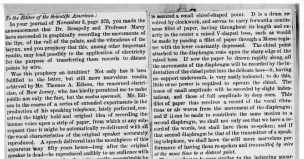
Edward Johnson to the Editor of the Scientific American



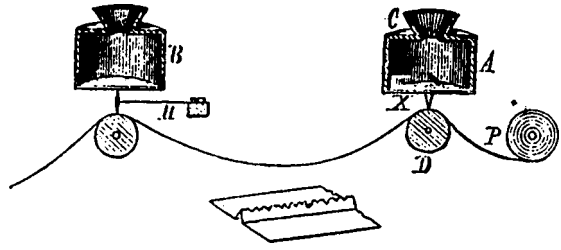
New York, November [6?], 1877[1]

To the Editor of the Scientific American:

In your journal of November 3, page 273,[2] you made the announcement that Dr. Rosapelly and Professor Marey have succeeded in graphically recording the movements of the lips, of the vail[3] of the palate, and the vibrations of the larynx, and you prophesy that this, among other important results, may lead possibly to the application of electricity for the purpose of transferring these records to distant points by wire.

Was this prophecy an intuition? Not only has it been fulfilled to the letter, but still more marvelous results achieved by Mr. Thomas A. Edison, the renowned electrician, of New Jersey, who has kindly permitted me to make public not only the fact, but the *modus operandi*.[4] Mr. Edison in the course of

a series of extended experiments in the production of his speaking telephone, lately perfected, conceived the highly bold and original idea of recording the human voice upon a strip of paper, from which at any subsequent time it might be automatically re-delivered with all the vocal characteristics of the original speaker accurately reproduced. A speech delivered into the mouthpiece of this apparatus may fifty years hence—long after the original speaker is dead—be reproduced audibly to an audience with sufficient fidelity to make the voice easily recognizable by those who were familiar with the original. As yet the apparatus is crude, but is characterized by that wonderful simplicity which seems to be a trait of all great invention or discovery. The subjoined illustration, although not the actual design of the apparatus as used by Mr. Edison, will better serve to illustrate and make clear the principle upon which he is operating.



A is a speaking tube provided with a mouthpiece, C—: X is a metallic diaphragm which responds powerfully to the vibrations of the voice. In the center of the diaphragm is secured a small chisel-shaped point. D is a drum revolved by clockwork, and serves to carry forward a continuous fillet of paper, having throughout its length and exactly in the center a raised V-shaped boss, such as would be made by passing a fillet of paper through a Morse register with the lever constantly depressed. The chisel point attached to the diaphragm rests upon the sharp edge of the raised boss. If now the paper be drawn rapidly along, all the movements of the diaphragm will be recorded by the indentation of the chisel point into the delicate boss—it, having no support underneath, is very easily indented; to do this, little or no power is required to operate the chisel. The tones of small amplitude will be recorded by slight indentations, and those of full amplitude by deep ones. This fillet of paper thus receives a record of the vocal vibrations or air waves from the movement of the diaphragm; and if it can be made to contribute the same motion to a second diaphragm, we shall not only see that we have a record of the

words, but shall have them re-spoken; and if that second diaphragm be that of the transmitter of a speaking telephone, we shall have the still more marvelous performance of having them re-spoken and *transmitted by wire at the same time to a distant point.*

The reproductor is very similar to the indenting apparatus, except that a more delicate diaphragm is used. The reproductor, B, has attached to its diaphragm a thread which in turn is attached to a hair spring, H, upon the end of which is a V-shaped point resting upon the indentations of the boss. The passage of the indented boss underneath this point causes it to rise and fall with precision, thus contributing to the diaphragm the motion of the original one, and thereby rendering the words again audible. Of course Mr. Edison, at this stage of the invention, finds some difficulty in reproducing the finer articulations, but he quite justified by results obtained, from his first crude efforts, in his prediction that he will have the apparatus in practical operation within a year. He has already applied the principle of his speaking telephone, thereby causing an electro-magnet to operate the indenting diaphragm, and will undoubtedly be able to transmit a speech, made upon the floor of the Senate, from Washington to New York, record the same in New York automatically, and by means of speaking telephones redeliver it in the editorial ear of every newspaper in New York. In view of the practical inventions already contributed by Mr. Edison, is there any one who is prepared to gainsay this prediction? I for one am satisfied it will be fulfilled, and that, too, at an early date.

EDWARD H. JOHNSON, Electrician.

PL, *Sci. Am.* (n.s.) 37 (1877): 304.

1. The date on the issue of the *Scientific American* was 17 November but it was printed and available by 6 November, on which day it was reprinted in a New York newspaper (the *Sun*) as "Echoes from Dead Voices. Wonderful possibilities of Mr. Edison's Latest Invention" (Cat. 1240, item 269, Batchelor [*TAEM* 94:80]). The newspaper report spread widely and apparently more rapidly than the journal, eliciting both skeptical and jocular initial responses. See "A Singular Invention," *New York World,* 7 Nov. 1877; "The Phonograph," *New York Times,* 7 Nov. 1877; "The Inventor of the Age. An Afternoon in the Laboratory of Prof. Thomas A. Edison," *New York Sun,* 29 Apr. 1878 (Cat. 1240, item 561, Batchelor [*TAEM* 94:186]). *Scientific American* prefaced the letter with several laudatory editorial paragraphs, all but one of which were also reprinted in the *Sun.*

2. "Speech Automatically Transmitted in Shorthand by the Telegraph."

3. The velum, or soft palate.

4. Johnson had mentioned Edison's invention in his telephone exhibitions as early as the beginning of August, and the *Philadelphia Record* had reported the invention on 14 August. His pamphlet on the telephone, published about this time, also contained a discussion similar to this letter. Doc. 991; "Edison at Home," *Philadelphia Record*, [6 June 1878?] (Cat. 1240, item 648 [*TAEM* 94:222]); Johnson 1877, 10–12; Johnson, "Address to the 11th National Electric Light Association Meeting," *Elec. W.* 15 (1890): 154.