Chronic Electrical Illness

By
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Chapter Five

The INVISIBLE RAINBOW

A History of Electricity and Life

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Chelsea Green Publishing
White River Junction, Vermont
London, UK

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IN 1859, THE CITY OF LONDON UNDERWENT AN ASTONISHING METAMORPHOSIS. A tangle of electric wires, suddenly and inescapably, was brought to the streets, shops, and residential rooftops of its two and a half million inhabitants. I will let one of the most famous English novelists, who was an eyewitness, begin the story.

"About twelve years ago," wrote Charles Dickens, "when the tavern fashion of supplying beer and sandwiches at a fixed price became very general, the proprietor of a small suburban pothouse reduced the system to an absurdity by announcing that he sold a glass of ale and an electric shock for four-pence. That he really traded in this combination of science and drink is more than doubtful, and his chief object must have been to procure an increase of business by an unusual display of shop keeping wit.

Whatever motive he had to stimulate his humour, the fact should certainly be put upon record that he was a man considerably in advance of his age. He was probably not aware that his philosophy in sport would be made a science in earnest in the space of a few years, any more than many other bold humorists who have been amusing on what they know nothing about. The period has not yet arrived when the readers of Bishop Wilkin's famous discourse upon aerial navigation will be able to fly to the moon, but the hour is almost at hand when the fanciful announcement of the beer-shop keeper will represent an every-day familiar fact. A glass of ale and an electric shock will shortly be sold for four-pence, and the scientific part of the bargain will be something more useful than a mere fillip to the human nerves. It will be an electric shock that sends a message across the house-tops through the web of wires to any one of a hundred and twenty district telegraph stations, that are to be scattered amongst the shopkeepers all over the town.

"The industrious spiders have long since formed themselves into a commercial company, called the London District Telegraph Company (limited), and they have silently, but effectively, spun their trading web.

One hundred and sixty miles of wire are now fixed along parapets, through trees, over garrets, round chimney-pots, and across roads on the southern side of the river, and the other one hundred and twenty required miles will soon be fixed in the same manner on the northern side. The difficulty decreases as the work goes on, and the sturdiest Englishman is ready to give up the roof of his castle in the interests of science and the public good, when he finds that many hundreds of his neighbours have already led the way."

English citizens did not necessarily welcome the prospect of electric wires being attached to their homes. "The British householder has never seen a voltaic battery kill a cow," wrote Dickens, "but he has heard that it is quite capable of such a feat. The telegraph is worked, in most cases, by a powerful voltaic battery, and therefore the British householder, having a general dread of lightning, logically keeps clear of all such machines." Nonetheless, Dickens tells us, the agents of the London District Telegraph Company persuaded nearly three thousand five hundred property owners to lend their rooftops as resting places for the two hundred and eighty miles of wires that were crisscrossing all of London, and that were shortly to drop into the shops of grocers, chemists, and tavern-keepers all over the city.[1]

A year later, the electrical web above London homes became even more densely woven when the Universal Private Telegraph Company opened its doors. In contrast to the first company, whose stations accepted only public business, Universal rented telegraph facilities to individuals and businesses for private use. Cables containing up to a hundred wires each formed the backbone of the system, each wire departing from its companions at the nearest approach to its destination. By 1869, this second company had strung more than two thousand five hundred miles of cable, and many times as much wire over the heads and under the feet of Londoners, to serve about fifteen hundred subscribers scattered throughout the city.

A similar transformation was occurring more or less everywhere in the world. The rapidity and intensity with which this happened is not appreciated today.

The systematic electrification of Europe had begun in 1839 with the opening of the magnetic telegraph on the Great Western Railway between West Drayton and London. The electrification of America began a few years later, when Samuel Morse's first telegraph line marched from Baltimore to Washington in 1844 along the Baltimore and Ohio Railroad. Even earlier, electric doorbells and annunciators began decorating homes, offices, and hotels, the first complete system having been installed in 1829 in Boston's Tremont House, where all hundred and seventy guest rooms were connected by electric wires to a system of bells in the main office. Electric burglar alarms were available in England by 1847, and soon afterwards in the United States.

