

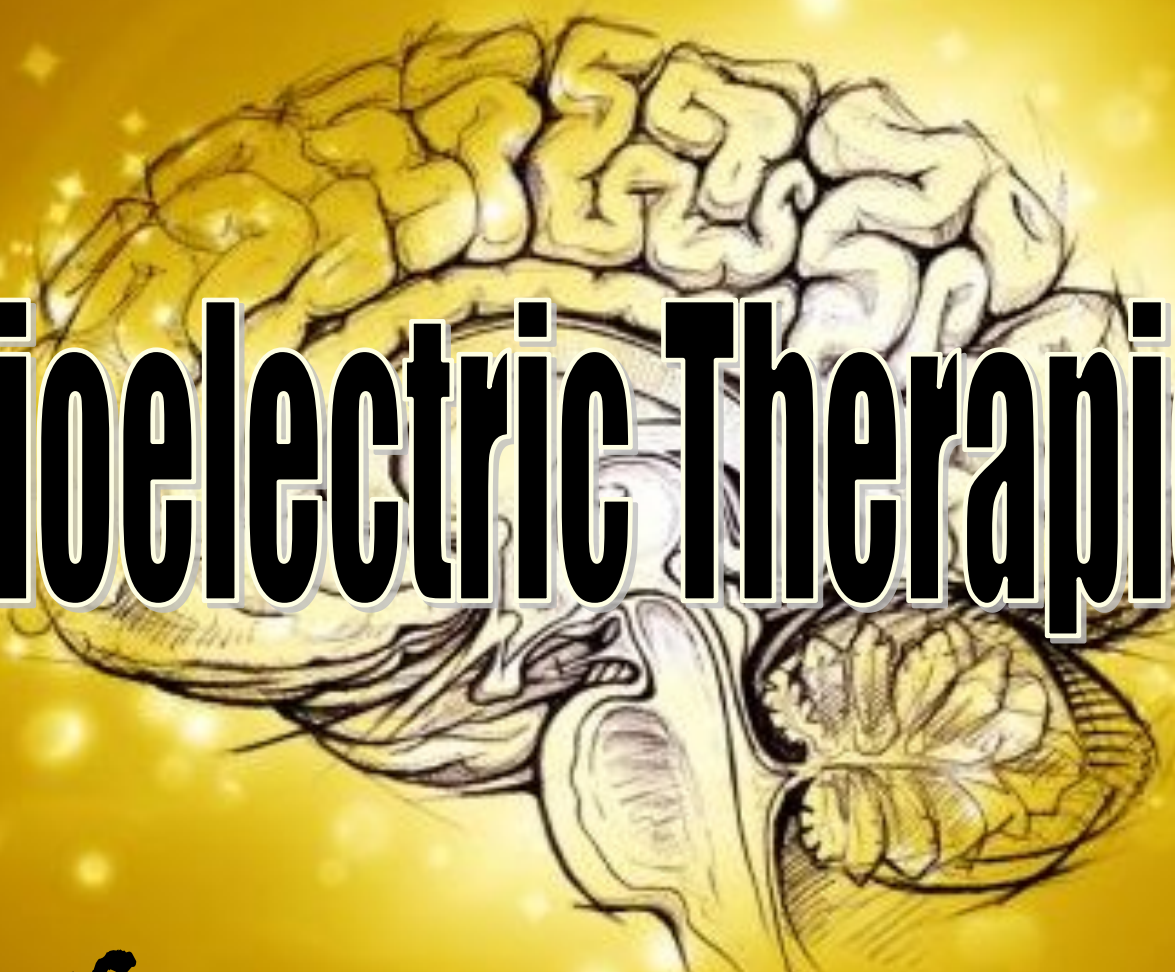
The American Institute of Stress

HEALTH AND STRESS

Your source for science-based stress management information

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Bioelectric Therapies

*The Future of
Medicine*



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HEALTH AND STRESS

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THE FUTURE



PART I: BRAIN STIMULATION WILL REPLACE DRUGS

by **Paul J. Rosch, MD, FACP**

Editor-in-Chief

This has already been demonstrated with respect to treating stress related disorders like depression, anxiety and insomnia. Non-invasive electrical brain stimulation is much safer and more cost effective than drugs, especially antidepressants designed to boost serotonin. Although no studies have ever demonstrated a consistent deficiency of serotonin in depression and some show [increased levels](#), this fallacious theory has been repeated so often it is ac-

cepted as truth. Many of these drugs are banned in other countries for anyone under age 21 because of increased risk of suicide and there are concerns that they are responsible for the unexplained epidemic of suicides in PTSD veterans who are not suffering from combat trauma but rampant unemployment and multiple difficulties in adjusting to civilian life.

In contrast, transcranial magnetic stimulation (rTMS) is effective in pa-

tients resistant to these and other antidepressants, works more rapidly, and is devoid of other side effects such as dependency and potentially fatal serotonin syndrome. Nevertheless, many physicians remain skeptical about brain stimulation for treating depression and other conditions for which it has a lengthy history of efficacy and safety. There are sound reasons for this, which can best be appreciated by reviewing the history of this modality.

