Commentary

Capturing the history of GE Lighting

In 1913 General Electric (GE) opened Nela Park, the US's first industrial park, outside of Cleveland, Ohio. The complex thereafter served as GE's headquarters for its lighting business, which was a successor of the lighting company founded by Thomas Edison in 1878.

In March 2022 several GE Lighting retirees, including the authors of this commentary, were recruited as volunteers to find museums that would welcome many traditional lighting artifacts that had accumulated since 1913. Over the years the operation at Nela Park played a leadership role in the world lighting industry, arguably developing more new lamps and light sources than anyone else.

As onetime colleagues at Nela Park who had loved our work, we represented many different facets of the business, including technology, manufacturing, and commercialization. Nela Park had an open college-campus-like environment in which it was easy for colleagues from different business functions to meet casually, or deliberately when needed. The once 3000 employees had a common cafeteria, an employee store, a library, a bank, and numerous other amenities.

The oldest of our recruited group had started at GE in 1952, and each member knew pieces of the company's history, but certainly not all of it. During our careers, our jobs had been to look forward, not backward. Moreover, the range of the collection that had accumulated at Nela Park was overwhelming. Much of it was of historical significance, but none of it had retained commercial importance in the new world of LEDs. The items included a vast collection of historic light bulbs; dozens of filing cabinets full of previously classified internal technical reports documenting 20th-century GE product developments; bulbs from Joseph Swan, who independently of Edison also developed incandescent lamps; and advertising and training materials for new products. There were also many photographs and film reels capturing the design, manufacture, and commercialization of more than a century of products.

One group of artifacts included four shadow boxes, which Edison took to the International Exhibition of Electricity in Paris in 1881.[1] They show how the earliest Edison light bulbs were made, starting with pieces of bamboo, which were turned into carbonized fibers that were shaped into filaments and sealed inside glass bulbs. Francis Jehl, one of Edison's assistants, documented how their lab tried 6000 different sources of plant fibers before settling on a bamboo from Japan.[2] Edison's exhibit in 1881 was such a success that the shadow boxes remained in Europe to promote his early commercialization there. They finally made it back to Nela Park in 2007. Our retiree group, with our outward-looking network, was able to establish their provenance.

We connected with several museums eager to accept significant parts of our historic treasure. We focused on museums that were of a regional or national stature and that had an online presence, including searchable catalogs of their collections. As we worked with museums and their curators came to Nela Park, we found that different museums were interested in different types of items. The artifacts ended up in several locations, including the Smithsonian Institution's National Museum of American History in Washington, DC; the Western Reserve Historical Society in Cleveland; and the Corning Museum of Glass in New York.

The GE artifacts serve as a reminder of the era when bright indoor electric lighting at the flick of a switch really captured people's attention and changed their lives. Before electric lighting, people had been making do with candles, oil lamps, and gas lighting. The dramatically brighter, cleaner, safer, more efficient, and more convenient electric lighting didn't start to significantly displace those sources until the very late 1800s. Some of the oldest light bulbs in the collection, including those of competitors like Swan, and some early gas and oil lamps went to the San Antonio Museum of Science and Technology.

AN 1881 EDISON SHADOW BOX showing different bamboos considered for sources of light-bulb filaments.

Indoor electric lighting has enabled our modern 24/7 economy and lifestyles in ways that were previously unimaginable.[3,4] While LEDs now offer significant improvement in energy efficiency and electronic control, their impact on our lives is nowhere near as dramatic as that of the traditional products in those first 100 years after 1879, the year of Edison's first significant prototype.[3] The GE commercial materials, now in museums, reflect the public excitement with the new products and GE's engagement in all aspects of their application.

The GE internal technical reports also provide a new perspective on the technological developments themselves. Advances in electric lighting occurred in step with the advances in basic and applied sciences during those same years. (See the article by John Anderson and John Saby, PHYSICS TODAY, October 1979, page 32.) The advances seldom occurred in isolation but rather in harmony with new products and new science developed around the world.

The record of those advances in technology in a century and more of progress has been known publicly through advertisements, product specifications, patents, academic papers, public presentations, published books, and other sources.[3,4] Access to the internal GE technical reports provides future scholars with a behind-the-scenes perspective on those advances. The documents now reside at the Hagley Museum and Library in Delaware, except for those involving glass, which are at Alfred University in New York.

We are grateful to the management team of GE Lighting, now a Savant company, who recruited us, provided logistical support in important ways, and made the preservation project possible. We hope that our experience inspires others who see history and technology moving forward and might know of artifacts worth preserving. Such items help the general public appreciate the rich history of scientific progress and enable scholars to study and interpret that history.

References

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LETTERS

Nineteenth-century women and physics across the pond

Joanna Behrman's article "Physics . . . is for girls?" (PHYSICS TODAY, August 2022, page 30) provides a refreshing antidote to today's stereotypes. For most of its history, Western science has been essentially a men's club, evolving in "a world without women," to borrow the title of David Noble's 1992 book that traces the male dominance of science to Christian clerical heritage.[1]

Behrman reports that in the 19th-century US, girls and young women were encouraged to study natural philosophy. But the situation at the time was quite different in Britain. Girls and women were thought incapable of "ascent up the hill of science," which Cambridge University geologist Adam Sedgwick said was "rugged and thorny, and ill-fitted for the drapery of a petticoat."[2] (Though, ironically, it is said that the cloth wrapping of the ring with which Michael Faraday discovered electromagnetic induction in 1831 was made from strips of his wife's petticoat.)

The Scottish physicist David Brewster, who worked on polarized light and invented the kaleidoscope, was explicit in his views toward women in science: "The mould in which Providence has cast the female mind, does not present to us those rough phases of masculine strength which can sound depths, and grasp syllogisms, and cross-examine nature."[3] J. J. Thomson, the Cambridge physicist who discovered the electron, expressed a similar worldview. In an 1886 letter to a family friend, he complained that a female student in one of his advanced classes did "not understand a word." He went on to state, "my theory is that she is attending my lectures on the supposition that they are on Divinity and she has not yet found out her mistake."[4]

The law of conservation of energy, established at midcentury with major contributions coming from the Englishman James Joule and the Scot William Thomson (later Lord Kelvin), was held by many to explain why women should not do science or indeed even be educated: A woman's body contained only a finite amount of energy, and trouble would befall those who channeled it away from childbirth and nurturing.[5]

In the 1800s, only a few women were accepted into Britain's scientific sphere. One of the most notable was the self-taught Mary Somerville, who wrote several treatises and translated and expanded Pierre Simon Laplace's *Mécanique céleste* (Celestial mechanics; see the article by James Secord, PHYSICS TODAY, January 2018, page 46). Fortunately, the station of women in the still predominately patriarchal social arena of science steadily improves.

References

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► **Behrman replies:** Robert Fleck astutely notes that despite significant cultural exchange between the US and Britain, the histories of women in physics in each country took very different paths. In her book *A Lab of One's Own*, Patricia Fara discusses the difficulty faced by British female scientists in obtaining employment and carving out spaces for themselves in science.[1] In contrast, the relative encouragement for girls to study science in the US paved the way for strong communities of female scientists at many of the country's numerous women's colleges. Miriam Levin chronicles one such