By 1850, telegraph lines were under construction on every continent except Antarctica. Twenty-two thousand miles of wire had been energized in the United States; four thousand miles were advancing through India, where "monkeys and swarms of large birds" were alighting on them[2]"; one thousand miles of wire were spreading in three directions from Mexico City. By 1860, Australia, Java, Singapore, and India were being joined undersea. By 1875, thirty thousand miles of submarine cable had demolished oceanic barriers to communication, and the tireless weavers had electrified seven hundred thousand miles of copper web over the surface of the earth—enough wire to encircle the globe almost thirty times.

And the traffic of electricity accelerated even more than the number of wires, as first duplexing, then quadriplexing, then automatic keying meant that current flowed at all times—not just when messages were being sent— and that multiple messages could be sent over the same wire at the same time, at a faster and faster rate.

Almost from the beginning, electricity became a presence in the average urban dweller's life. The telegraph was never just an adjunct to railroads and newspapers. In the days before telephones, telegraph machines were installed first in fire and police stations, then in stock exchanges, then in the offices of messenger services, and soon in hotels, private businesses, and homes. The first municipal telegraph system in New York City was built by Henry Bentley in 1855, connecting fifteen offices in Manhattan

and Brooklyn. The Gold and Stock Telegraph Company, incorporated in 1867, supplied instantaneous price quotations from the Stock, Gold, and other Exchanges telegraphically to hundreds of subscribers.

In 1869, the American Printing Telegraph Company was created to provide private telegraph lines to businesses and individuals. The Manhattan Telegraph Company was organized in competition two years later. By 1877, the Gold and Stock Telegraph Company had acquired both those companies and was operating 1,200 miles of wire. By 1885, the industrious spiders linking almost thirty thousand homes and businesses had to spin webs over New York even more intricate than the ones over Dickens' London.

In the midst of this transformation, a slender, slightly deaf clergyman's son wrote the first clinical histories of a previously unknown disease that he was observing in his neurology practice in New York City. Dr. George Miller Beard was only three years out of medical school. Yet his paper was accepted and published, in 1869, in the prestigious Boston Medical and Surgical Journal, later renamed the New England Journal of Medicine. A self-assured young man, possessed of a serenity and hidden sense of humour that attracted people to him, Beard was a sharp observer who, even so early in his career, was not afraid to break new medical ground.

Although he was sometimes ridiculed by his elders for his novel ideas, one of his colleagues was to say many years after his death that Beard "never said an unkind word against anyone[3]."

Besides this new disease, he also specialized in electrotherapy and hypnotherapy, both of which he was instrumental in restoring to good repute, half a century after the death of Mesmer. In addition, Beard contributed to the knowledge of the causes and treatment of hay fever and seasickness. And in 1875 he collaborated with Thomas Edison in investigating an "etheric force" that Edison had discovered, which was able to travel through the air, causing sparks in nearby objects without a wired circuit. Beard correctly surmised, a decade before Hertz and two decades before Marconi, that this was high frequency electricity, and that it might one day revolutionize telegraphy[4].

George Miller Beard, M.D. (1839-1883)

As far as the new disease that he described in 1869, Beard did not guess its cause. He simply thought it was a disease of modern civilization, caused by stress, that was previously uncommon. The name he gave it, "neurasthenia," just means "weak nerves." Although some of its symptoms resembled other diseases, neurasthenia seemed to attack at random and for no reason and no one was expected to die from it.

Beard certainly didn't connect the disease with electricity, which was actually his preferred treatment for neurasthenia—when the patient could tolerate it. When he died in 1883, the cause of neurasthenia, to everyone's frustration, had still not been identified. But in a large portion of the world where the term "neurasthenia" is still in everyday use among doctors—and the term is used in most of the world outside of the United States—electricity is recognized today as one of its causes. And the electrification of the world was undoubtedly responsible for its appearance out of nowhere during the 1860's, to become a pandemic during the following decades.

