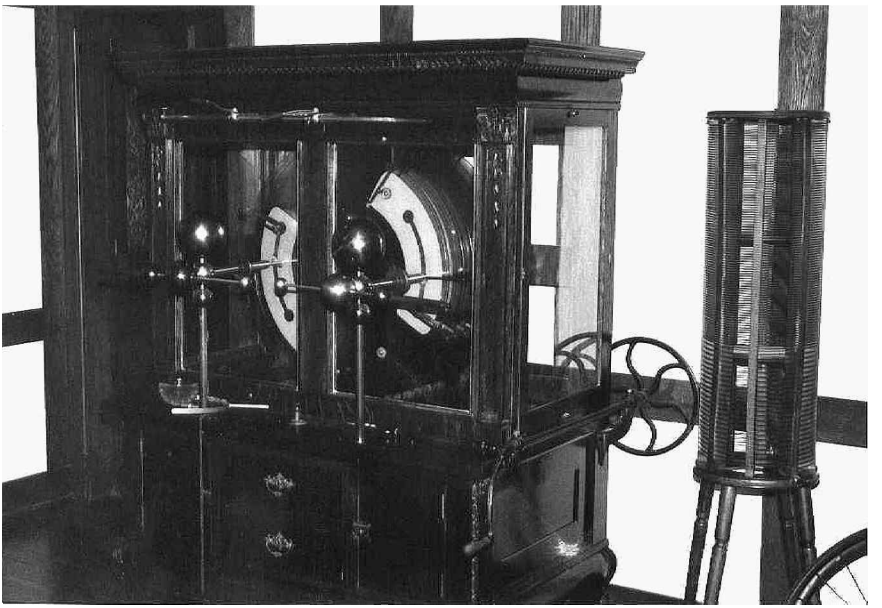

Fig. 3. Holtz-Toepler machine (ca. 1900). I believe they were first made in the 1880s and were in use until around 1920. The spinning plates were enclosed to help control humidity and air currents. They were used to power low-current x-ray devices (8-min exposures) from the late 1890s until ca. 1915 or so and were also used for "general electrification."

electrical devices that he wanted to dispose of. I made the trip to see "Trader Joe," as I began to call him, and—sure enough—he had some very nice pieces, including a large Holtz-Toepler machine (Figure 3) and a very early EKG (or ECG, electrocardiograph) unit. But the story—and the odd instruments—did not end there. Trader Joe informed me that he had acquired his collection from a doctor living in Morelia, Mexico. This doctor was a descendant of the last Mexican emperor, Iturbide. This scientifically enlightened monarch, deposed in 1815 by Santa Ana, had early set about collecting a private *cabinet scientifique,* importing many scientific instruments from Europe, including a Volta pile (Figure 4: the Eveready battery of its time).

The Morelia doctor owned the remains of this collection and, in addition, had a collection of late 19th– and early 20th–century medical electrical devices of his own. He was over 80 years old, very vigorous, and had a wife who was about 30. He used his two small children—about 8 and 10 years old—for purposes of demonstrating all the functions of his noisy and flashing Neurisco E.N.T. (eye, nose, and throat) machine. The children accepted their role as subjects for demonstration calmly, as though they had undergone this ordeal many times before. Their initial experience, however, must have been one of terror. Among the functions performed by the Neurisco were light diagnosis, high-voltage "violet ray" treatment, and low-voltage stimulation. I obtained