The Origins And Evolution Of Electrical And Magnetic Therapies

The earliest description of the therapeutic effects of electricity appears in *Compositiones Medicamentorum* written by Scribonius Largus, a Roman physician. It contained all the treatments that were in use circa 50 A.D. that included placing a painful body part in contact with electric rays that delivered a shock when touched. These flattened fish with enlarged pectoral fins could produce a jolt ranging up to 220 volts. This produced a numbness and transient period of pain relief that was effective for treating gout and severe headaches. They were later called torpedo fish, (Latin *torpere*, "numb" or "stiff").

Probably no individual influenced Western and Arabic medicine more than the Greek physician, Claudius Galen, who was often called "The Medical Pope of the Middle Ages". His teachings were considered gospel and his humoral theory of disease persisted until the early 19th century. He lived more than 100 years after Scribonius Largus' book and was apparently unaware of it, but had heard

about the treatment of severe headache with torpedo fish. This was of particular interest since he was the first to describe migraine, derived from the Greek word *hēmikrania* (half the head). However, Galen took nothing for granted unless he could personally verify it. He did numerous experiments confirming its efficacy when the live ray was repeatedly placed over the affected site and the patient endured the electrical discharges until the pain disappeared. Other sea

creatures also had pain-relieving properties. Electric catfish, native to the Nile, are portrayed in ancient Egyptian murals that appear to depict medical applications. Egyptian papyri from 2,750 B.C. referred to them as "Thunderers of the Nile", suggesting the belief that this force was in some way similar to the energy in a bolt of lightning.

Galen's recommendation made electric shocks from fish the treatment of choice for headache and other pains. Books and po-



Electric Ray (*Torpedo marmorata*)



South American Electric Eel

ems were written about it, and some who used a trident for fishing claimed that the shock transmitted via the three-pronged metal spear relieved their arthritic pains. This was especially true for the powerful South American eel (*Electrophorus electricus*) that, despite its name, is more closely related to a giant catfish. Adults are typically 6 or 7 feet long and can generate electric shocks of up to 600 volts through 24 feet of water, which allows them to feed on other fish and small mammals. When they were brought to Europe in 1750, people, especially those suffering from arthritis, flocked to be treated with its "natural electricity."

The term "electricity" was coined by Queen Elizabeth's physician, William Gilbert, in his 1600 book *De Magnete*. Gilbert was the first to recognize the difference between the attraction seen with magnets and a similar force that developed when amber was rubbed. He coined this new Latin word "*electricus*", which became electricity in English. It was derived from *élektron*, the Greek word for amber, a fossilized resin that was used to make beads and other jewelry. Thales of Miletus, a 6th century B.C. Greek philosopher-mathematician noted that when amber was rubbed with a piece of wool, it would pick up light objects such as feathers, straw, or dried grass, but

not bits of iron or other metals. He concluded that rubbing the amber imparted some "human energy" that attracted objects. This was similar to the way that magnetic or live-stones (*lapus vivus*) behaved, since they moved for no visible reason when placed close together, and would also attract anything containing iron. Magnet is believed to stem from *mágnēs líthos*, (stone from Magnesia), a region of Greece rich in magnetic stones, which became *magneta* in Latin. It was later discovered that when these stones were suspended from a string so they could rotate, they acted like a compass needle that pointed in a north-south direction. This aided in leading to more correct navigation, particularly for ships, and were termed lodestones, which in Middle English meant "leading stone" or "course stone".

The notion that the energy in these stones could cure disease and enhance health stems from the ancient Chinese, who believed that in addition to needles (acupuncture) and heat (moxibustion), applying magnetic stones to acupuncture sites could also restore the blockage of

Qi. The Vedas, religious Hindu scriptures, also several thousand years old, similarly refer to the therapeutic powers of *ashmana* and *siktavati* (instruments of stone), which were almost certainly lodestones. Hippocrates allegedly used magnetic stones to cure sterility, and according to legend, Cleopatra wore a small one on her forehead as an amulet to preserve her youth. Tibetan monks used them to treat depression and still place bar magnets on the skulls of novitiates to improve concentration and learning skills.

In the early 1500's, Paracelsus, a Swiss physician, alchemist and metallurgist, proposed that life came from a pervasive energizing force in the atmosphere he and others called *archeus*, from the Greek for ancient or first. He believed that this force was most influenced by the mysterious power in magnets and wrote, "*Magnetism is the king of all secrets*." Magnetism could replenish *archeus* energy and restore health, and was used to treat everything from epilepsy and diarrhea to various types of hemorrhage. Lodestones were also ground to make powders that could

be applied in magnetic salves or included in foods.

