

“The human brain is a storage battery capable of sending impulses over the nerves. Why may it not be capable of sending impulses by means of some other medium known or unknown? Why may there not be such a thing as brain radio?”

— Upton Sinclair
Mental Radio, 1930¹

Academic histories of neuroscience frequently offer descriptive, technical accounts of what prior researchers thought about observations rooted in neuronal events.² This perspective often encourages a focused examination of subject matter that is relevant to readers with highly specialized interests. However, an alternative perspective - known as contextual historiography - has emerged among historians of neuroscience within the past several decades.³ Contextual historians examine discoveries as well as various social trends to determine how these discoveries shaped the prevailing perceptions, needs and desires of daily life. An important goal for contextual historians in the field of neuroscience is to bridge a variety of subject areas to invite a wider readership to the field.³

Innovations in electrical technology during the nineteenth century exerted a significant impact on popular conceptions of the human body in the United States. The physical body emerged as an electrical appliance to be diagnosed and repaired with the appropriate tools. Similarly, the concept of the brain as a piece of technology was encouraged by the identification of electrical activity in the central nervous system and subsequently by the development of electroencephalography (EEG) to record this activity. This article explores how electricity and the human brain were conceived in popular culture during the early twentieth century thus providing the context for a critical reading of Upton Sinclair’s *Mental Radio*, a literary work published in 1930.

The Cultural Impact of EEG

In 1875 evidence of electro-cortical activity in laboratory test animals prompted a German psychiatrist to develop the first successful procedure for obtaining an “electrical brain drawing” by recording signals from neurons in the human central nervous system.⁴⁻⁶ Hans Berger’s experiments involving the “elektrenkephalograph” identified oscillating electrical patterns associated with behaviors such as relaxed wakefulness, visual activity and even simple mental tasks. See Figure 1.⁷

Berger’s investigations, which extended from 1924 to 1938, occurred in the wake of numerous advances pioneered during the previous century. Major developments in medical instrumentation included electrically



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stable recording sensors; electro-mechanical devices to detect and amplify minute bio-signals; and eventually spring-wound, ink-writing units to display signal changes over time. By the middle of the 1930s, EEG equipment had evolved into a standardized diagnostic tool for clinical neurologists.^{8,9}

Improved recording devices and Berger’s tantalizing evidence that brain signals could offer a glimpse of mental events led to the rise of “electro-philosophy” in Germany during the early decades of the 1900s, notes neuroscientist and cultural historian Cornelius Borck of Montreal’s McGill University. Furthermore, electrical technology “affected concepts of the human body, resulting, literally as well as metaphorically, in an electrification of the body, brain, and mind.”¹⁰ Such conceptions ranged from the fantastic to the sinister, as evidenced by the 1927 film *Metropolis*, which focused on the creation of a tireless, robot factory worker; and by the proposed use of EEG in personality profiling and eugenics screening programs.¹⁰⁻¹²

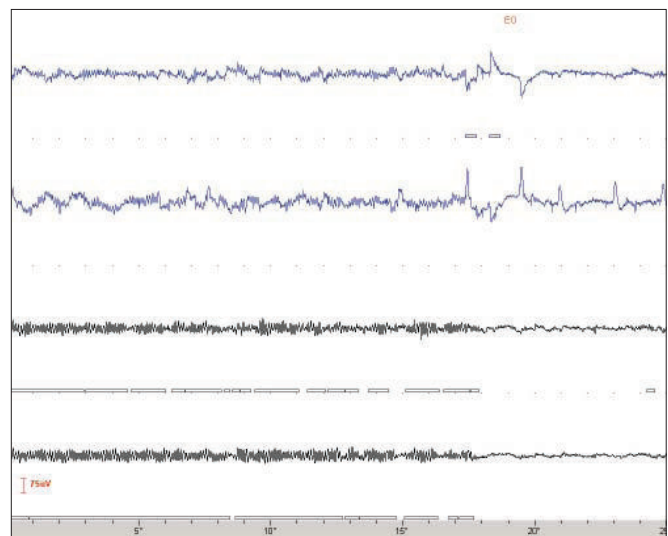


FIGURE 1. Contemporary recording of electrical potential (in microvolts) with respect to time (in seconds). Top channels display left and right eye movements; bottom channels display activity from left and right occipital regions of the brain, respectively. Alpha blocking occurs when the subject’s eyes are open as indicated at the top of the record.⁷

In the United States, a general attitude of “admiration and incomprehension” regarding mechanical devices emerged from the expanding importance of telecommunications and electric transportation during the late 1800s to early 1900s.¹³ Popular depictions of the human body appearing in newspapers and magazines were shaped by an “unbridled electrical enthusiasm,” maintains Carolyn De la Pena, professor of American Studies at the University of California:

The parallel ascent of electricity and electrotherapy in the popular imagination was no coincidence. Electrotherapy, by promising that the body could improve as a physical entity with the application of electricity, quieted fears of an encroaching electric modernity. If the body’s full capacity for health and strength could be reached by only connecting it physically to electric currents, how could one not feel an odd kinship with the telephone, telegraph and streetcar?¹⁴

This pervasive attitude encouraged the cultural trend of viewing prospective patients as appliances to be repaired, maintained or even enhanced by a variety of self-styled “therapists” who ranged from electrical hobbyists and amateur scientists to itinerant college lecturers on summer break.¹⁵ An incomplete understanding of electrophysiology - even among many medical practitioners - helped fuel a techno-centered enthusiasm that galvanized a rapidly industrializing nation.

