



Joseph Henry and the Telephone

By Frank Rives Millikan

Henry's contributions to the development of the telephone are of minor importance compared to his role in the development of the [telegraph](#) and the [electric motor](#). But the story of Henry and the telephone does provide an interesting example of his interaction with inventors, who often sought his advice and guidance.

The story begins with one obscure inventor, Joseph Faber, and ends with the father of the telephone, Alexander Graham Bell.

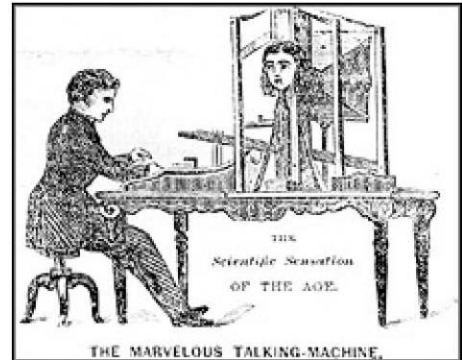
In December 1845, Joseph Faber exhibited his "Wonderful Talking Machine" at the Musical Fund Hall in Philadelphia. This machine, as recently described by writer David Lindsay, consisted of a bizarre-looking talking head that spoke in a "weird, ghostly monotone" as Faber manipulated it with foot pedals and a keyboard.¹

Just prior to this public exhibition, Joseph Henry visited Faber's workshop to witness a private demonstration. Henry's friend and fellow scientist, Robert M. Patterson, had tried to drum up financial support for Faber, a beleaguered German immigrant struggling to earn a living and learn how to speak English. Henry, who was often asked to distinguish fraudulent from genuine inventions, agreed to go with Patterson to look at the machine. If an act of ventriloquism was at work, he was sure to detect it.²

Instead of a hoax, which he had suspected, Henry found a "wonderful invention" with a variety of potential applications. "I have seen the speaking figure of Mr. Wheatstone of London," Henry wrote in a letter to a former student, "but it cannot be compared with this which instead of uttering a few words is capable of speaking whole sentences composed of any words what ever."³

Henry observed that sixteen levers or keys "like those of a piano" projected sixteen elementary sounds by which "every word in all European languages can be distinctly produced." A seventeenth key opened and closed the equivalent of the glottis, an aperture between the vocal cords. "The plan of the machine is the same as that of the human organs of speech, the several parts being worked by strings and levers instead of tendons and muscles."⁴

Henry, who in 1831 had invented a demonstration telegraph while pursuing his electromagnetic investigations, believed that many applications of Faber's machine



Faber's machine. From *Illustrated History of Wild Animals and Other Curiosities Contained in P. T. Barnum's Great Traveling World's Fair...* (1847).



"could be immagined [sic]" in connection with the telegraph. "The keys could be worked by means of electro-magnetic magnets and with a little contrivance not difficult to execute words might be spoken at one end of the telegraphic line which have their origin at the other." A devout Presbyterian, Henry immediately seized upon the possibility of having a sermon delivered over the wires to several churches simultaneously.[5](#)

Tantalizingly close in this letter to imagining the telephone, Henry then shifted his discussion to a subject no doubt of greater importance in his view: the discovery of the Faraday effect, as it became known. Henry informed his correspondent that during the past week he had succeeded in reproducing recent experiments of British scientist Michael Faraday demonstrating the effect of magnetism upon light. Henry astutely called the phenomena observed by Faraday "the greatest discovery [sic] of the present century" next to Hans Christian Oersted's demonstrations of the connection between electricity and magnetism.[6](#)

Barlow's result seemed to present an insurmountable barrier to using this newly discovered physical force for long-distance communication.

Perhaps Henry simply couldn't envision the telephone. Or perhaps the scientist in Henry trumped the inventor in Henry. The possibility of a mere device--no matter how revolutionary for society--could not compete for attention with a discovery illuminating the workings of basic physical phenomena. Whatever the case, it would be another thirty years before Henry would take a serious interest in the telephone.

