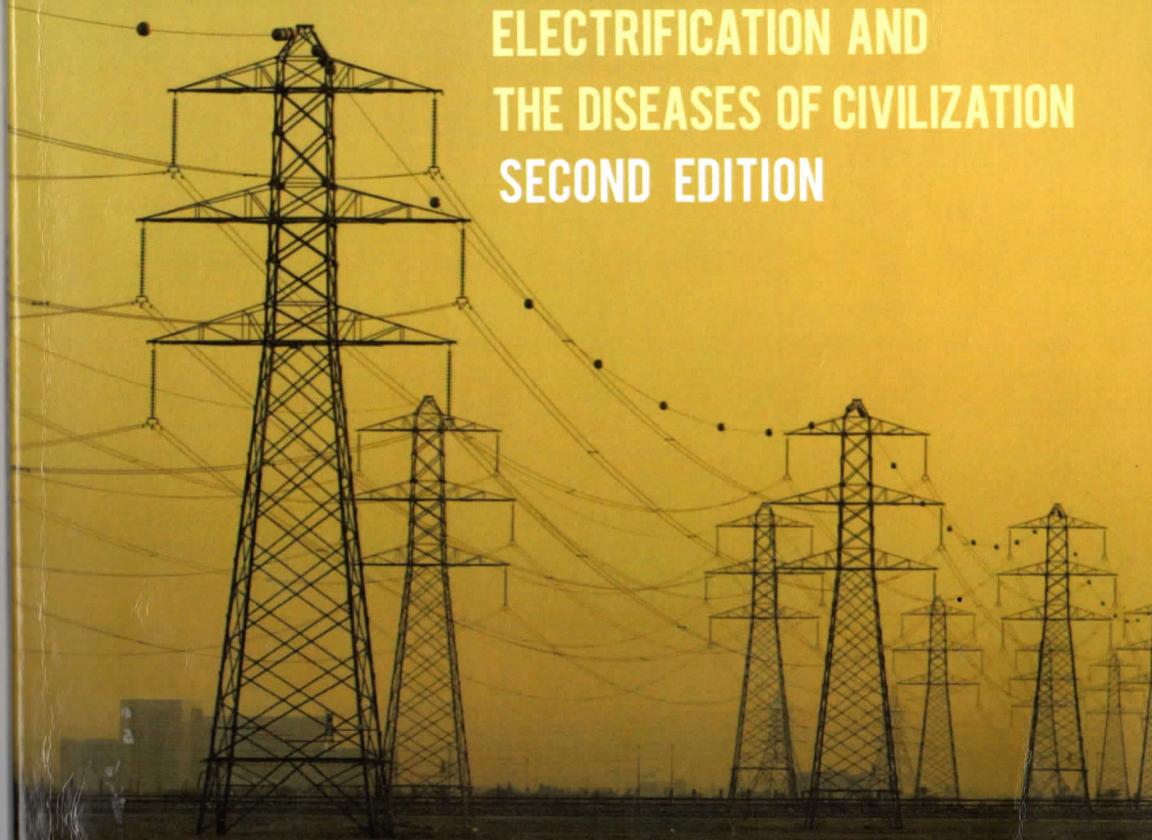
DIRTY ELECTRICITY

ELECTRIFICATION AND
THE DISEASES OF CIVILIZATION
SECOND EDITION



SAMUEL MILHAM, MD, MPH

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To Eddie O'Gorman, founder of the UK charity Children with Leukemia, and to the memory of his children, Paul and Jean, and his wife, Marion, all of whom died of electromagnetic field-related diseases.

"Those who ignore history are destined to repeat it."

—Edmund Burke (1729–1797)

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All science is based on the cumulative ideas and work of others. Since much of my work as an epidemiologist is based on the vital registration system of statistics and population data, I'm deeply indebted to the scores of people who filled out, collected, and tabulated the millions of United States birth, death, and census records over the last century. The 1961 paper showing the emergence of the childhood leukemia age peak in the early part of the twentieth century by Michael Court-Brown and Richard Doll, as well as a graph of the time trend of United States electrification published by Jesse Ausubel and Cesare Marchetti, and finally the identification, characterization, and measurement of dirty electricity by Martin Graham and David Stetzer, were necessary precursors to my study at the La Quinta Middle School that identified dirty electricity as a potent universal carcinogen. Without the *Desert Sun* newspaper article by Mike Perrault about the La Quinta teachers' cancers, none of this new knowledge would have emerged.

At each stop on my fifty-year odyssey there were people who helped and supported me. At the New York State Health Department, Alan

Gittlesohn rescued me from an unfulfilling public health residency and worked on a number of projects with me. In Hawaii, Bob Worth was the best boss and colleague I could have asked for. At the Washington State Health Department, much of my work was facilitated and improved by Eric Ossiander. Our childhood leukemia project was critical to everything that followed. Eric has also given me a continuing bridge to Washington State data during my twenty-year retirement.

Over the years, the late William Ross Adey, MD, was always available to answer technical questions about electromagnetic fields. Louis Slesin, Ph.D., editor of *Microwave News,* has for decades been an important conduit into the latest electromagnetic field (EMF) research.

