

“Perfectly Reproduced Slow or Fast”: A New Take on Edison’s First Playback of Sound

by Patrick Feaster

Just tried experiment with a diaphragm having an embossing point & held against parafin paper moving rapidly the ~~nam~~ spkg vibrations are indented nicely & theres no doubt that I shall be able to store up & reproduce automatically at any future time the human voice perfectly

The above words appear in Thomas Edison’s handwriting at the bottom of a laboratory note topped by the signatures of Charles Batchelor and James Adams along with a date: “July 18, 1877.”¹ On the strength of this evidence, commentators regularly cite 18 July as the day on which Edison invented his phonograph, or discovered its principle, or first played back a recorded sound. In doing so, they tacitly assume that the dates found on Edison’s laboratory notes refer to the days on which those notes were originally composed. But do they?

Some grounds for doubt come straight from the inventor’s own mouth. On 18 October 1895, while Edison was giving a deposition in the court case *American Graphophone Company et al. vs. United States Phonograph Company et al.*, his counsel, Samuel Owen Edmonds, said: “I hand you a sketch; please state if you know what it is?” Edison replied: “It is a sketch of phonographic ideas, made in my handwriting and witnessed by several of my assistants. It is dated November 1st, 1877. This does not mean that the sketch was made at that time, as it was usual for me to make sketches on the books lying around the laboratory, and then at a certain time we collected them all together, put the date on, and all the men would sign it and date it the day they signed it.” Edmonds pressed for clarification: “This sketch, then was made and signed either on the day of its date or before that time?” “The witness’ signatures and my own signature were made on the date upon the paper,” Edison responded, “but the sketch might have been made a couple of months or more previous to that.”² Again, on 23 March 1896, he said of docu-

ments dated 9 September and 1 November 1877: “They were made previous to or at the time that they were signed.” “And when were they signed?” “They were signed on the date given on the records.”³ In connection with the same case, Charles Batchelor testified on 12 March 1896 about some sketches bearing dates in February 1878: “To the best of my knowledge, they were signed on the date which is given on the sheet. The sketches may have been made a few days before. It was always our custom to date them when we signed them.”⁴

Edison didn’t always tell quite the same story. He had also described his standard operating procedure fifteen years before, on 8 November 1880, in connection with telephone litigation: “in 1877...I commenced the practice of placing note books all over my laboratory, with orders to my assistants to draw out and sign every experiment.” His counsel, Lemuel W. Serrell, asked: “State what has been your habit in regard to the fixing of dates upon drawings?” Edison replied: “It has been to make the drawing, immediately sign it and date it, explain it to my assistants, and have them witness it, and this is most always done on the same day that the drawing is made; in case the date was not put on the drawing, and it was afterwards found, no date was allowed to be put upon it.”⁵ But “most always” isn’t the same as “always,” and two days later Edison had explicitly acknowledged the existence of exceptions: “There has been instances where drawings were made, and a date and title was not written down, but always within three or four days the date was placed upon the paper, which date was the date written, hence the diagrams would in this case be made before the date upon them. These books were scattered all over the laboratory, so that if I wished to express an idea, or explain a movement or design to an assistant, I would pick up a book nearest by, write the title, date it, put my name down, and make the

drawings. When the book was full, they were collected together and fresh books scattered around the laboratory.”⁶

We find some contradictory statements, then, about just when Edison’s laboratory notes were typically signed and dated: this is supposed to have happened “immediately” upon creation, or within a few days (or months), or whenever the filled notebooks were collected. Nevertheless, the dates are consistently described as showing only that a document had *existed* on a particular day (so that it could be signed then) and that it was therefore *at least* that old for purposes of establishing priority of invention. Even this seems unlikely to have been true in all cases, judging from one phonographic note introduced as evidence in 1895 that bears several signatures under the date “Sept. 8 or 9, 1877.”⁷ If the date had been added when the note was signed, in order to document when it had been signed, how could there have been any uncertainty about the exact day? Had Edison and his team been signing it just as the laboratory clock struck midnight?

