Early Magnetic Recording

Thanks to Richard Rath and David Goldberg

Discuss how this is part of a larger project on "the digging condition" --- how is it that data became material, and what might the history of magnetic audio tell us about how we talk about things such as data, electronic text, and even computer screens

Also mention interest in how histories of technology are intertwined with histories of fiction and hyperbole

For the next forty minutes or so, I am going to explore the articulation of early magnetic audio with perception, memory, faith, and record making, with an emphasis on materials published between the 1870s and 1910s. Oscillating between technical, cultural, and literary approaches to sound, my aim is not to privilege one approach over the others. It is to exhibit how they collectively inform a series of historical incongruities, all of which are anchored *in a device called the telegraphone.*

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As this talk's object of inquiry, the telegraphone becomes an overdetermined site of a shared investment: noise-free magnetic audio. Put to a variety of uses and saturated with an array of meanings, the machine was imagined as a way to *individuate people through immersed listening to high-fidelity sounds, without any perceivable trace of mediation or inscription.* Unlike the tinfoil, disc, or cylinder phonograph, it would *impress sounds, not write* them. And by extension, *it was understood as a vehicle for what we might call "perfect records."* Quite practically, it also corresponded with the opportunity to store and consolidate sounds for later listening: to defer what was once ephemeral.

Importantly, the telegraphone was a commercial failure. It was never available for widespread consumption. However, as I hope to show today, the once-new device helps us better understand how people initially learned to *simultaneously ignore, trust, and desire* magnetic storage—to examine how faith in magnetic recording emerged between the 1870s and 1910s, well before now-ubiquitous hard drives, not to mention seemingly unlimited cloud storage. From my perspective, the story of a failed sound machine offers a prehistory for contemporary computing, invested as it often is in the automagical transubstantiation of magnetic impressions—on platters—into data expressions—on screens and through speakers.

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This prehistory matters because it not only contextualizes contemporary computing and today's magnetic media through mechanical age audio cultures. It also sparks some speculation about what artifacts are not at hand, in the archive, or on file—*about what does not ultimately go into storage*. (I will discuss this more on Thursday, with an emphasis on prototyping old media with new technologies.) Indeed, if—during the development of early magnetic media—the perfect record would never be inscribed or written, then we must ask *how such a record was actively constructed*, through what material procedures of impression and playback, and in what relation to transforming notions of proof, perception, and memory during the turn of the century. To be clear, then, the prehistory for present-day computing that I am presenting today is an account of *making records*, not giving or taking them.

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As magnetic audio historian Mark H. Clark notes, in early 1878 an engineer named Oberlin Smith visited Thomas Edison's Menlo Park laboratory to listen to the tinfoil phonograph. About ten years later, Smith published a piece in *The Electrical World*, detailing an alternative to

Edison's machine. To my knowledge, this is the earliest written appearance of magnetic recording or a magnetic recording technology, which Smith described as "*purely electrical . . . recording telephone*," where people would speak into the phone, thereby vibrating a diaphragm that would convert sounds into an electric current. Varying in a length and intensity relative to the duration and amplitude of what was spoken into the diaphragm, the current—together with a magnetized cord—would pass through a helix. The helix would function as a recording coil, translating the current into "a series of short magnets grouped into alternate swellings and attenuations of magnetism" impressed on the passing cord. The cord would be wound through two parallel reels and put into motion by hand or clockwork. And it would be kept taut by a tension brake or spring pressed against one of the reels.

Smith hypothesized the results in aesthetic terms: "The cord . . . therefore contains a perfect record of the sound, far more delicate than the indentations in the tin-foil of the mechanical phonograph." Not only would it be cheap and flexible; it could also "talk back" if rewound on a reel and redrawn through the helix at roughly the same speed of recording. Importantly, though, Smith never patented or built this magnetic recording device.

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Yet according to *Technical World Magazine* in 1906, his idea was in fact translated into a marketable technology. In "A Spool of Wire Speaks" by E. F. Stearns, audiences could read about "an instrument of most unusual appearance," a "weird instrument," "a box of something less than a cubic foot [with] two spools, five or six inches in diameter, filled with hair-like steel wire." The device was of most unusual appearance because it resembled a telephone without being one. It was a weird instrument because it served a function people were unaware needed

serving. And, as Stearns's title indicates, it was wound with wire. "But," Stearns adds, "the weirdness comes when you listen":

> The demonstrator, say, has set the "speaking" switch, and you have spoken haphazard words into the transmitter; now the switch goes to "hearing," and you listen. And the words come forth—not after the "scratchy" manner of the phonograph, not with the side noises so often incidental to the telephone, but clearly, distinctly, with a pure, clear-cut, flowing quality difficult to describe, but astounding to hear!

All of the technical features that Smith imagines are present here, and they are presented in a magazine chiefly aimed at men already studying, working, and investing in the fields of engineering and applied sciences.