Today, when million-volt power lines course through the countryside, twelve-thousand-volt lines divide every neighbourhood, and sets of thirty-ampere circuit breakers watch over every home, we tend to forget what the natural situation really is. None of us can begin to imagine what it would feel like to live on an unwired earth. Not since the presidency of James Polk have our cells, like puppets on invisible strings, been given a second's rest from the electric vibrations. The gradual increase in voltage during the past century and a half has been only a matter of degree. But the sudden overwhelming of the earth's own nurturing fields, during the first few decades of technological free-for-all, had a drastic impact on the very character of life.

In the earliest days telegraph companies, in countryside and in cities, built their lines with only one wire, the earth itself completing the electric circuit. None of the return current flowed along a wire, as it does in electrical systems today; all of it travelled through the ground along unpredictable paths.

Twenty-five-foot-high wooden poles supported the wires on their journeys between towns. In cities, where multiple telegraph companies competed for customers and space was at a premium, forests of overhead wires tangled their way between housetops, church steeples, and chimneys, to which they attached themselves like vines. And from those vines hung electric fields that blanketed the streets and byways and the spaces within the homes to which they clung.

The historical numbers provide a clue to what happened. According to George Prescott's 1860 book on the Electric Telegraph, a typical battery used for a 100-mile length of wire in the United States was "fifty cups of Grove," or fifty pairs of zinc and platinum plates, which provided an electric potential of about 80 volts[5].

In the earliest systems, the current only flowed when the telegraph operator pressed the sending key. There were five letters per word and, in the Morse alphabet, an average of three dots or dashes per letter. Therefore, if the operator was proficient and averaged thirty words per minute, she pressed the key at a rhythm of 7.5 strokes per second. This is the very near the fundamental resonant frequency (7.8 Hz) of the biosphere, to which all living things, as we will see in chapter 9, are tuned, and whose average strength—about a third of a millivolt per meter—is given in textbooks.

It is easy to calculate, using these simple assumptions, that the electric fields beneath the earliest telegraph wires were up to 30,000 times stronger than the natural electric field of the earth at that frequency. In reality the rapid interruptions in telegraph keying also produced a wide range of radio frequency harmonics, which also travelled along the wires and radiated through the air. The magnetic fields can also be estimated. Based on the values for electrical resistance for wires and insulators as

given by Samuel Morse himself[6], the amount of current on a typical long-distance wire varied from about 0.015 ampere to 0.1 ampere, depending on the length of the line and the weather. Since the insulation was imperfect, some current escaped down each telegraph pole into the earth, a flow which increased when it rained. Then, using the published value of 10-8 gauss for the magnetic field of the earth at 8 Hz, one may calculate that the magnetic field from a single early telegraph wire would have exceeded the earth's natural magnetic field at that frequency for a distance of two to twelve miles on either side of the line. And since the earth is not uniform, but contains underground streams, iron deposits, and other conductive paths over which the return current would travel, exposure of the population to these new fields varied widely.

In cities, each wire carried about 0.02 ampere and exposure was universal. The London District Telegraph Company, for example, commonly had ten wires together, and the Universal Private Telegraph Company had up to one hundred wires together, strung above the streets and rooftops over a large part of town. Although the apparatus and alphabet of London District differed from those used in America, the current through its wires fluctuated at a similar rate—about 7.2 vibrations per second if the operator transmitted 30 words per minute[7]. And Universal's dial telegraph was a hand-cranked magneto-electric machine that actually sent alternating current through the wires.