To complicate matters further, the provenance of Edison’s laboratory notes from this period was scrambled beyond recovery when the books were disbound and the pages reorganized. We find an account of this process in Edison’s deposition of November 1880: “Some of these Exhibits have been injured on their upper edges. How did that arise?” “They were torn out of books of the size of the cover which I now produce.” “Why were these torn out, and when?” “They were torn out so that experiments relating to the same subject might have their records placed together. Every experiment having generally a title indicating what it was. It was done over a year ago, I think. My book-keeper, Mr. Carman, will be able to give the probable date.” “Do you remember whether there was anything being done at this time, when these drawings were being torn out, that rendered it important to select the records relating to particular subjects, and bring them together?” “Yes, sir; I expected that they would be used in the interferences on the telephone. I also desired to make tracings,

so that they could be kept apart for safety.” Edison referred further to “numbers on the top left hand corner of some of the sheets, made by a person who took tracings of these drawings on tracing paper.”⁸ This work was presumably carried out in response to a letter Serrell had written to Edison on 16 February 1880: “Will you oblige by having one of your young men go over the bundle of sketches (the original ones) and lay out all matters relating to Telephones or acoustic matters leading thereto, and arrange them according to dates.”⁹ (This apparently didn’t happen right away, since Serrell wrote again on 1 April: “I want to have your assistant [presumably Carman] sort out the drawings and evidence according to date as yesterday understood.... on Tuesday I will go through with you, number and list the drawings &c.”¹⁰) The “tracing” numbers written in the corners may reflect the order in which Carman first reorganized the notes by date after removing them from their bindings, but the notes were reorganized yet again for the 1880 telephone interference into “volumes” numbered from 8-18, with the documents in each volume numbered sequentially starting at 1; this latter organization is the one preserved today. Thus, neither the current organization of the notes nor the alternative sequence of “tracing” numbers reflects the original order of the notes before they were disbound. Instead, the notes had already been separated by topic and reorganized by date at the time the numbers were assigned. But, as we have seen, the dates aren’t reliable either. In short, we’re dealing with quite a mess!

This is troubling. Nearly everything we think we know about the chronology of Edison’s phonographic efforts before December 1877 comes from his laboratory notes. If the dates on the notes don’t reliably correspond to when the notes were written, we may need to reassess some generally accepted points in the early history of the invention. For example, consider Paul Israel’s statement: “The phonograph he [Edison] sketched on November 1 still looked very much like an automatic telegraph and still recorded on paper tape.”¹¹ The sketch in question is certainly dated 1 November 1877, but this is the specific document Edison said

“might have been made a couple of months or more previous to that,” so we can’t really be sure when it was drawn. According to Edison’s own testimony, it might reflect the state of his thoughts in early November 1877—or it might not. Suddenly it seems a lot less certain just what happened when.

But there’s a silver lining to this cloud. I believe the distinction between dates of creation and dates of signing can resolve a puzzle that surrounds Edison’s earliest dated notes about the idea of phonographic sound recording. One, dated 17 July 1877, runs as follows:

...reproduced slow or fast by a copyist & written down This can be applied telegraphically thus [followed by a sketch]

Sheet after received is sent to Copyist whole pass it in machine similar to that shewn on other page & copied at rate of 25 words per minute whereas it was sent at rate of 100 per minute thus Saving all skilled oprs & 5 persons doing work of .8. Emg might be used instead of magnet to receive it might be done in other ways besides indenting—such as perforating with needle or by a friction ink=

Revolving plate two telephone tubes=¹²

The other note, dated 18 July and describing the famous “experiment with a diaphra[g]m,” was quoted at the beginning of this article. In the past, it’s been assumed that these two notes were composed on the specific dates written on them—and hence on two different days. Here’s how Paul Israel describes Edison’s invention of the phonograph based on his interpretation of this pair of documents:

On July 17, 1877, Edison had been thinking about the possibility of recording telephone messages. Thinking of the telephone as a form of telegraph, he and others in the industry thought that it would be necessary to produce a written record. He therefore envisioned using a recorder similar to the embossing recorder-repeater he was then developing for Western Union. Still reflecting on the

idea the following day [18 July], he experimented “with a diaphragm having an embossing point & held against paraffin paper moving rapidly.” Finding that the sound “vibrations are indented nicely” he concluded “theres no doubt that I shall be able to store up & reproduce automatically at any future time the human voice perfectly.”¹³

Similarly, we read in the print edition of Edison’s laboratory notes:

On 17 July Edison designed a message recorder that would do for the telephone what his embossing repeater did for Morse telegraphy, only to realize hours later [presumably on 18 July] that he had conceived a means for permanently recording sound—the phonograph.¹⁴

In other words, Edison is supposed to have contemplated the idea of recording and repeating telephone messages on 17 July (documented in one note) and then tried out phonographic sound reproduction in practice for the first time on 18 July (documented in another note). However, the note dated 17 July seems to start in mid-sentence, and internal evidence had led me to infer in the past that a page preceding it must already have described a means of recording and reproducing sound separately from the telephone. Since I couldn’t find any documents dated 17 July that fit this description, I assumed the preceding page had gone missing.¹⁵