A century later, magnets were used to cure so many illnesses in Elizabethan England they were viewed by some to be the long sought-after "philosopher's stone" and/or "elixir of life." Gilbert was the first to distinguish the force in magnets from the static electricity generated when amber was rubbed with a cloth. He debunked the medicinal value of magnetic salves and powders as well as other popular claims, such as the ability of magnets to remove sorcerer's spells, identify unfaithful wives and "make one acceptable and in favor with princes." He observed that iron rods in buildings or windows that had been aligned in a north-south direction for decades became weakly magnetized, as did iron rods struck by lightning. He also found that steel retained its magnetic properties much longer than iron. Permanent magnets were made by hammering lodestones into molten iron bars whose ends pointed north and south to utilize the earth's magnetic field. Compasses using a magnetized needle of iron or steel were in wide use by

explorers and merchant ships and Gilbert was aware of the variable magnetic deviation of compasses in different parts of the world and the inclination to a vertical position when a magnet was not in a horizontal plane. This led him to conclude in *De Magnete*, that the earth itself was a giant lodestone with magnetic North and South poles that were conveniently close to its geographic poles.

By the middle 1700's, more powerful carbon-steel magnets had become available in Europe and the belief in their curative powers escalated. Maximilian Hell, a highly respected Jesuit priest and chief astronomer at the University of Vienna, treated patients with steel magnets made into different shapes to correspond to structures in the body that required healing and recounted his numerous successes in a 1762 treatise entitled *Introductio ad utilem usum Magnetis ex chalybe*. A leading proponent was Franz Anton Mesmer, a Viennese physician, who proposed that an invisible magnetic field flowed through the atmosphere as well as all body fluids. Organs and other body components had

north and south magnetic poles and if these fell out of alignment and blocked this universal magnetic flow, it caused physical and mental complaints that could be corrected by the proper application of permanent magnets. Mesmer soon became legendary throughout Europe for his miraculous magnetic therapy achievements, which included instantly curing the deaf and blind. He made a distinction between the magnetic force in iron and steel that he referred to as "mineral magnetism," and "animal magnetism," a spirit-like healing power generated in the body. He believed he could use this energy to magnetize wood, paper and water and transfer it to patients by passing his hands from their shoulders down along their arms or touching the affected area with an iron rod clenched in his hand.

In 1778, Mesmer moved to Paris and established a practice that quickly attracted so many wealthy and powerful patients that he was unable to treat all of them. He had become convinced that magnets merely acted as conductors to accelerate the transfer of his ani-

mal magnetism to patients. He viewed this and the universal magnetic field, as conductible and capable of being stored in water and discharged when needed, much like a car battery. He subsequently developed a method of treating several patients simultaneously by creating a salon in which patients sat around wooden tubs containing magnetized water and iron and had projecting magnetized iron rods. Patrons poured magnetic water on affected parts of their bodies or rubbed them against the rods or simply grasped the rods. They also periodically joined hands to facilitate the flow of universal magnetic fluid. "Assistant Magnetizer's" in ornate uniforms were available to provide instructions and assist in these activities. Everything was conducted in a highly theatrical setting that included numerous colored fabrics, lights and dramatic music often played on a glass harmonica. The extravaganza was orchestrated and presided over by Mesmer, who periodically appeared with a long iron rod and used either this or his hands to perform healings. It was not unusual for a patient to

faint or have a seizure, which was viewed as a sign that the problem had been cured.

Mesmer's animal magnetism was hailed as a new force analogous to Isaac Newton's "cosmic aether" and gravity. Parisians stood in long queues to gain admission to the salon. His rich and famous patients included the Marquis de Lafayette, a Revolutionary War hero, who wrote to his friend George Washington extolling the virtues of animal magnetism. Marie Antoinette also embraced it, as did Mozart. In his opera *Così fan tutte*, a poisoned man is revived by magnetism and his savior explains, "*This is that piece of magnet, The stone of Mesmer, Who originated In Germany, and then became so famous.*" An English physician who had attended these salon sessions described his experience as follows:

"In the middle of the room is placed a vessel of about a foot and a half high which is called here a "baquet". It is so large that twenty people can easily sit round it; near the edge of the lid which covers it, there are holes pierced corresponding to

the number of persons who are to surround it; into these holes are introduced iron rods, bent at right angles outwards, and of different heights, so as to answer to the part of the body to which they are to be applied. Besides these

rods, there is a rope which communicates between the baquet and one of the patients, and from him is carried to another, and so on the whole round. The most sensible effects are produced on the approach of Mesmer, who is said to

convey the fluid by certain motions of his hands or eyes, without touching the person. I have talked with several who have witnessed these effects, who have convulsions occasioned and removed by a movement of the hand."



One of many depictions of Mesmer's Therapeutic sessions is shown in an oil painting in the Wellcome Library (above). The patients are seated around Mesmer's baquet, a large flat drum containing mesmeric fluid. Pipes, tubes and cords emerging from the drum could be applied to the affected parts: one man on the far left is winding a cord doused in mesmeric fluid around his head, while several others are applying the ends of the tubes to their eyes (detail right). A woman in Turkish dress in the centre foreground is treating the eye of a child to a dose of the mesmeric fluid.





