Thomas Alva Edison-
Battery Developer, Entrepreneur, and Factory Manager.

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While often heralded for advances in other technical areas, Thomas Alva Edison spent at least 56 of the 84 years of his life concerned with battery activities. This paper reviews his many battery developments and provides insight into his life style as factory owner, entrepreneur, and developer of many electrical and chemical devices. Illustrations from Edison's personal notes, memos to his factory staff, and notebooks will show these various aspects.

Edison was born in 1847 and by the time he was 30 years old he had carried out considerable experimentation on various types of primary cells. He developed a unique method of fabrication of a high surface area carbon electrode based on egg whites and developed and commercially produced a primary cell for railroad signaling applications. A patent on his improved version of the copper oxide-zinc Lalande-Chaperon system was issued in 1889. Modern versions of this system, are often called Edison-Lalande cells and are still offered in some locations and are also referred to as 'railway primary cells'.

In 1900 Edison proposed substituting cadmium for the zinc with the intention of obtaining a reversible cell by elimination of the soluble zinc material. This was quickly followed by a very important 1901 patent which described cells with an iron negative electrode and either nickel oxide or cobalt oxide as positive electrode materials.

Edison's goal in his storage battery activities was related to electric vehicles and the displacement of horse-drawn vehicles. He believed that the lead-

sulfuric acid battery would not fit the commercial requirements of 'fool-proofness'. He presupposed that the new commercial battery would have to withstand great mechanical strain and his design efforts were based on this concern.

A commercial product was introduced around 1901, but was withdrawn from the market in 1904 because advanced testing indicated problems. When the battery was reintroduced into the market in 1908, it had an entirely different construction as well as very significant changes in materials. Graphite had been replaced by nickel flake, the positive material was contained in cylindrical tubes rather than pockets, and mercuric oxide and other substances had been added to the negative iron electrode. This design was essentially produced without significant change until 1960, when the Electric Storage Battery Company of Philadelphia

acquired the battery division from the McGraw-Edison company and developed new designs and manufacturing procedures.

Until his death in 1931, Edison spent much of his time at the battery factory in West Orange, NJ. As shown by memos to and from his factory managers, he was intimately concerned with operation of the business. He negotiated the sale of iron powder to the Pharmaceutical industry as a dietary supplement, responded to the requests of volunteer fire companies for donations, and was concerned with the amount of labor in the assembly plant in West Orange and the Chemical Plant in Bloomfield.

Edison's developments lead to several spin-offs of technology. His German licensee in the 1900's was the Deutsche Edison Accumulator Company, now called Varta. The Edison Battery Company had representatives attending the earliest meetings of The Electrochemical Society.

References

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