One enterprising scientist, professor of physics John Trowbridge at Harvard University, decided to put to the test his own conviction that signals riding on telegraph wires that were grounded at both ends were escaping from their appointed paths and could easily be detected at remote locations. His test signal was the clock at the Harvard Observatory, which transmitted time signals four miles by wire from Cambridge to Boston. His receiver was a newly invented device—a telephone—connected to a length of wire five hundred feet long and grounded to the earth at both ends. Trowbridge found that by tapping the earth in this way he could clearly hear the ticking of the observatory clock up to a mile from the observatory at various points not in the direction of Boston. The earth was being massively polluted with stray electricity, Trowbridge concluded. Electricity originating in the telegraph systems of

North America should even be detectable on the other side of the Atlantic Ocean, he said after doing some calculations. If a powerful enough Morse signal, he wrote, were sent from Nova Scotia to Florida over a wire that was grounded at both ends, someone on the coast of France should be able to hear the signal by tapping the earth using his method.

A number of historians of medicine who have not dug very deep have asserted that neurasthenia was not a new disease, that nothing had changed, and that late nineteenth and early twentieth century high society was really suffering from some sort of mass hysteria[8].

A list of famous American neurasthenes reads like a Who's Who of literature, the arts, and politics of that era. They included Frank Lloyd Wright, William, Alice and Henry James, Charlotte Perkins Gilman, Henry Brooks Adams, Kate Chopin, Frank Norris, Edith Wharton, Jack London, Theodore Dreiser, Emma Goldman, George Santayana, Samuel Clemens, Theodore Roosevelt, Woodrow Wilson, and a host of other well-known figures.

Historians who think they have found neurasthenia in older textbooks have been confused by changes in medical terminology, changes that have prevented an understanding of what happened to our world a hundred and fifty years ago. For example, the term "nervous" was used for centuries without the connotations given to it by Freud. It simply meant, in today's language, "neurological." George Cheyne, in his 1733 book, The English Malady, applied the term "nervous disorder" to epilepsy, paralysis, tremors, cramps, contractions, loss of sensation, weakened intellect, complications of malaria, and alcoholism.

Robert Whytt's 1764 treatise on "nervous disorders" is a classic work on neurology. It can be confusing to see gout, tetanus, hydrophobia, and forms of blindness and deafness called "nervous disorders" until one realizes that the term "neurological" did not replace "nervous" in clinical medicine until the latter half of the nineteenth century. "Neurology," at that time, meant what "neuro-anatomy" means today. Another source of confusion for a modern reader is the old use of the terms "hysterical" and "hypochondriac" to describe neurological conditions of the body, not the

mind. The "hypochondria" were the abdominal regions and "hystera," in Greek, was the uterus; as Whytt explained in his treatise, hysterical and hypochondriac disorders were those neurological diseases that were believed to have their origins in the internal organs, "hysterical" traditionally being applied to women's diseases and "hypochondriac" to men's.

When the stomach, bowels and digestion were involved, the illness was called hypochondriac or hysterical depending on the patient's sex. When the patient had seizures, blackouts, tremors, or palpitations, but the internal organs were not affected, the illness was called simply "nervous."

Confounding this confusion still further were the Draconian treatments that were standard medical practice until well into the nineteenth century, which themselves often caused serious neurological problems. These were based on the humoral theory of medicine as set forth by Hippocrates in the fifth century B.C. For thousands of years all sickness was believed to be caused by an imbalance of "humours"—the four humours being phlegm, yellow bile, black bile, and blood—so that the goal of medical treatment was to strengthen the deficient humours and drain off those that were in excess. Therefore all medical complaints, major and minor, were subject to treatment by some combination of purging, vomiting, sweating, bleeding, medicines, and dietary prescriptions. And the drugs were liable to be neurotoxic, preparations containing heavy metals such as antimony, lead, and mercury being frequently prescribed.

By the early nineteenth century, some doctors had begun to question the humoral theory of disease, but the term "neurology" had not yet acquired its modern meaning. During this time the realization that many illnesses were still being called "hysterical" and "hypochondriac" when there was nothing wrong with the uterus or internal organs led a number of physicians to try out new names for diseases of the nervous system. In the eighteenth century Pierre Pomme's "vaporous conditions" included cramps, convulsions, vomiting, and vertigo. Some of these patients had total suppression of urine, spitting of blood, fevers, smallpox, strokes, and other illnesses that sometimes took their lives. When the disease didn't kill them the frequent bleedings often did. Thomas Trotter's book,