Parisian physicians considered Mesmer a fraud, and convinced King Louis XVI to convene a Board of Inquiry to determine whether animal magnetism existed. In 1784, he appointed Antoine

Lavoisier, who discovered the role of oxygen in combustion, Joseph-Ignace Guillotin, an expert in pain control after whom the guillotine was named, and the Mayor of Paris. Benjamin Franklin, American

Ambassador to France and the preeminent authority on electricity was named Chairman. They spent a week trying to reproduce Mesmer's results under the supervision of one of his trusted disciples without any success. The opening statement of their report summarized their rational approach, *"Animal magnetism might well exist without being useful, but it cannot be useful if it does not exist."* Mesmer challenged them to give him patients with stubborn neuropsychiatric problems they deemed incurable, but Franklin wisely declined since he suspected that any success would be due to the power of suggestion, or what we would call a placebo effect, rather than a biophysical force that could be detected, much less measured. Mesmer was thoroughly discredited and returned to Vienna, but despite this, magnet therapy continued to flourish. Elisha Perkins, a Connecticut physician, was granted a patent in 1795 for his "magnetic tractor," a device that could "draw off the noxious electrical fluid that lay at the root of suffering" and made a fortune selling them for \$25.

Hypnotism, Chiropractic, Osteopathy And Christian Science

Others found that like Mesmer, they could use their own animal magnetism to relieve pain or put patients in a trance by touching or passing their hands over them along with strong suggestions that bordered on commands. James Braid, a Scottish physician, was convinced that animal magnetism was a hoax and did his own experiments. He found he could achieve similar results by holding a small bright object between 8 to 16 inches in front of his subjects' eyes and suggesting they would soon fall asleep. In many cases, the eyelids would close spontaneously as they fell into this half-conscious state, and he was eventually able to induce this with suggestion alone. In 1842 he published *Neurypnology or The Rationale of Nervous Sleep Considered In Relation With Animal Magnetism*. Because Braid believed this phenomenon was a form of sleep he named it hypnosis, after Hypnos, the Greek god of sleep and master of dreams. But by 1847 he discovered that all the ma-

ajor characteristics of hypnotism such as catalepsy, anesthesia and amnesia, could be produced without sleep, and that calling this hypnosis had been a mistake. He tried to rename it monoideism without success, although this aspect of brain stimulation or mind manipulation is still referred to as mesmerism.

Mesmer was also indirectly responsible for the development of chiropractic and osteopathy. Daniel D. Palmer, a former teacher and grocer, opened his office of magnetic healing (hypnosis) in Davenport, Iowa in 1886. His treatment program also incorporated touching or massaging painful sites, but this increased dramatically in 1895 when he was treating a patient with low back pain who was partially deaf. Both problems started suddenly seventeen years earlier, while he working in a very cramped area, and he felt a "pop" in his back. On examination, Palmer found a tender lump that he believed was due to some misalignment of the spine. When he corrected this, not only did the pain promptly disappear, but so did his deafness. Palmer theorized that misalignment of the

bones in the body was the basic underlying cause of all "dis-ease" and the majority of these misalignments were in the spinal column. In 1897 he opened the Palmer School of Chiropractic in Davenport and began teaching his technique. He referred to himself as "Doctor" and explained, *"Give me a simple mind that thinks along single tracts, give me 30 days to instruct him, and that individual can go forth on the highways and byways and get more sick people well than the best, most complete, all around, unlimited medical education of any medical man who ever lived."*

Andrew Taylor Still was a physician who served in the Civil War and based on this and the death of three of his children from spinal meningitis in 1864, concluded that current medical practices were not only frequently ineffective but also dangerous. Unsanitary surgical practices often resulted in more deaths than cures and the most common medicines, arsenic, castor oil, whiskey, and opium also often did more harm than good. He investigated alternative treatments, such as various types of

hydrotherapy, diet, musculoskeletal manipulation and magnetic healing. He became convinced that most diseases and disturbances in physiology stemmed from musculoskeletal disorders he could correct by "bone setting" along with spiritual advice. He invented the name "osteopathy", from the Greek *osteon* (bone) and *pathos* (suffering) and opened his American School of Osteopathy in Kirksville, Missouri in 1892. This is now the A.T. Still University of Health Sciences, and graduates with the D.O. degree from this and 30 other osteo-

pathic medical schools in the U.S. have the same rights and privileges as M.D.s in all 50 states and 60 countries.