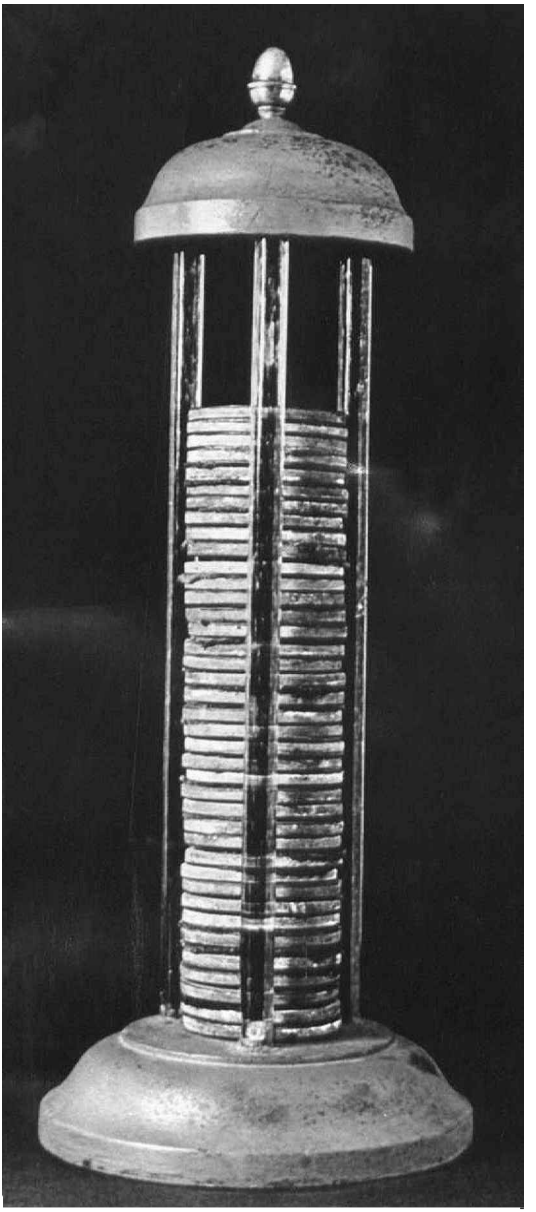

Fig. 4. Volta Pile. This example is from about 1800—and is therefore contemporary with Alessandro Volta himself. It is composed of a column of alternating zinc and copper disks with felt pads to hold moisture.

this machine along with several others. After two days of socializing, Trader Joe closed the deal, and we went on to other parts of Mexico. On the way to Morelia we had negotiated fog-shrouded mountain passes overlooking sheer drops to rock piles, which more than once constituted the final resting place of a broken-backed Mexican bus. On the return trip we ran into major flooding, major enough that it was reported world-wide in the news, and, within hours after my plane left Mexico City for Minneapolis, an earthquake struck, causing considerable damage to the Puebla area. If one were looking for lost Incan gold, one might expect to experience such an Indiana Jones adventure, but when looking for old electrical machines?

The next large acquisition of rare electrical machines occurred in England, and under circumstances that were at least as strange as the events I described in the Mexican adventure. At about the same time that I was securing the Mexican material, I was contacted by the late great antiquarian Heinz Norden of London. Heinz had located an extraordinary collection of electrical devices of all kinds, owned "by a gypsy in Peckham" who had "rings in his ears and long, greasy black hair"—your average collector of rare antique electrical instruments, I thought. This collection was housed in an ordinary, very run-down three-story wood-frame house, of which only the top floor was inhabitable. The rest of the building was occupied by a junky-looking antique shop (which turned out, on closer inspection, to be full of great items of every kind)—and by a collection of over 400 electrical motors, generators, coils, electric toys, and accesories, all in superb condition and dating back into the 18th century. I gasped at the sight of it (Figure 5). The owner of this collection, whose appearance did not deviate markedly from Heinz's description, was himself a collector and, consequently, was somewhat loath to give up his treasures. Consequently, nearly 2 years passed before I could negotiate the acquisition of the material I wanted. Eventually we obtained 80 or more of the devices, selecting just those that had something directly to do with electrotherapy or electrophysiology or that demonstrated some significant development in the history of electrical technology. The "gypsy" retained his collection of electrical motors, a collection that thoroughly documented, in three-dimensional objects, the technological developments achieved in the 19th century.

In addition to these two important "found" collections, certain dealers played significant roles in the development of the Bakken collection of instruments. Most notable among these was the legendary Alain Brieux of Paris. The bulk of the instruments in the collection are of either French or English origin, and Alain energetically searched out the French instruments. He located and offered to us classic devices of great rarity, including a D'Arsonval induction cage, a Guilleminot spiral, a signed coil of Duchenne de Boulogne (Figure 6), a glass harmonica (Figure 7) that Benjamin Franklin had made for his Parisian friend Madame Brillon, and a variety of other instruments he considered of special importance for understanding the history and development of the biomedical use of electrical instrumentation. Many significant and especially fine devices were obtained through Harriet Wynter of London, and two of our best

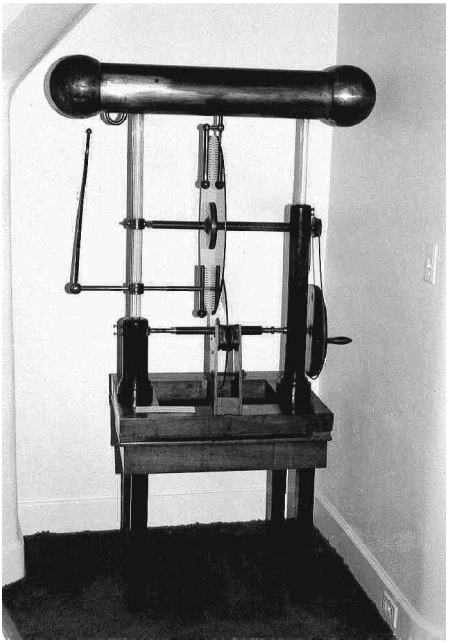

Fig. 5. Machine à Carré (ca. 1875). It is in superb condition with accessories (not shown), found by me in the Peckham area of London ca. 1974—in the possession of a gypsy who had an enormous collection of electrical devices going back to the 18th century (he also collected banjos). The Carré machine was developed around 1865, and it is quite efficient. I was able to draw a 6–8-inch spark in the none-too-dry London air, and it is capable of producing a 10-inch spark.