A View of the Nervous Temperament, written in 1807, included cases of worms, chorea, tremors, gout, anaemia, menstrual disorders, heavy metal poisonings, fevers, and convulsions leading to death. A series of later French doctors tried out names like "proteiform neuropathy," "nervous hyperexcitability," and "the nervous state." Claude Sandras' 1851 ***Traité Pratique des Maladies Nerveuses*** ("Practical Treatise on Nervous Diseases") is a conventional textbook on neurology. Eugène Bouchut's 1860 book on "***l'état nerveux***" ("the nervous state") contained many case histories of patients suffering from the effects of blood-letting, tertiary syphilis, typhoid fever, miscarriage, anaemia, paraplegia, and other acute and chronic illnesses of known causes, some lethal. Beard's neurasthenia is not to be found.

In fact, the first description anywhere of the disease to which Beard called the world's attention is in Austin Flint's textbook of medicine published in New York in 1866. A professor at the Bellevue Hospital Medical College, Flint devoted two brief pages to it and gave it almost the same name Beard was to popularise three years later. Patients with "nervous asthenia," as he called it, "complain of languor, lassitude, want of buoyancy, aching of the limbs, and mental depression. They are wakeful during the night, and enter upon their daily pursuits with a sense of fatigue."9 These patients did not have anaemia or any other evidence of organic disease. They also did not die of their disease; on the contrary, as Beard and others were later to also observe, they seemed to be protected from ordinary acute illnesses and lived, on average, longer than others.

These first publications were the beginning of an avalanche. "More has been written about neurasthenia in the course of the last decade," wrote Georges Gilles de la Tourette in 1889, "than on epilepsy or hysteria, for example, during the last century[10]."

The best way to familiarize the reader with both the disease and its cause is to introduce another prominent New York City physician who herself suffered from it—though by the time she told her story the American medical profession had been trying to find the cause of neurasthenia for nearly half a century and, not finding one, had concluded that the illness was psychosomatic.

Dr. Margaret Abigail Cleaves, born in the territory of Wisconsin, had graduated from medical school in 1879. She had first worked at the State Hospital for the Insane at Mt. Pleasant, Iowa, and from 1880 to 1883 had served as chief physician to the female patients of the Pennsylvania State Lunatic Hospital. In 1890 she had moved to the big city, where she had opened a private practice in gynaecology and psychiatry. It was not until 1894, at the age of 46, that she was diagnosed with neurasthenia. What was new was her heavy exposure to electricity: she had begun to specialize in electrotherapy. Then, in 1895, she opened the New York Electro-Therapeutic Clinic, Laboratory, and Dispensary, and within a matter of months experienced what she termed her "complete break."

Margaret Abigail Cleaves, M.D. (1848-1917)

The details, written down over time in her Autobiography of a Neurasthene, describe the classic syndrome presented nearly half a century earlier by Beard. "I knew neither peace nor comfort night nor day," she wrote. "There remained all the usual pain of nerve trunks or peripheral nerve endings, the exquisite sensitiveness of the body, the inability to bear a touch heavier than the brush of a butterfly's wing, the insomnia, lack of strength, the recurrence of depression of spirits, the inability to use my brain at my study and writing as I wished."

"It was with the greatest difficulty," she wrote on another occasion, "to even use knife and fork at the table, while the routine carving was an impossibility."

Cleaves had chronic fatigue, poor digestion, headaches, heart palpitations and tinnitus. She found the sounds of the city unbearable. She smelled and tasted "phosphorus." She became so sensitive to the sun that she lived in darkened rooms, able to go outdoors only at night. She gradually lost her hearing in one ear. She became so affected by atmospheric electricity that, by her sciatica, her facial pain, her intense restlessness, her feeling of dread, and her sensation "of a crushing weight bowing me to the earth," she could predict with certainty 24 to 72 hours in advance that the weather was going to change. "Under the influence of oncoming electrical storms," she wrote, "my brain does not function[11]."