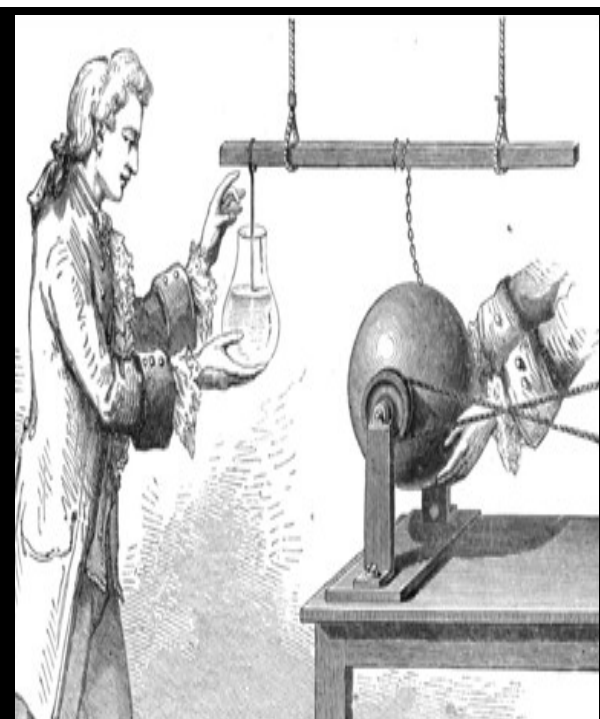
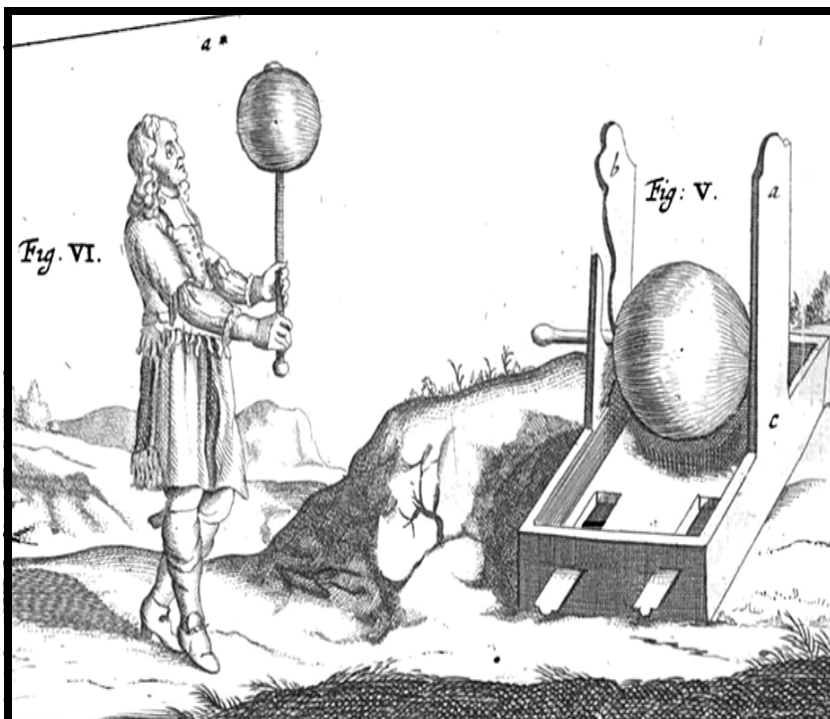
Phineas Quimby suffered from "consumption" as a youth, for which his doctor prescribed calomel (Mercuric chloride). Instead of curing him, it began to rot his teeth and he began to experiment with other possible forms of relief. He found that intense excitement like galloping his horse alleviated his pain for brief periods and became interested in how the mind could affect the body. In 1838, he attended a lecture by

Charles Poyen, a French mesmerist, and asked questions about animal magnetism and how he could learn more about its powers. Poyen told him that with proper training, anyone could become adept at becoming a hypnotist. Quimby quit his job as a watchmaker and for the next two years, followed Poyen on his lecture tour around New England, and became proficient in mesmerism. In 1840 he met a young man who was unusually susceptible

to hypnosis and used him to start his own tour to demonstrate the wonders of magnetism. He constantly tried ways to improve this by using the power of touch, suggestion and spiritualism, and called his method of healing the "science of health" and the "science of Christ;" since he believed that Christ and scientific healing were synonymous. He attracted large crowds and in 1859, opened an office in Portland, Maine to provide ready access. Three years later, he successfully treated a 41-year-old patient named Mary Patterson who had suffered from a variety of mental and physical problems for decades. She married and became Mary Baker Eddy and although originally a proponent of mesmerism, she later derided it as being "malicious." She firmly believed that the only source of healing was prayer, and in 1879, founded the [Church of Christ, Scientist, which became known as Christian Science](#). Mesmer's legacy extended to numerous similar groups in Europe and elsewhere, and as noted previously, mesmerism is still used as a synonym for hypnotism.



Andrew Taylor Still, MD, DO
(1828-1917)



Electrical Stimulation For Depression And Other Mental Disorders

Around 1650, Otto von Guericke, a German scientist who had been stimulated by Gilbert's book, built a crude electrostatic generator.