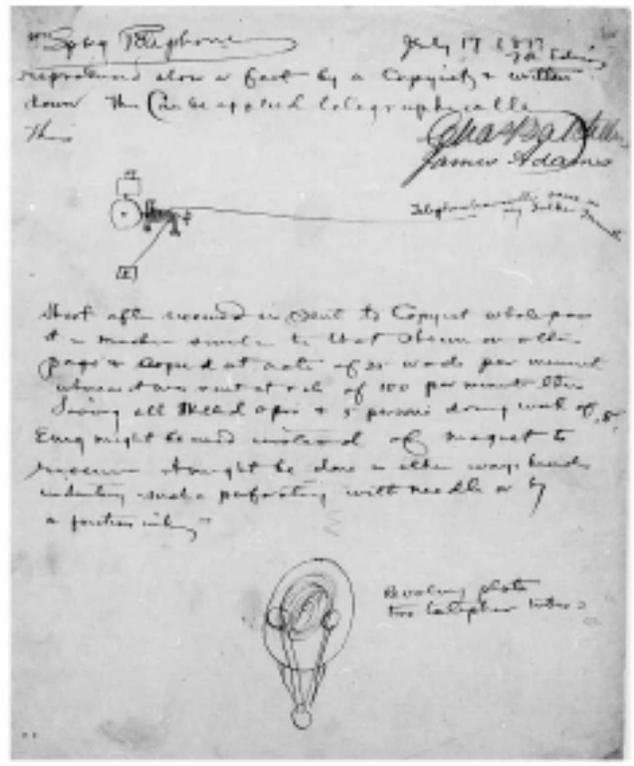
But if notebook entries were sometimes signed and dated haphazardly a day or more after being made, as the depositions I’ve quoted suggest, then couldn’t the note dated 17 July have been a *continuation* of the note dated 18 July? The passage spanning the page break would then read:

theres no doubt that I shall be able to store up & reproduce automatically at any future time the human voice perfectly reproduced slow or fast by a copyist & written down This can be applied telegraphically thus....

The two texts fit together grammatically and con-



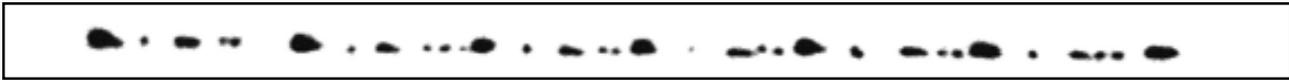
ceptually like pieces of a jigsaw puzzle; the result is awkwardly phrased, to be sure, but no more so than usual for Edison. I can think of no really conclusive way to prove or disprove this hypothesis; apart from the problems of provenance I've already mentioned, the "18 July" page is known to survive only in facsimile, so its inks and paper characteristics can't be compared with those of the "17 July" page. Still, let's consider the potential implications. If the page signed and dated on 18 July was written before a second page signed and dated on 17 July, then the page dated 18 July must also have existed on 17 July, even if it remained undated until the next day. In that case, Edison's first sound playback experiment would necessarily have taken place on or before 17 July, and not on 18 July as generally believed. The "17 July" page would also represent Edison's first effort to devise a use scenario for a principle he had just discovered or demonstrated through experiment (as documented on the "18 July" page), rather than speculation into a process he hadn't yet tried, which seems intuitively to make more sense and is also more consistent with later reminiscences.¹⁶



The reference on the "17 July" page to a "machine similar to that shewn on other page" remains puzzling. "This referent is unidentified," states the print edition of Edison's papers,¹⁷ and my new hypothesis is admittedly not very helpful here. The drawings on the "18 July" page depict real-time telephone repeater relays, and not something through which a recorded sheet could have been "passed" for playback. Still, the reference could be to a *third* page, for which there may be several candidates.¹⁸

And there may be other graphic documentation of the breakthrough moment as well. The editors of the print edition of Edison's papers represent the "18 July" page as continued from yet another sheet dated 18 July, which they observe has a "row of closely spaced dots" sketched at its bottom.¹⁹ The text and drawings above the dots describe a novel approach to transmitting "hiss" sounds via telephone with the aid of a tuning fork "arranged to give a number of Contacts one after the other";

The "18 July" and "17 July" pages in hypothesized original order.



