Inventing the Telephone

“Mr. Watson, come here, I want you.” With these words, spoken by inventor Alexander Graham Bell into his experimental telephone on March 10, 1876, an industry was born. For down the hall, Bell’s assistant, Thomas Watson, distinctly heard Bell utter the first spoken sentence ever transmitted via electricity. That achievement was the culmination of an invention process Bell had begun at least four years earlier.

In the 1870s, electricity was the cutting-edge technology. Like today’s Internet, it attracted bright, young people, such as Bell and Watson, who were only 29 and 22 in 1876. The field of electricity offered them the opportunity to create inventions that could lead to fame and fortune.

Although Bell was just learning electricity, he was already an expert on sound and speech. Born and raised in Edinburgh, Scotland, Bell was the son of Alexander Melville Bell, a professor of elocution who had devised a technique called visible speech, a set of symbols that represented speech sounds. The elder Bell used the technique to teach the deaf to speak.

Young Aleck followed in his father’s footsteps, and by the time he was 20, he was teaching visible speech in London. In 1870, he emigrated with his parents to Canada. The next year, Bell moved to Boston to lecture on visible speech and to teach the deaf. In 1872, he became a professor of elocution at Boston University, where he trained teachers of the deaf and taught private pupils.

Among those pupils were Thomas Sander’s young son, George, and Gardiner Hubbard’s teen-aged daughter Mabel. Bell impressed both men with his knowledge of electricity, and by 1874 they had agreed to pay his research expenses in return for a share in any inventions Bell might make.

There was already one great electrical industry — the telegraph, whose wires crossed not only the continent but even the Atlantic Ocean. The need for further innovations, such as a way to send multiple messages over a single telegraph wire, were well known and promised certain rewards. But other ideas, such as a telegraph for the human voice, were far more speculative. By 1872, Bell was working on both voice transmission and a “harmonic telegraph” that would transmit multiple messages by using musical tones of several frequencies

The telegraph transmitted information by an intermittent current. An electrical signal was either present or absent, forming the once-familiar staccato of Morse code. But Bell knew that sounds like speech were complex, continuous waves, with not only tone but amplitude. In the summer of 1874, while visiting his parents in Brantford, Ontario, Bell hit upon a key intellectual insight: To transmit the voice electrically, one needed what he called an “induced undulating current.” Or to put it another way, what was required was not an intermittent current, but continuous electrical waves of the same form as sound waves.

But Bell still needed to prove his idea with an actual device. He struggled to find time to develop it among competing demands, including his teaching duties and his efforts — pushed by Hubbard — to perfect a multiple telegraph. As Bell was falling in love with Hubbard’s daughter, Mabel, he felt he could ill afford to ignore the older man’s wishes.

On July 1, 1875, Bell succeeded in transmitting speech sounds, but they weren’t intelligible. In the fall, he began to draw up patent specifications for “an improvement in telegraphy,” the improvement being that it talked. Bell delayed filing for a patent, however, because he had promised another backer, George Brown, that he would not do so until Brown applied for a British patent (which Brown never did).

But Gardiner Hubbard was under no such restriction. Without Bell’s knowledge, he filed the patent application on the morning of Feb. 14, 1876.

There’s a well known tale that Bell beat another inventor, Elisha Gray, to the patent office by a few hours. While true, it’s not the whole story. Bell filed a patent application, a claim that “I have invented.“ Gray, on the other hand, filed a caveat, a document used at the time to claim “I am working on inventing.“ Priority in American patent law follows date of invention, not date of filing. Still, filing first helped Bell avoid a possible costly and time-consuming dispute. The U.S. Patent Office issued patent #174,465 to Bell on March 7, 1876.

Bell returned to his experiments in Boston. On March 10, he hooked up his latest design, known as the liquid transmitter, into an electrical circuit, and Watson heard Bell’s voice.

Bell announced his discovery, first in lectures to Boston scientists and then at the Philadelphia Centennial Exposition to a panel of notables including Brazilian Emperor Dom Pedro II and eminent British physicist William Thomson. The emperor exclaimed, “My God! It talks!” Thomson took news of the discovery across the ocean and proclaimed it “the greatest by far of all the marvels of the electric telegraph.”

By the summer of 1877, the telephone had become a business. The first private lines, which typically connected a businessman’s home and his office, had been placed in service. Bell, Sanders and Hubbard formalized their relationship by creating the Bell Telephone Company, the direct corporate predecessor of today’s AT&T. Bell Telephone issued the first telephone stock to seven stockholders. The initial telephone exchange opened the following year in New Haven.

Alexander Graham Bell had little interest in being a businessman. In July 1877, he married Mabel Hubbard, and set sail for what proved a long honeymoon in England. He left the growing business to Hubbard and Sanders, and went on to a long productive career as a scientist and inventor.

But from the telephone’s earliest days, Bell understood his invention’s vast potential. He wrote in 1878: “I believe in the future wires will unite the head offices of telephone companies in different cities, and a man in one part of the country may communicate by word of mouth with another in a distant place.”