In the meantime, Faber, who had destroyed an earlier version of his talking machine out of frustration over an unappreciative public, apparently felt encouraged by the response of Henry and Patterson to his new machine. In 1846, he accompanied P. T. Barnum to London, where the "Euphonia," as it was now called, was put on display at London's Egyptian Hall. The exhibit drew an endorsement from the Duke of Wellington and remained a part of Barnum's repertoire for the next several decades. The financial returns for Faber, however, were meager. He would die in the 1860s without achieving the fame or fortune he sought.[7](#)

Faber would thus not live to witness the most important outcome of his invention. By a curious twist of fate, one person who happened to see the Euphonia in London in 1846 and come away deeply impressed was Melville Bell, the father of Alexander Graham Bell.

The elder Bell was a student of acoustics with a special interest in speech production. Still intrigued by the memory of Faber's device in 1863, he took his son Alexander, then about sixteen years old, to see the "speaking machine" of British scientist Charles Wheatstone, the one Henry had found inferior to Faber's. After the visit, Melville challenged Alexander and his brother to build such a machine of their own. That year



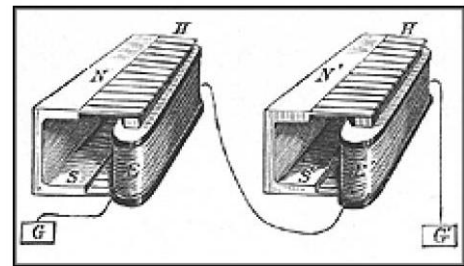
they began work on the project and soon succeeded in having their speaking machine cry, "Mama."[8](#)

Over the next decade, Alexander pursued a number of lines of investigation that helped culminate in the telephone. Helping his father in his work on speech production, he learned how to analyze the pitch of vowels by correlating their sounds with a tuning fork. Bell continued to experiment with the mechanical production of sound as he settled into a career teaching hearing-impaired students how to speak. One of his ideas was to make an instrument for transmitting vibrations to enable lip-readers to tell the difference between "P" and "B."[9](#)

This latter instrument, according to Bell's biographer, was an indication of his interest at this time in developing a multiple telegraph, that is, a telegraph capable of carrying several messages simultaneously over the same wire. Thomas Edison, only three weeks older than Bell, was also trying to develop one. But Bell's harmonic approach was different, involving the transmission of different pitches over a wire and using tuned receivers to reassemble them.[10](#)

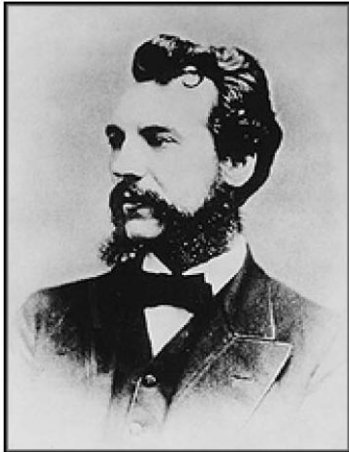
By the beginning of 1874 and after much experimentation, Bell had constructed a harmonic multiple telegraph that he considered ready for patenting. He delayed the application after receiving a haughty and discouraging letter from the Chief Superintendent of Telegraphs at the British Post Office in London. (Bell was a native of Canada and thus a British subject.) But patenting the invention continued to remain his foremost objective.[11](#)

In the summer of 1874, Bell began to explore another idea, "electric speech," as his father termed it in a diary entry. He sketched a harp apparatus that was based on the notion, according to a letter Bell wrote to his parents, that "the vibrations of a permanent magnet will induce a vibrating current of electricity in the coils of an electromagnet." Bell theorized that if one spoke into a transmitting harp, a series of steel reeds would vibrate over a magnet to induce an undulating current and reproduce the sound at the other end. In this manner, the complex frequencies of the human voice could possibly be transmitted. Bell called the harp apparatus "my first form of articulating telephone."[12](#)



Sketch of harp apparatus (never made). George B. Prescott, *Bell's Electric Speaking Telephone* (New York, 1884), p. 67.