As illustrated on the left above, it consisted of a sulfur ball that rotated on a shaft. When Guericke held his hand against the ball and turned the shaft quickly, a static electric charge built up. This charge was much more powerful than had been

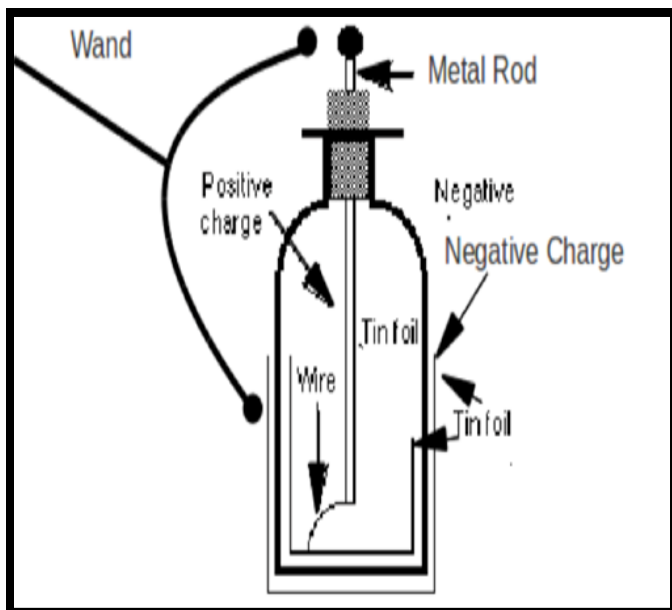
seen before and could attract feathers and light objects more than a foot away. This led to different types of friction machines that could generate electricity, and eventually the Leyden jar invented in 1745 by Pieter van Musschenbroek at the University of Leyden in Holland. At the time, it was thought that there were two types of electrical charges, vitreous, which came from rubbing glass, and resinous, from friction with amber, and that like water, these charges could be stored in a jar

for future use.

In the illustration on the right above, the static electricity produced by the rotating glass due to friction from hand contact was conducted by a chain through the suspended bar to the water in a glass flask via a wire. A large charge accumulated in the water and an opposite charge was built up in the hand of the assistant holding the flask. When he touched the wire dipping in the water with his other hand, he received a powerful shock.

It was initially believed that the charge was stored in the water, but Benjamin Franklin and others showed that it was in the glass by simply lining the inside and outside of an empty flask with tin foil as shown below.

A Typical Leyden Jar



The foil coatings stop short of the mouth of the jar to prevent the charge from arcing between the foils. A metal rod projects through the stopper at the mouth of the jar, electrically connected by a chain to the inner foil, to allow it to be charged. The jar is charged by an electrostatic generator, or other source of electric charge, connected to the inner electrode while the outer foil is grounded. The inner

and outer surfaces of the jar store equal but opposite charges.

It was later found that Leyden jars could be linked together to provide more powerful jolts of electricity. The term "battery" was coined by Benjamin Franklin be-

cause it resembled what was called a battery of cannons that were grouped together to produce a more powerful battering effect.

Franklin was the first to show that lightning was static electricity by flying a kite during a thunderstorm with the help of

his son, William. The kite was held by a silk strings with an iron key at the other end. A thin metal wire wrapped around the key was then inserted into a Leyden jar. As the thunderstorm approached, they attached a silk ribbon to the key and holding onto the kite by the silk ribbon, they flew the kite and once it was aloft, moved into a barn in order to avoid getting wet. When the thunderstorm

passed over them, the negative charges in the cloud passed onto his kite, down the wet silk strings to the key, and were then stored in the Leyden jar. Franklin was not affected because he was holding the dry silk ribbon, which insulated him from the charges on the key. But when he moved his free hand towards the iron key, he received a shock. Had lightning hit the key he could have been killed, as were others who repeated this experiment.

Franklin was also the first to use the terms "positive" and "negative" electricity. He had previously noted that electrical sparks were most easily drawn to and emitted from points, and in 1747, three years prior to the kite experiment, he developed the lightning rod. This was a pointed metal rod on top of a building that was grounded to prevent a lightning bolt from damaging the structure. He was intent on exploring possible medical applications of electricity and reported two accidents in which electricity passed through his brain. Aside from temporary confusion and amnesia about what caused the accident, there



were no ill effects from the first one. The second was a massive jolt that came from two fully charged six-gallon Leyden jars that were to be used to kill a turkey. Although it entered through his hands rather than his head, it had a powerful effect on his entire body. He described his experience in a letter to a friend as follows:

A universal Blow thro'out my whole Body from head to foot follow'd by a violent quick Trembling in the Trunk, which wore gradually off in a few seconds. It was some Moments before I could collect my Thoughts so as to know what was the Matter; for I did not see the Flash tho' my Eye was on the Spot of the Prime Conductor from whence it struck the Back of my Hand, nor did I hear the Crack tho' the By-standers say it was a loud one; nor did I particularly feel the Stroke on my Hand, tho' I afterwards found it had rais'd a Swelling there the bigness of half a Swan Shot or pistol Bullet.