And yet through it all, suffering until the end of her life, she was dedicated to her profession, exposing herself day in and day out to electricity and radiation in their various forms. She was a founding and very active officer of the American Electro-Therapeutic Association. Her textbook on Light Energy taught the therapeutic uses of sunlight, are light, incandescent light, fluorescent light, X-rays, and radioactive elements. She was the first physician to use radium to treat cancer.

How could she not have known? And yet it was easy. In her day as in ours, electricity did not cause disease, and neurasthenia—it had finally been decided—resided in the mind and emotions.

Other related illnesses were described in the late nineteenth and early twentieth centuries, occupational diseases suffered by those who worked in proximity to electricity. "Telegrapher's cramp," for example, called by the French, more accurately, "mal télégraphique" ("telegraphic sickness") because its effects were not confined to the muscles of the operator's hand. Ernest Onimus described the affliction in Paris in the 1870's.

These patients suffered from heart palpitations, dizziness, insomnia, weakened eyesight, and a feeling "as though a vice were gripping the back of their head." They suffered from exhaustion, depression, and memory loss, and after some years of work a few descended into insanity. In 1903, Dr. E. Cronbach in Berlin gave case histories for seventeen of his telegraphist patients. Six had either excessive perspiration or extreme

dryness of hands, feet, or body. Five had insomnia. Five had deteriorating eyesight. Five had tremors of the tongue. Four had lost a degree of their hearing. Three had irregular heartbeats. Ten were nervous and irritable both at work and at home. “Our nerves are shattered,” wrote an anonymous telegraph worker in 1905, “and the feeling of vigorous health has given way to a morbid weakness, a mental depression, a leaden exhaustion–-

Hanging always between sickness and health, we are no longer whole, but only half men; as youths we are already worn out old men, for whom life has become a burden... our strength prematurely sapped, our senses, our memory dulled, our impressionability curtailed.” These people knew the cause of their illness. “Has the release of electrical power from its slumber,” asked the anonymous worker, “created a danger for the health of the human race?”12 In 1882, Edmund Robinson encountered similar awareness among his telegraphist patients from the General Post Office at Leeds. For when he suggested treating them with electricity, they “declined trying anything of the kind.”

Long before that, an anecdote from Dickens could have served as a warning. He had toured St. Luke’s Hospital for Lunatics. “We passed a deaf and dumb man,” he wrote, “now afflicted with incurable madness.” Dickens asked what employment the man had been in. “‘Aye,’ says Dr. Sutherland, ‘that is the most remarkable thing of all, Mr. Dickens. He was employed in the transmission of electric-telegraph messages.’” The date was January 15, 1858[13].

Telephone operators, too, often suffered permanent injury to their health. Ernst Beyer wrote that out of 35 telephone operators that he had treated during a five-year period, not a single one had been able to return to work. Hermann Engel had 119 such patients. P. Bernhardt had over 200. German physicians routinely attributed this illness to electricity. And after reviewing dozens of such publications, Karl Schilling, in 1915, published a clinical description of the diagnosis, prognosis, and treatment of illness caused by chronic exposure to electricity. These patients typically had headaches and dizziness, tinnitus and floaters in the eyes, racing pulse, pains in the region of the heart, and palpitations. They felt

weak and exhausted and were unable to concentrate. They could not sleep. They were depressed and had anxiety attacks. They had tremors. Their reflexes were elevated, and their senses were hyperacute. Sometimes their thyroid was hyperactive. Occasionally, after long illness, their heart was enlarged. Similar descriptions would come throughout the twentieth century from doctors in the Netherlands, Belgium, Denmark, Austria, Italy, Switzerland, the United States, and Canada[14].

In 1956, Louis Le Guillant and his colleagues reported that in Paris "there is not a single telephone operator who doesn't experience this nervous fatigue to one degree or another." They described patients with holes in their memory, who couldn't carry on a conversation or read a book, who fought with their husbands for no reason and screamed at their children, who had abdominal pains, headaches, vertigo, pressure in their chest, ringing in their ears, visual disturbances, and weight loss. A third of their patients were depressed or suicidal, almost all had anxiety attacks, and over half had disturbed sleep.