While Bell continued to conduct research on improving the telegraph, he learned that Henry had previously discovered some of the same acoustical phenomena he was encountering. He therefore decided to introduce himself to Henry in March of 1875 during a trip to Washington. As he wrote in a letter to his parents, Bell wanted to "explain all the experiments, and ascertain what was new and what was old."[13](#)



Alexander Graham Bell in 1876. Smithsonian Institution Archives (neg. no. 9823-C or SIA2012-1090)

Bell's letter to his parents, written a few weeks after seeing Henry at the Smithsonian, conveys the significance the young scientist attached to the visit. At the time Henry was fifty years older than the twenty-seven-year old Bell. Bell describes how Henry "listened with an unmoved countenance--but with evident interest to all-- but when I related an experiment that at first sight seems unimportant--I was startled at the sudden interest manifested."

What intrigued Henry was the sound Bell heard coming from an empty coil of copper wire when a current of electricity passed through it. Henry asked Bell to repeat the

experiment for him, and Bell did so the next day.

"I felt so much encouraged by his interest," Bell wrote, "that I determined to ask his advice about the apparatus I have designed for the transmission of the human voice by telegraph." Bell wanted to know whether he should publish his research at once, or keep working on the problem himself. Henry advised him to work it out himself, calling it the "germ of a great invention." When Bell said he felt he lacked the electrical knowledge needed to overcome some of the mechanical difficulties of his harp apparatus, Henry simply replied, "GET IT."[14](#)



Henry, ca. 1875. From engraving by G. R. Hall, possibly after a photograph by T. W. Smilie. Smithsonian Archives.

"I cannot tell you how much these two words have encouraged me," he told his parents. "I live too much in an atmosphere of discouragement for scientific pursuits.... Such a chimerical idea as telegraphing vocal sounds would indeed to most minds seem scarcely feasible enough to spend time in working over. I believe, however, that it is feasible, and that I have got the cue [sic] to the solution of the problem."

Over the next year, with the assistance of Thomas Watson, Bell indeed "worked out" the problem. He filed a patent for his telephone on February 14, 1876, and the patent was officially issued the following month. On March 10, one year after his meeting with Henry, Bell succeeded in transmitting the first intelligible human speech over the telephone--the now famous words, "Mr. Watson--Come here--I want to see you."[15](#)

Henry continued to lend support to Bell's efforts to develop the telephone. In his role as a judge at the 1876 Centennial Exhibition in Philadelphia, Henry submitted a report



explaining the workings and the significance of Bell's invention. He and the other judges considered Bell's telephone "the greatest marvel hitherto achieved by the telegraph." While Bell was in Washington in January 1877 to file his second telephone patent, he gave a demonstration of the telephone at the Smithsonian for Henry and his daughters. He repeated the demonstration that same evening at Henry's invitation before the Philosophical Society of Washington, of which Henry was president. On this occasion Henry spoke of "the value and astonishing character of Mr. Bell's discovery and invention."[16](#)

Testimonials from Henry and other eminent scientists helped establish Bell's credibility at a time when his financial status was precarious. In an unsettled state, he had been forced to postpone plans for marriage. Lecture fees were his main source of income in July 1877, when he formed the Bell Telephone Company with Watson and two other partners.[17](#)

Bell never forgot Henry's contribution. Shortly after Henry's death in 1878, Bell arranged for free telephone service for Henry's widow, Harriet, and her daughters. Several years later, he intervened when the phone was removed from service. Writing the president of American Bell Telephone Company, as it was now named, Bell explained why he strongly urged restoration of service: "This telephone was placed in position there and no charge was made therefore in recognition of the efforts and services of Professor Henry in the early history of the instrument and who did a great deal to encourage the invention."[18](#)

Bell's solicitude to the Henry family was also in evidence shortly after Harriet's death in 1882. When her daughter Mary needed financing in 1883 for a real estate investment and for a business trip to New York, Bell agreed to purchase Henry's library from her for \$5,000.[19](#)

Many years after Bell's death, his descendants gave the Henry library to the Smithsonian, along with some 2,000 books and pamphlets that belonged to Bell. The Bell-Henry Library, as it is called, quite fittingly links two great scientists together.