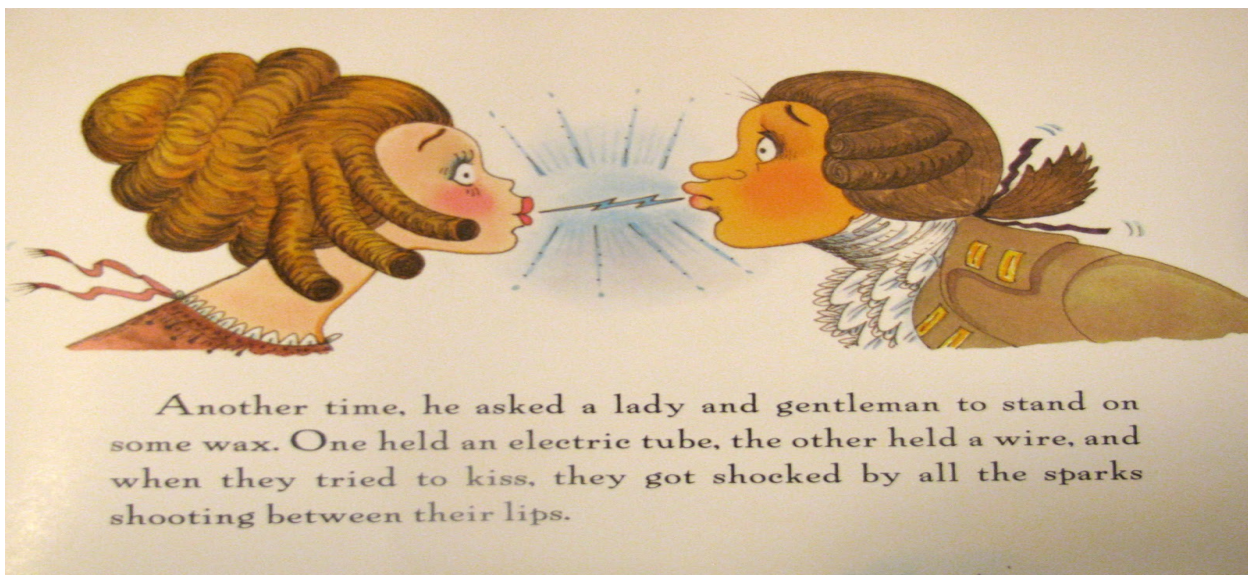
He later demonstrated that patients could tolerate shocks to the brain without causing permanent damage, although some also had retrograde amnesia about the onset of the event. This phenomenon is still commonly seen in patients undergoing electroconvulsive therapy who do not recollect what is going to happen despite having had several treatments.

Franklin tried to help several patients paralyzed by a stroke but failed, and in 1758 wrote that: *"Patients perceiving and finding the Shocks pretty severe, they became discourag'd, went home and in a short time relapsed; so that I never knew any Advantage from Electricity in Palsies that was permanent."* How-

ever he did cure a case of hysterical seizures in a young female that he treated in 1752. Her problems began when she was 14 years old and she had been treated by several physicians without success. Her symptoms varied, *"Sometimes she was tortur'd almost to madness with a cramp in different parts of the body; then with more general convulsions of the extremities, and a choaking deliquium (swooning); and, at times with almost the whole train of hysteric symptoms."* Although the shocks were applied to the *"affected, tremulous and cramped"* parts of her body rather than her head, the results were amazing and persisted. As she wrote in a letter several years later, *"the fits were soon carried off*

and I now enjoy such a state of health, as I would have given all the world for."

Franklin continually encouraged colleagues in Europe to do their own experiments and because of his stature and fame, many static electricity machines were developed to treat patients by what was referred to as "Franklinization." In France, Charles Le Roy wrapped wound conducting wires around the head of a blind man and one wire to his leg. The wires were connected to an array of Leyden jars and 12 shocks were administered 2 or 3 times a day for several days. Although the patient did report seeing vivid flashes of light, there was no improvement in vision.





Another French physician, Duchenne de Boulogne, later discovered that a current from two electrodes applied to wet skin could stimulate muscles without damaging the skin. He used this to stimulate various muscles in the face to mimic what happened with different emotions. Photography had just been invented and many of his photos were used by

Charles Darwin in *The Expression of the Emotions in Man and Animals*. The plate above is from Duchenne de Boulogne's book *Le Mécanisme de la Physionomie Humaine*. In the upper row and the lower two rows, patients have different expressions on either side of their faces. He also treated a comatose patient that had been brought to the hospital

who stopped breathing and had no pulse. He revived her by "faradization of the skin of the praecordia," which may possibly have been an early form of cardioversion. Franklin's favorite European colleague was Jan Ingenhousz, a brilliant Dutch doctor who discovered photosynthesis and was later appointed court physician to Empress Maria Theresa of Austria

for inoculating her and her 16 children with smallpox. Vienna had been experiencing a deadly smallpox epidemic, a cousin had already died and she requested assistance from the English Royal Family. Ingenhousz was recommended and those treated were spared, including Marie Antoinette, the future Queen of France. His interest in electricity began when he attended lectures by van Musschenbroek at the University of Leyden and he continued to conduct his own experiments. He met Franklin in 1767 and they became close friends and corresponded frequently. He was aware of Franklin's accidents and in a 1783 letter, wrote to tell him of his personal experience. Not only did it render him unconscious, but he awoke very confused and feared that he might "*remain for ever an idiot.*" After a good night's sleep, however, he felt unusually elated.