rare-book dealers, Jeremy Norman of San Francisco and Jacques Vellekoop (E. P. Goldschmidt, Ltd.), also of London, made it their business to keep a sharp eye out for a choice item. Several important finds may be added to their credit.

The historian of science, Willem D. Hackmann, once said of The Bakken that one might be able to put together something like it by combining the relevant materials from the libraries at Cambridge, Oxford, and the Wellcome in England, but that nowhere but at The Bakken can one find a single resource of such richness for researching into the history of medical and experimental uses of electricity in life. I have often, with considerable emphasis, encouraged historians to visit the library. They have politely indicated their desire to see the collection, but have put it off, as we all do, for months and years. When, at their convenience, they finally did visit The Bakken, I found myself the target of serious reproaches for not having conveyed the scope and importance of the collection. "If I had known this was here, I would have come much earlier!"

The task of collecting material in such a narrow subject area has led to several discoveries, some of them original. I learned that DC defibrillation was used in the 1770s, that electroacupuncture and low-voltage stimulation for

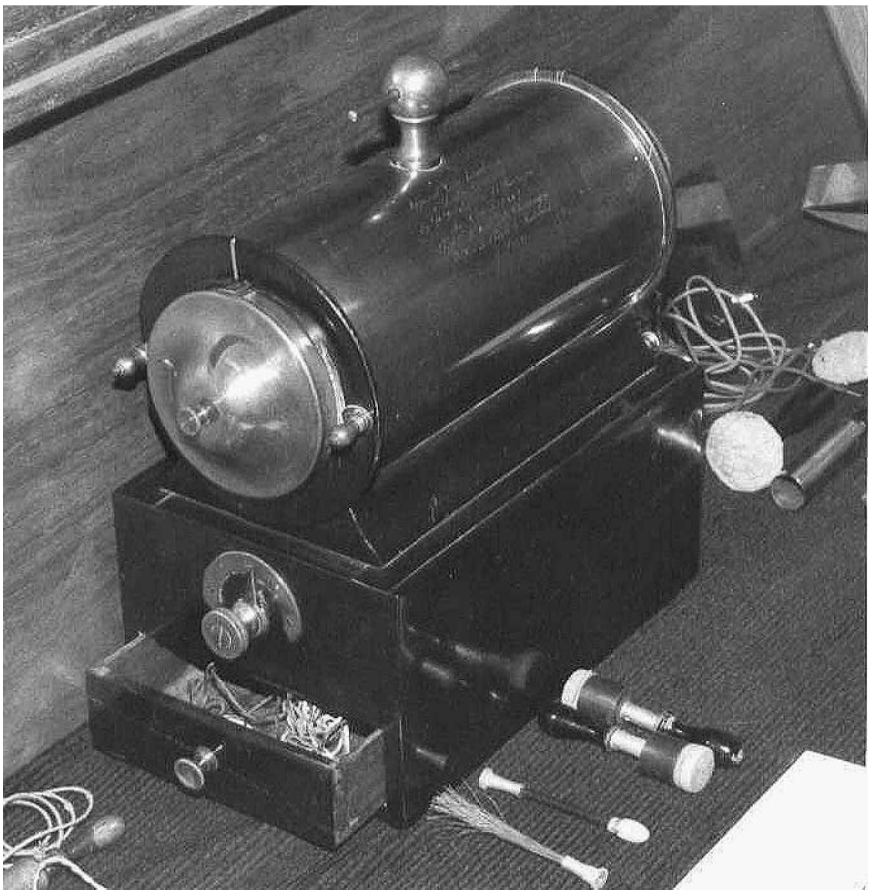

Fig. 6. Signed electrostimulation device of Duchenne du Boulogne (ca. 1865). This device was evidently made in his own shop and is signed (engraved) with his name and the address of the place. Duchenne is famous for his initial description of "Duchenne's disease"—a particularly malignant form of muscular dystrophy—and for his early scientific use of photography to illustrate what muscles were involved in various facial expressions. His work on this subject was used in Darwin's *Expression of Emotion in Animals and Man*. Virtually the complete works of Duchenne are in the Bakken Library, including an extremely rare album of Duchenne's scientific photographs. A first edition of the Darwin work is there as well. The device pictured may also be considered extremely rare.