Attributing physical illness to blocked energies, some therapists promoted quack remedies such as “electric bathing,” as depicted in Figure 2. Proponents claimed that the blockage could be purged by inducing electric currents in the body through full-body immersion into a magnetic field, which was produced within the cylindrical coil of wire by an electrical generator.¹⁶ This belief that human abilities can be enhanced through technology is a recurrent theme in pop culture. For example, the Marvel Comics character Sandman (the main adversary of Spiderman) assumes awesome powers as a result of an accidental exposure to nuclear waste.

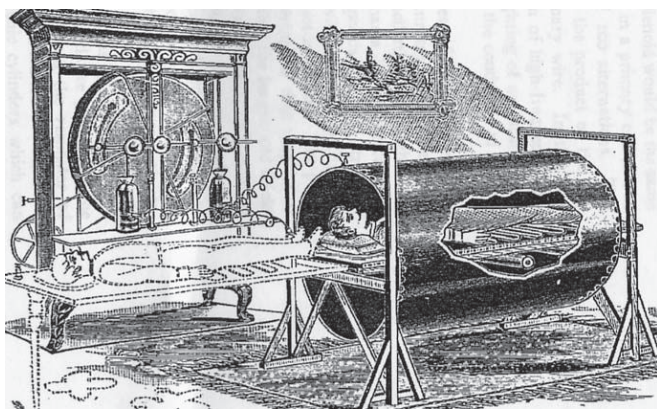


FIGURE 2. “Electric Bathing”¹⁶

A Future with Wireless Thought Messaging

The following categories adapted from De la Pena’s exhaustive review of period manuscripts, newspapers and trade publications provide a way to organize late-nineteenth-century conceptions of electricity and the brain. These categories are known as “tropes” in the field of literary criticism.

The “Displayed Brain” was exemplified by Berger’s intended use of EEG signals as a clinical tool for providing a picture of brain function. The “Expanded Brain” anticipated the use of such signals to influence an individual’s mental state and eventually evolved into clinical relaxation training via the use of neurofeedback.¹⁷ Lastly the “Powered” or “Amplifying Brain” speculated on the use of brain signals to carry the sender’s thoughts wirelessly as “cerebral radiation” for reception by others.¹⁸ This concept of the Powered Brain is central to Sinclair’s *Mental Radio*.

Sinclair was born in Baltimore, Maryland, in 1878. His working-class family moved to New York in 1888. He covered his expenses at the City College of New York by selling his articles to newspapers and magazines. By the age of 28 he had acquired a reputation as an idealistic investigative journalist by some and a “muckraker” by others who were the targets of his hard-hitting articles. His inquisitive nature eventually led him to explore the field of parapsychology.

In *Mental Radio* Sinclair attempted an extensive documentation of what supposedly were his wife’s remarkable psychic abilities. Hundreds of pages are devoted to describing Mary Kimbrough’s success at reproducing numerous hidden sketches of animals, articles of clothing or household utensils. Sinclair placed these sketches in envelopes and hid them in various locations throughout the house. He asked his wife to focus on his mental representation of each sketch and subsequently draw whatever messages entered her mind. As Sinclair fully expected, Mary was able to recognize many of these sketches and reproduce them by hand without any external assistance.

Albert Einstein, who graciously consented to author the preface of the book, praised the author’s writing ability as well as his “good faith and dependability.” Despite Sinclair’s sincerity and honest recollection of his methods, his study falls short of what research psychologists would consider even the most rudimentary experimental design necessary to show any significant results beyond chance happenings.^{19,20} In other words, despite the large number of stimulus presentations (specifically, Sinclair’s mental image of each original sketch), the absence of a suitable experimental design precluded the possibility of identifying effects of the stimulus on the dependent variable (namely, the data set consisting of reproduced sketches).

Undaunted by the lack of internal validity in his research, Sinclair sought to account for his wife’s apparent ability to reproduce unseen sketches. His explanation was consistent with the trope of the Powered Brain that envi-

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sioned EEG signals as electrified thoughts capable of being propagated across spatial distances. Sinclair theorized that thoughts sent from one brain could be received by another brain that was sufficiently powerful to detect and amplify faint impulses of “cerebral radiation.”⁹ According to this argument, image recognition without sensory perception was an example of brain waves performing as radio waves, hence the title of his book.

Summary

The discovery of electro-cortical activity, the subsequent development of EEG recording technology as well as the emergence of the telecommunications industry in the United States contributed to the popular view of the brain as a piece of electrical technology capable of transmitting brain waves - envisioned as electric thoughts - from one physical location to another. The cultural space created by the confluence of these events during the late eighteenth and early nineteenth centuries provided the context for a critical review of the “Powered Brain” theme in Upton Sinclair’s work, *Mental Radio*.

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