As late as 1989, Annalee Yassi reported widespread "psychogenic illness" among telephone operators in Winnipeg, Manitoba and St. Catharines, Ontario, and in Montreal, Bell Canada reported that 47 percent of its operators complained of headaches, fatigue, and muscular aches related to their work.

Then there was "railway spine," a misnamed illness that was investigated as early as 1862 by a commission appointed by the British medical journal Lancet. The commissioners blamed it on vibrations, noise, speed of travel, bad air, and sheer anxiety. All those factors were present, and no doubt contributed their share. But there was also one more that they did not consider. Because by 1862, every rail line was sandwiched between one or more telegraph wires running overhead and the return currents from those lines coursing beneath, a portion of which flowed along the metal rails themselves, upon which the passenger cars rode. Passengers and train personnel commonly suffered from the same complaints later reported by telegraph and telephone operators: fatigue, irritability, headaches, chronic dizziness and nausea, insomnia, tinnitus, weakness, and numbness. They had rapid heart beat, bounding pulse,

facial flushing, chest pains, depression, and sexual dysfunction. Some became grossly overweight. Some bled from the nose, or spat blood. Their eyes hurt, with a "dragging" sensation, as if they were being pulled into their sockets. Their vision and their hearing deteriorated, and a few became gradually paralyzed. A decade later they would have been diagnosed with neurasthenia—as many railroad employees later were.

The most salient observations made by Beard and the late nineteenth century medical community about neurasthenia are these: It spread along the routes of the railroads and telegraph lines.

It affected both men and women, rich and poor, intellectuals and farmers. Its sufferers were often weather sensitive. It sometimes resembled the common cold or influenza. It ran in families.

It seized most commonly people in the prime of their life, ages 15 to 45 according to Beard, 15 to 50 according to Cleaves, 20 to 40 according to H. E. Desrosiers,15 20 to 50 according to Charles Dana.

It lowered one's tolerance for alcohol and drugs.

It made people more prone to allergies and diabetes.

Neurasthenes tended to live longer than average.

And sometimes—a sign whose significance will be discussed in chapter 10—neurasthenes passed reddish or dark brown urine.

It was the German physician Rudolf Arndt who finally made the connection between neurasthenia and electricity. His patients who could not tolerate electricity intrigued him. "Even the weakest galvanic current," he wrote, "so weak that it scarcely deflected the needle of a galvanometer, and was not perceived in the slightest by other people, bothered them in the extreme." He proposed in 1885 that "electro-sensitivity is characteristic of high-grade neurasthenia." And he prophesied that electro-sensitivity "may contribute not insubstantially to the elucidation of phenomena that now seem puzzling and inexplicable."

He wrote this in the middle of an intense, unrelenting haste to wire the whole world, driven by an unquestioning embrace of electricity, even an adoration, and he wrote it as though he knew he was risking his reputation.

A large obstacle to the proper study of neurasthenia, he suggested, was that people who were less sensitive to electricity did not take its effects at all seriously: instead, they placed them in the realm of superstition, "lumped together with clairvoyance, mind-reading and mediumship[16]."

That obstacle to progress confronts us still today.

The Renaming

In December 1894, an up-and-coming Viennese psychiatrist wrote a paper whose influence was enormous and whose consequences for those who came after have been profound and unfortunate. Because of him, neurasthenia, which is still the most common illness of our day, is accepted as a normal element of the human condition, for which no external cause need be sought. Because of him, environmental illness, that is, illness caused by a toxic environment, is widely thought not to exist, its symptoms automatically blamed on disordered thoughts and out-of-control emotions.

Because of him, we are today putting millions of people on Xanax, Prozac, and Zoloft instead of cleaning up their environment. For over a century ago, at the dawn of an era that blessed the use of electricity full throttle not just for communication but for light, power, and traction, Sigmund Freud renamed neurasthenia "anxiety neurosis" and its crises "anxiety attacks." Today we call them also "panic attacks."