Retirement meant leaving professional networks behind. With no office, students, colleagues, library, or professional meetings, most of my research efforts have, of necessity, been a solitary enterprise for the last twenty years. It has taken every bit of the last fifty years for all of the pieces of this puzzle to fall into place to reveal the amazing picture of an invisible, hidden exposure contributing to our modern "diseases of civilization."

Thanks to George Nedeff of iUniverse for guidance and advice on publishing, and to B. Blake Leavitt for making this book more readable. Magda Havas produced most of the figures in the book. Sherry Milham offered valuable suggestions and proofreading.

PREFACE

THIS BOOK IS written in an urgent attempt to warn you about what I believe to be a global man-made health threat. When Thomas Edison began wiring New York City with a direct current electricity distribution system in the 1880s, he gave us the magic of electric light, heat, and power, but inadvertently opened a Pandora's Box of unimaginable illness and death.

There is a high likelihood that most of the twentieth century "diseases of civilization," including cardiovascular disease, malignant neoplasms (cancer), diabetes, and suicide, are not caused by lifestyle alone, but by certain physical aspects of electricity itself. The data to prove this has been available since 1930, but no one investigated it. Consequently, the "wars" on cancer and cardiovascular diseases are doomed to failure, because a critical etiologic factor has not been recognized. What's more, these very diseases are now increasing in the population in direct proportion to our increasing exposures to high-technology electrical devices.

The electrical part of this story begins with a childhood leukemia

cluster centered in Rome, New York, that I studied in the 1960s. I didn't realize that the cluster was probably caused by radar exposure until many years later when Stanislaw Szmiegelski, a researcher in Poland, reported that radar and radio-exposed military personnel had high rates of leukemia and lymphoma (Szmiegelski 1996). In the United States, the emergence of childhood leukemia in the 1930s, and the spread of the age two-through-five-year peak for the major leukemia of childhood, common acute lymphoblastic leukemia, was strongly correlated with the gradual spread of electrification from urban into rural areas (Milham & Ossiander 2001). Even today, this childhood leukemia age peak does not appear in non-electrified areas like sub-Saharan Africa.

While conducting the childhood leukemia age peak study, a few adult cancers, including female breast cancer, also showed a strong correlation with residential electrification. At that time, I could not believe that 60-Hz magnetic fields could be responsible. A few years later, a 2004 newspaper article about a cancer cluster in teachers at the La Quinta Middle School in Southern California led me to conduct another study, which showed that high frequency voltage transients (called "dirty electricity" by the utility industry) was a potent universal carcinogen. Dirty electricity rides along on the sixty-cycle sine wave of alternating current (AC) power as high frequency voltage transients, between two and one hundred kilohertz. It also is increasingly found in ground currents returning to utility substations. They are caused by interruptions of current flow and by arcing and sparking. Dirty electricity can be present on electrified wires anywhere and probably has been on them since the beginning of electrification. Ambient dirty electricity couples capacitively to the human body and induces electrical currents in the body.

The La Quinta paper, published in 2008 (Milham & Morgan 2008), led to another study in 2009, "Historical evidence that electrification caused the twentieth century epidemic of disease of civilization" (Milham 2010), which motivated the writing of this book and my warning. This book will explain how a then seventy-two-year-old retired

medical epidemiologist became involved with what turned out to be the most important, interesting, heart-breaking, and difficult series of studies of my long career.

The health and mortality effects of electrification happened so gradually, and on such a wide scale, that they went virtually un-noticed, and the major illnesses that can be attributed to them came to be considered "normal" diseases of modern civilization. Although major cities had electricity at the turn of the last century, it took until the mid-1950s for the last farms in the United States to be electrified. By 1940, more than 90 percent of all the residences in the northeastern United States and California were electrified. In 1940, almost all urban residents in the United States were, therefore, exposed to electromagnetic fields (EMFs) in their residences and at work, while rural residents were exposed to varying levels of EMFs, depending on the progress of rural electrification in their states. In 1940, only 28 percent of residences in Mississippi were electrified, while five other Southern states had less than 50 percent of residences electrified. Eleven states, mostly in the Northeast, had residential electrification rates above 90 percent. In the highly electrified Northeastern states and in California, urban and rural residents could have similar levels of EMF exposure, while in states with low levels of residential electrification, there were potentially great differences in EMF exposure between urban and rural residents. It wasn't until 1956 that these differences finally disappeared. What was already known by then, but not appreciated, was that urban death rates were much higher than rural rates for cardiovascular diseases, malignant neoplasms, diabetes and suicide in the 1930 and 1940 United States mortality data. In 1930, urban cancer death rates were 58.8 percent higher than rural cancer death rates. Rural death rates were significantly correlated with the level of residential electric service by state for most of the causes examined.