Could this be a drawing of Edison's first experimental sound recording?

however, the patterning of the dots is clearly too irregular to represent the vibrations of a tuning fork. It vaguely resembles Morse code, perhaps a repeated “— · — ·,” but the variations in spacing appear wrong for that too, and no other notes dated close to this time seem to deal with Morse telegraphy. What I believe the row of dots *most* looks like is a vertically modulated phonographic record of just over six cycles of a complex waveform such as we might expect from a vowel sound. Could this be an unlabeled drawing of the results of Edison's first phonographic experiment, sketched at the bottom of a sheet of notes that was conveniently near at hand? Such a drawing would be perfectly consistent with a statement Edison made in April 1878 about his phonographic work “last July,” as he sought in vain for a “phonographic alphabet”: “*I found that repeating the letter ‘A’ many times produced an ever varying puncture, all of unlike depth or size under the microscope.*”²⁰ Indeed, if he had been studying such things, it would be surprising if he had *not* attempted to make a drawing of what he saw.

In summary, I'm suggesting that Thomas Edison probably recorded and played back sound for the first time on or before 17 July 1877, rather than on 18 July as generally believed; and that the “ever varying puncture” of his very first sound recording may well survive in the form of an unlabeled sketch.

NOTES:

¹ Reese Jenkins, Robert A. Rosenberg, Paul Israel, *et al.*, eds., *The Papers of Thomas A. Edison* (Baltimore: Johns Hopkins University Press, 1989—), henceforth “TAEB,” 3:444; Thomas E. Jeffrey, ed. *Thomas A. Edison Papers: A Selective Microfilm Edition*, (Frederick, Maryland: University Publications of America, 1985—), henceforth “TAEM,” 11:367; or the digital edition at edison.rutgers.edu, henceforth “TAED,” TI2197.

² Deposition of Thomas A. Edison, 18 October 1895, *American Graphophone Company vs. The United States Phono-*

graph Company, Victor H. Emerson and George E. Tewksbury, TAEM 116:329, TAED QP001161, p. 171.

³ Deposition of Thomas A. Edison, 23 March 1896, *Ibid.*, TAEM 116:395, TAED QP001642, p. 646.

⁴ Deposition of Charles Batchelor, 12 March 1896, *Ibid.*, TAEM 116:366, TAED QP001585, p. 598.

⁵ Deposition of Thomas A. Edison, 8 November 1880, *The Speaking Telephone Interferences: Evidence for Thomas A. Edison*, TAEM 11:3, TAED TI1011, p. 11.

⁶ Deposition of Thomas A. Edison, 10 November 1880, *Ibid.*, p. 60.

⁷ The original doesn't appear to survive, but a tracing may be found at TAEM 7:454, TAED NS7703F.

⁸ Deposition of Thomas A. Edison, 10 November 1880, *op. cit.*, pp. 59-60.

⁹ Serrell to Edison, 16 February 1880, TAEM 55:36, TAED D8036ZAE.

¹⁰ Serrell to Edison, 1 April 1880, TAEM 55:77, TAED D8036ZBO; see also Serrell to James Jackson Storrow, 1 April 1880, TAED X012JE.

¹¹ Paul Israel, *Edison: A Life of Invention* (New York: John Wiley and Sons, 1998), 144. For the document itself, see TAEB 3:613-4, TAEM 116:458, TAED QP001779.

¹² TAEB 3:440-1, TAEM 4:8, TAED NV12016.

¹³ Israel, *Edison*, 144.

¹⁴ TAEB 3:412.

¹⁵ Patrick Feaster, “Speech Acoustics and the Keyboard Telephone: Rethinking Edison's Discovery of the Phonograph Principle,” *ARSC Journal* 38:1 (Spring 2007), 25-6. The document is also identified as “fragment?” in TAEB 3:441.

¹⁶ TAEB 3:445, n. 4; 699-700; “A Marvellous Discovery,” *New York Sun*, 22 February 1878 (TAEM 94:115-16, TAED MBSB10378).

¹⁷ TAEB 3:441, n. 3.

¹⁸ One possibility might be TAEM 162:548, TAED NS77030, dated simply “July 1877” and signed by Edison, Batchelor, and Kruesi, though the formatting is quite different from that of the two other pages. Another page of sketches dated 17 July 1877 (TAEM 4:9, TAED NV12017) doesn't appear readily explicable—could it illustrate some kind of strip recording or playback device?

¹⁹ TAEB 3:445, note b; TAEM 11:366, TAED TI2196. Also intriguing is TAEM 97:607, TAED NV17008, apparently identified by the editors as a spiral Morse telegraph record, but found in a “volume” otherwise devoted entirely to phonograph notes.

²⁰ Gath, “A Visit to Edison,” *Philadelphia Weekly Times*, 27 April 1878 (TAEM 25:189, TAED SM029054a).