Notes

1. David Lindsay, "Talking Head," *American Heritage of Invention & Technology* (Summer 1997): 57. [Return to [text.](#)]
2. Joseph Henry to Henry M. Alexander, January 6, 1846, in *The Papers of Joseph Henry*, Vol. 6, Marc Rothenberg et al., eds. (Washington, 1992), pp. 359-364. [Return to [text.](#)]
3. *Ibid.*, p. 362. [Return to [text.](#)]
4. *Ibid.* [Return to [text.](#)]
5. *Ibid.* [Return to [text.](#)]
6. *Ibid.*, p. 363. [Return to [text.](#)]
7. Lindsay, "Talking Head," pp. 60-61; Lindsay, *Madness in the Making: The Triumphant Rise and Untimely Fall of America's Show Inventors* (New York, 1997), pp. 88-89. Even after Faber's death, his niece's husband, calling himself Professor Faber, continued to exhibit the machine for many years. The second Faber would seek Henry's endorsement of the machine in 1872 and Bell's financial assistance in 1885. F. A. Barnard to Joseph Henry, November 30, 1872, Record Unit 26, Incoming Correspondence, Office of the Secretary, Smithsonian Archives; Henry's Desk Diary, December 5, 1872, Henry Papers, Smithsonian Archives. Alexander Graham Bell to Joseph Wehrle, April 16, 1885; Bell, "To whom it may Concern," April 25, 1885; Bell to Joseph Faber, April 25, 1885: all in "Faber's Talking Machine," Alexander Graham Bell Papers, Manuscript Division, Library of Congress. [Return to [text.](#)]
8. Lindsay, "Talking Head," pp. 60-61; Robert Bruce, *Bell: Alexander Graham Bell and the Conquest of Solitude* (Boston, 1973), pp. 33, 35-37, 82. Bruce says that Alexander and his father saw Faber's machine in London in 1863, but he seems to be confusing this with Wheatstone's machine. Bruce doesn't cite a source, and Bell's later recollection mentions Wheatstone but not Faber. Alexander Graham Bell, *Beinn Bhrèagh Recorder*, vol. 2, p. 61. [Return to [text.](#)]
9. Bruce, *Bell*, pp. 45-46, 74-80, 94. [Return to [text.](#)]
10. *Ibid.*, pp. 92-93. [Return to [text.](#)]
11. *Ibid.*, pp. 104-110, 123; James MacKay, *Alexander Graham Bell: A Life* (New York, 1997), p. 85. [Return to [text.](#)]
12. *Ibid.*, pp. 120, 123; Michael E. Gorman, "Alexander Graham Bell's Path to the Telephone," Gorman's home page; Bell quoted in George B. Prescott, *Bell's Electric Speaking Telephone* (New York, 1884), p. 66. [Return to [text.](#)]
13. Alexander Graham Bell to Alexander Melville Bell and Eliza Symonds Bell, March 18, 1875, Alexander Graham Bell Papers, Family Papers, Manuscript Division, Library of Congress. [Return to [text.](#)]
14. Bell placed a double underline beneath the two words, which I have rendered as capital letters. To view Bell's letter on the web site of the Library of Congress, [click here](#). [Return to [text.](#)]



15. Bell's Experimental Notebook, March 10, 1876, Alexander Graham Bell Papers, Manuscript Division, Library of Congress. [Return to [text](#).]

16. The Bell Telephone: The Deposition of Alexander Graham Bell in the Suit Brought by the United States to Annul the Bell Patents (Boston, 1908), pp. 139-140; Henry quoted in Bruce, Bell, p. 214, from minutes of the Philosophical Society of Washington. [Return to [text](#).]

17. Bruce, Bell, pp. 208-209, 214, 226-227, 231. [Return to [text](#).]

18. Spencer F. Baird to Bell, December 29, 1884, and Bell to W. B. Forbes, January 8, 1885, "The Telephone," Alexander Graham Bell Papers, Family Papers, Box 293, Manuscript Division, Library of Congress. [Return to [text](#).]

19. Mary Henry to Alexander Graham Bell, May 2, 1883; receipt of purchase, May 2, 1883: both in "Mary Henry," Alexander Graham Bell Papers, Family Papers, Manuscript Division, Library of Congress. [Return to [text](#).]