The symptoms listed by Freud, in addition to anxiety, will be familiar to every doctor, every "anxiety" patient, and every person with electrical sensitivity:-

Irritability

Heart palpitations, arrhythmias, and chest pain

Shortness of breath and asthma attacks

Perspiration

Tremor and shivering

Ravenous hunger

Diarrhoea

Vertigo

Vasomotor disturbances (flushing, cold extremities, etc.)

Numbness and tingling Insomnia

Nausea and vomiting Frequent urination Rheumatic pains Weakness Exhaustion.

Freud ended the search for a physical cause of neurasthenia by reclassifying it as a mental disease. And then, by designating almost all cases of it as "anxiety neurosis," he signed its death warrant. Although he pretended to leave neurasthenia as a separate neurosis, he didn't leave it many symptoms, and in Western countries it has been all but forgotten. In some circles it persists as "chronic fatigue syndrome," a disease without a cause that many doctors believe is also psychological and that most don't take seriously. Neurasthenia survives in the United States only in the common expression, "nervous breakdown," whose origin few people remember.

In the International Classification of Diseases (ICD-10), there is a unique code for neurasthenia, F48.0, but in the version used in the United States (ICD-10-CM), F48.0 has been removed. In the American version, neurasthenia is only one among a list of "other nonpsychotic mental disorders" and is almost never diagnosed. Even in the Diagnostic and

Statistical Manual (DSM-V), the official system for assigning codes to mental diseases in American hospitals, there is no code for neurasthenia. It was a death warrant only in North America and Western Europe, however. Half the world still uses neurasthenia as a diagnosis in the sense intended by Beard.

In all of Asia, Eastern Europe, Russia and the former Soviet Republics, neurasthenia is today the most common of all psychiatric diagnoses as well as one of the most frequently diagnosed diseases in general medical practice[17]. It is often considered a sign of chronic toxicity[18].

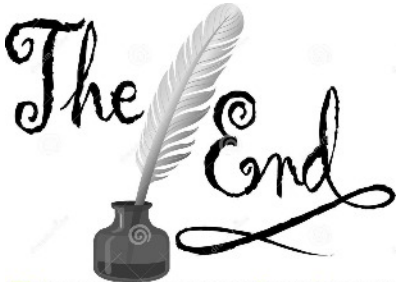
In the 1920's, just as the term was being abandoned in the West, it was first coming into use in China[19]. The reason: China was just beginning to industrialize. The epidemic that had begun in Europe and America in the late nineteenth century had not yet reached China at that time.

In Russia, which began to industrialize along with the rest of Europe, neurasthenia became epidemic in the 1880's[20]. But nineteenth century Russian medicine and psychology were heavily influenced by neurophysiologist Ivan Sechenov, who emphasized external stimuli and environmental factors in the workings of the mind and body. Because of Sechenov's influence, and that of his pupil Ivan Pavlov after him, the Russians rejected Freud's redefinition of neurasthenia as anxiety neurosis, and in the twentieth century Russian doctors found a number of environmental causes for neurasthenia, prominent among which are electricity and electromagnetic radiation in their various forms.

And as early as the 1930's, because they were looking for it and we weren't, a new clinical entity was discovered in Russia called "radio wave sickness," which is included today, in updated terms, in medical textbooks throughout the former Soviet Union and ignored to this day in Western countries, and to which I will return in later chapters. In its early stages the symptoms of radio wave sickness are those of neurasthenia.

As living beings, not only do we possess a mind and a body, but we also have nerves that join the two. Our nerves are not just conduits for the ebb and flow of electric fluid from the universe, as was once believed, nor are

they just an elaborate messenger service to deliver chemicals to muscles, as is currently thought. Rather, as we will see, they are both. As a messenger service, the nervous system can be poisoned by toxic chemicals. As a network of fine transmission wires, it can easily be damaged or unbalanced by a great or unfamiliar electric load. This has effects on both mind and body that we know today as anxiety disorder.



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