

A DEEP TRADITION OF COMPUTING TECHNOLOGY:
CALCULATING ELECTRIFICATION IN THE AMERICAN WEST

Although he was best known for the *Wizard of Oz*, which featured little in the way of cutting-edge technology, in 1901 L. Frank Baum published *The Master Key*, a novel about the incalculable nature of electrical phenomena—what he called the “Demon of Electricity.” This demon had an endless array of “electrical inventions” to offer to a boy called Rob, including something that looks like a computer as we now know it. Overwhelmed by the inconvenient surprises that came with the use of these inventions in his social environment, Rob decided to return them to the demon. In the fiction of L. Frank Baum, there was something demonic, and something incalculable, about electricity.

This cautionary but fantastical tale reminds us of the cultural fascination with electricity at the time that another Frank Baum came on the scene. That Frank Baum was a faculty member of the Stanford electrical engineering department who moved on to spend his life working for the Pacific Gas and Electric Company (PG&E). Like all leading electrical engineers of his generation, he was a firm believer in the use of “imaginary numbers” in calculations of elusive electrical phenomena. The engineering imaginary formed by these calculating numbers was built into the construction of his “alternating current calculating device,” which he distributed with a book he published in 1902, in a folder attached to the back page. As we will see in this essay, like Baum the novelist, Baum the engineer was cautioning that the calculability of electricity was not a given.

The development of calculating technology early in the twentieth century at prestigious research institutions like the Massachusetts Institute of Technology (MIT) and at the electrical manufacturer General Electric Company (GE) is a well-known chapter in the history of pre-electronic computing. One of the acknowledged protagonists in this literature is Vannevar Bush, the MIT professor of electrical engineering who became a powerful manager of top military research projects during