It is difficult to believe that mortality differences of this magnitude could go unexplained for more than seventy years after first being reported, and forty years after they had actually been noticed and

commented upon. I suspect that in the early part of the twentieth century, nobody was looking for answers or knew how to properly frame the appropriate broad epidemiologic questions. By the time EMF epidemiology began in earnest in 1979, the entire population was exposed to EMFs. There was then simply no way to find an unexposed control group; therefore, all studies were potentially biased. Cohort studies, which follow groups of people forward in time, were by then using EMF-exposed population statistics to compute expected values, and case-control studies were comparing more exposed cases to less exposed controls.

By way of analogy, the mortality from lung cancer in two-pack-a-day smokers is more than twenty times that of non-smokers, but only three times that of one-pack-a-day smokers. Extending that analogy to EMFs, after 1956, the EMF equivalent of a non-smoker ceased to exist in the United States, with the exception of the small Amish population. The inescapable conclusion of these findings is that the twentieth century epidemic of the so-called diseases of civilization, including cardiovascular disease, cancer, diabetes and also suicide, was caused by electrification and the unique biological responses we have to it. A large proportion of these diseases may therefore be preventable.

We are an electrochemical soup at the cellular and organ level. Think of ECG (electrocardiogram), EEG (electroencephalogram), and EMG (electromyogram). We evolved in a complex EMF environment with an interplay of natural terrestrial and extra-terrestrial EMF sources from solar activity, cosmic rays, and geomagnetic activity. I believe that our evolutionary balance, developed over the millennia, has been severely disturbed and disrupted by man-made EMFs.

I believe that man-made EMFs, especially dirty electricity, are chronic stressors and are responsible for many of the disease patterns of electrified populations.

The very good news is that there are reasonable ways to eliminate or reduce this hazard if society chooses to do so, in ways that can make modern life far safer without requiring us to live in the dark. It took nearly fifty years of education and experience to place me in a position to really understand what the La Quinta school cancer data meant. Please join me in a trip back to Albany, New York, in 1932 as I explain how I got to here from there.

1
THE EARLY DAYS

I WAS BORN IN The Albany Hospital, in Albany, New York, on May 12, 1932. I would later attend medical school in the same old red brick building where I had been born, and my first son would also be born there.

My parents were Lebanese and Syrian, and both were Orthodox Christians. My dad, Sam, was actually born in Albany, but his parents had come to the United States in the early 1900s from Brummana, a small town near Beirut, Lebanon. My mother, Louise, was born in Tartous, Syria, and had immigrated as an infant with her parents. My mother graduated from high school, while my dad only finished the fourth grade, because he and his three siblings became trapped in Lebanon by World War I with their mother while visiting her parents. They were out of touch with my grandfather, Alex, for nearly four years, and were often hungry during the Turkish occupation of the Middle East. They all survived the war, but tragically, before I was born, my grandmother, Libby, died in a roll-over car accident while on a family

trip. My dad was so traumatized by her death that he never drove a car.

I attended grades one through eight at Public School 26 in the west end of Albany, which was one hundred feet from our front door. The school was torn down a few years ago to make way for an office complex. This location was important, since I spent the seventh grade in bed with a respiratory infection but lost no school time, because the teachers were able to drop off my lessons after school on the way to their bus stop. After ninth grade at Philip Livingston Junior High School, I attended Albany High School, one public bus ride from home. Academically, the school skimmed off about twenty bright students out of the five hundred who attended and put them in special classes taught by system-wide department chairmen. The tangible benefit of the special high school education that a few of us received was that we could compete with the New York City kids, who had the benefit of attending special technical and science high schools for New York State scholarships. I won the German Prize and the Solid Geometry Prize at high school graduation. One day near the end of twelfth grade, I took an examination that won me a full tuition scholarship to any New York State college of my choice. I decided on Union College in Schenectady, New York, so I could live at home.

Union College was one of the oldest colleges in the country and was affiliated with a state university system that included the Albany Medical School, the Law School, and the Pharmacy School. With an early love of science, I enrolled in the pre-med program. The college had a lovely park-like campus, a fraternity system, and some exceptional teachers. With no family car, I hitchhiked the sixteen miles to and from college every weekday for four years. One of my pre-med classmates helped me find a weekend job at St. Clare's hospital in Schenectady working in the clinical laboratory on weekends for one dollar per hour plus room and board from Friday evening until Monday morning. Within a few months, I was single-handedly running the lab at night, drawing pre-op bloods, doing blood counts and chemistry profiles,

taking blood samples for transfusions, typing, cross-matching, and doing bacteriology. The pathologist who oversaw the lab allowed me to assist in autopsies. He also loaned me his books, an old monocular Zeiss microscope, and a hematology slide collection that I could take home to study. Here, I got my first taste of the practice of medicine, and working in the lab gave me hands-on experience in clinical pathology.

In my senior year at Union, I took another test for a state scholarship and won full tuition to the Albany Medical College (AMC). At that time, I also won another small scholarship, the Fuller Chemistry Prize for Excellence in Chemistry, awarded to a Union graduate headed to AMC. I don't know if New York State still has full scholarship programs, but without them, my life would undoubtedly have taken a different course. Without such financial help, I would surely be doing something else today, and it's likely that none of the research described in this book would ever have taken place. This is something to keep in mind when government programs for education are cut.