Franklin was enthusiastic about this suggestion. He was still serving as Ambassador to France and preparing to evaluate Mesmer. In his response, he emphasized the need for clinical trials and that he had

"communicated that Part of your Letter to an Operator, encourag'd by Government here to electrify epileptic and other poor Patients, and advis'd his trying the Practice on Mad People according to your opinion."

Because of his personal euphoric experience, Ingenhousz was particularly anxious to treat patients suffering from melancholia and was so pleased, he urged others to do so. At the time, the term was used to describe a common type of madness that included not only deep depression, but also sadness, tiredness, insomnia, fear, irritability, loss of appetite, low esteem, social isolation and other dis-

orders described by Robert Burton in his massive tome *The Anatomy of Melancholy*. In some respects, melancholy was the opposite of mania, and because of Galen's humoral theory, was thought to be due to an excess of black bile (Gr. *mélas chole*) and should be treated by purging, sweating, bleeding and dietary changes. Nevertheless, because shock therapy had been recommended by these two famous physicians, many others tried it and became proponents.

John Birch began using electric shocks to the head of melancholia patients in 1787 with great success. His first case was a "porter of the India

Igenhousz's 1783 Letter to Franklin: "My mental faculties were at that time not only returned, but I felt the most lively joye in finding, as I thought at the time, my judgment infinitely more acute. It did seem to me I saw much clearer the difficulties of every thing, and what did formerly seem to me difficult to comprehend, was now become of an easy Solution. I found moreover a liveliness in my whole frame, which I never had observed before. This experiment, made by accident, on my self, and of which I gave you an account, has induced me to advise some of the London mad-Doctors, as Dr. Brook, to try a similar experiment on mad men, thinking that, as I found in my self, my mental faculties improved and as the world well knows, that your mental faculties, if not improved by the two strokes you received, were certainly not hurt, by them, it might perhaps be a remedie to restore the mental faculties when lost."

warehouses," who had a history of melancholia and whose current condition appeared to be "induced by the death of one of his children."

Birch's observations:

"He had been two months afflicted when I first saw him. He was quiet, would suffer his wife to lead him about the house, but he never spoke to her; he sighed frequently, and was inattentive to every thing that passed. I covered his head with a flannel, and rubbed the electric sparks all over the cranium; he seemed to feel it disagreeable, but said nothing. On the second visit ... I passed six small shocks through the brain in different directions. As soon as he got into an adjoining room, and saw his wife, he spoke to her, and in the evening was cheerful, expressing himself, as if he thought he should soon go to his work again. I repeated the shocks in like manner on the third and the fourth day, after which he went to work: I desired to see him every Sunday, which I did for three months after, and he remained perfectly well."

His second melancholia patient was a singer who had attempted suicide. After receiving "about six" shocks "through the head" every day for a fortnight, this patient experienced "a re-

freshing sleep, from which he awoke a new being: that he felt sensible of the powers of electricity every day after it's application, being capable

of mental exertions immediately...he said ... no one but himself could have an adequate idea of the sudden change the first electric shocks wrought in his mind." Birch later founded and headed the electrical department at St. Thomas's Hospital in London.

There were numerous other reports of spectacular cures, but as noted above, patients diagnosed with melancholia had symptoms that often dis-

appeared spontaneously, and in many instances the treatment likely produced a transient placebo effect. Unscrupulous doctors found this a harmless way to increase their income and we have no knowledge of the dose of

electricity they administered or their credentials. In contrast, reputable physicians like Birch kept careful records, had lengthy follow-ups and reported failures to avoid such criticisms. For example, his third patient was a 26-year-old man with "moping melancholy." This seems to have been a low-grade, chronic depressive disorder that would later be diagnosed as dysthymia. Birch increased the strength of the shocks "as far as prudence would direct" without success. "By day three, this patient reported nothing more than a mild headache for an hour after the procedure." Birch wrote that he subsequently "dismissed the patient, in the same unhappy state he had so long suffered."

As you will see in Part II, all of this began to change dramatically after 1800, when Alessandro Volta discovered a new type of electricity that flowed steadily like a current of water, instead of discharging itself with a spark or shock - So stay tuned!

Paul J. Rosch, MD, FACP
Editor-in-Chief

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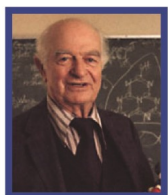
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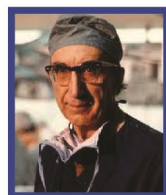
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