bone healing were fairly well-known modalities throughout most of the 19th century, and that electrical control of the heart rate was accomplished by the direct stimulation of the myocardium in the 1860s. That electricity might play a role in the functioning of the cardiovascular system was suggested at the time of William Harvey. These and other similar facts were reported regularly in columns that I initiated in *Medical Instrumentation* ("Artifact") and in the

Fig. 7. Glass harmonica built by Benjamin Franklin, ca. 1765. Franklin gave the device to Mme. Brillon de Jouy, and it remained in the Brillon family until the mid-1970s, when I acquired it through Alain Brieux, the famous dealer in scientific antiques in Paris. Modern versions are still played, and there is a huge Web site on the subject of the Benjamin Franklin glass harmonica.

now-defunct international journal *Medical Progress through Technology* ("Retrospectroscopy").

Important educational programs (Figure 8) are held at The Bakken and have included lectures and demonstrations—by Samuel Devons of Columbia University and others—on the nature and operation of historical instruments in experimental use. Recently The Bakken was extensively expanded and renovated. The new facility opened up to the public in the spring of 1999. Interested parties should contact the Director, Dr. David Rhees (rhees@thebakken.org),

Fig. 8. The children are examining a Wimshurst static-electricity generator and some charge-storage devices, one of them a facsimile Leyden jar using foil to collect charge.

or the Librarian, Elizabeth Ihrig (ihrig@thebakken.org), at The Bakken, 3537 Zenith Ave., S. Minneapolis, MN 55416; phone (612) 927-6508, fax (612) 927-7265; website www.thebakken.org.

Acknowledgments

All photos are courtesy of The Bakken.

APPENDIX

The Bakken Today

KATHLEEN KLEHR

The Bakken has grown from its founding in 1975 as a small not-for-profit library and museum of electricity and magnetism into a unique, world-class center for education and learning. In 1976, its present home was acquired—a mansion located on the west shore of Lake Calhoun in southwest Minneapolis. Professional cataloguing and detailed accession records began, as well as a program to provide fellowships to researchers from outside the Twin Cities; these fellowships are provided to this day. The Bakken has continued and expanded its highly successful workshops and summer institutes to train middle and senior high school teachers in using the history of science in their curricula. Publications of the Bakken's newsletter, *News from the Bakken,* formerly

known as the *Electric Quarterly,* describe activities, acquisitions, and current research at The Bakken.

Recently the Bakken underwent a major 2-year renovation and expansion project, opening its doors again in the spring of 1999. The expansion includes a new wing that consists of two large classrooms and a workshop area for student science projects, several exhibit galleries, a museum store, an aquarium room for electric fish, and additional storage space for collections. Separate from the new wing, a new reading room was added to the south end of the original building. The impetus for this project was to support The Bakken's commitment to students, teachers, scholars, and the general public, with an emphasis on providing space for new resources and programming dedicated specifically to young people.

Today The Bakken serves over 6,000 children per year in its field program. The Earl Bakken Science Program is well into its second year of providing hands-on science exploration and mentoring to young people. Popular Family Science Saturdays continue to flourish in the new space, bringing families together through stimulating hands-on activities and events.

The new exhibit galleries include such items as a working, coin-operated "shocker" from the 1920s, an early EKG, a 1930s French mural depicting the history of electricity, and a Hopi kachina doll representing the spirit of lightning. The exhibits also contain a number of interactive items including an "Earth Magnet," an MRI computer display, and a theremin, the world's first electric musical instrument. Tours of the Bakken's medicinal garden, begun in 1999, evolved into a full garden program in the summer of 2000. The Frankenstein exhibit opened in October 2000, as part of the 25th anniversary celebration of the founding of The Bakken.

The Bakken has the world's leading collections of over 11,000 books, bound journals, and manuscripts on historic discoveries in electricity and magnetism; almost 2,000 antique scientific instruments; medicinal gardens and well-maintained grounds; a building that is both beautiful and historic; engaging exhibit galleries; and electrifying programs for youth and adults. The Bakken is a unique place for people of all ages to explore their love of learning by participating in the activities and programs offered and by exploring the exhibits. We invite you to open the door to understanding the human side of science by becoming a Friend of the Bakken. For further information, please phone (612) 927-6508.

For further information, contact Kathleen Klehr, Manager: Marketing, Public Relations and Events (klehr@thebakken.org).

The Bakken home page, www.thebakken.org, contains information on exhibits and educational programs as well as a catalogue of most of the library holdings.