In other words, "A Spool of Wire Speaks" is an advertisement in text form. Through hypothetical scenarios, it describes the "weird instrument" as it sells it, stressing several opportunities for technological innovation, like permanently recording otherwise ephemeral telephone conversations, easily editing and erasing dictations on the fly, and answering a phone in the absence of a subscriber. These affordances might be rephrased from the perspective and parlance of a business operating circa 1906: irrefutable evidence of verbal agreements, the obsolescence of stenographers and associated costs, and increased efficiency through automated messaging and split attention.

Indeed, with a machine to hear for them, people could double their labor, listening to a telephone caller in one space while completing additional tasks in another. Understood this way, the machine was not a distraction device. At least in principle, it would increase what people could achieve in a typical day, and it could presumably translate routine sensual labor—such as

listening—into value-producing activities—such as the creation and administration of office records. Businesses could also increase the thoroughness and transparency of their file keeping.

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Stearns elaborates on these technological and business innovations by creating an everyday character named Mr. Jones, who has to work on the weekend. “It is a Saturday afternoon in summer; save for himself, the office is wholly deserted.” However, Mr. Jones must depart the office in order run some errands uptown. Knowing important people will probably call him, he sets his new storage device on “ready” and leaves. While he is absent from the office, several messages are left, each no longer than three minutes, at which point the device stops. If callers do not complete their message within that time frame—selected solely for the purposes of efficiency, since a two-mile spool of wire could receive up to 17.6 minutes of sound—then they must call back. When he returns to the office, he finds the spool of wire near full. So “Mr. Jones sits back in his chair, starts up the instrument, puts the receivers to his ears and listens to the various voices and messages that have been floating into his office since noon.”

For reasons explained later in this essay, Stearns’s scenario remains largely a fiction in *Technical World Magazine* and elsewhere, at least during its time period. As historian David Morton notes, it was not until the 1980s that many Americans had an answering machine in their businesses or homes. Nevertheless, something like it did exist in 1906.

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In fact, the answering machine’s predecessor existed as early as 1898. Although there is no evidence that he read Oberlin Smith’s work, that year an engineer by the name of Valdemar Poulsen experimented with storing voices on piano wire. Since Poulsen believed magnetic recording’s most important use was storing telephone messages, he directed his research toward

what he called the telegraphone (meaning "to write voice at a distance"). Historians Clark and Nielsen suggest Poulsen "was frustrated by the inability of telephone users to leave a message when the party they called was not at home." In 1898, Poulsen patented the telegraphone in Denmark, following with applications elsewhere, including one filed in the United States on July 8, 1899 and granted on May 29, 1906. There, his description of the magnetic recording process is incredibly similar to what Smith articulates in "Some Possible Forms of Phonograph." In the patent, Poulsen makes a sum total of forty-three enumerated claims. All of them somehow relate to receiving, recording, storing, or reproducing speech, sounds, signals, and electrical impulses. Also, three of the final four claims seek to patent "a phonogram or sound-record . . . having impressed therein or thereupon magnetic conditions." Poulsen suggests the phonogram or sound-record could be composed of steel and assume the form of a wire or strip. More important, the warrant motivating all of these claims is a critique of the mechanical phonograph:

> As is well known, in the usual phonographs the vibrations of air transmitted to a membrane are caused, by means of suitable mechanical parts, to make indentations in a receptive body, which indentations can cause a membrane to repeat the said vibrations by suitable mechanical means. Mechanical alterations of such bodies, however, give rise to disturbing noises, which apart from the expense of such apparatus is one of the principal reasons why the phonograph has not come more extensively into use.

Indeed, the affinities with Smith's article (published just eleven years earlier) are uncanny. And they revolve around the aesthetics of recording and playback—around the "disturbing noises" problem. Nonetheless, speculating about how Smith influenced Poulsen, or offering an origin story for magnetic recording, is more than a futile exercise; it also distracts from the traction

Poulsen's telegraphone gained in various communities of practice, where the "weird instrument" described by Stearns in 1906 quickly became a spectacle.

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For instance, the telegraphone received a gold medal at the 1900 Paris World Exhibition. From the perspective of industry and consumer culture, that event was a major gathering on an international scale. Novelist Émile Zola was present, as was Austro-Hungarian Emperor Franz Joseph, who consented to a recording. (Play the recording.)

At events such as the Paris World Exhibition, Poulsen foregrounded the aesthetics of the telegraphone over the particulars of its hardware, in part because the machine was not exactly reliable. But of course, he also wanted to highlight the magic of the machine's effects. This tendency toward whiz bang persisted across demonstrations and settings. As but one example, consider Charles K. Fankhauser's work in the early 1900s.

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At the Franklin Institute on December 16, 1908, Fankhauser presented the telegraphone, speaking little about its material specificities and instead favoring a hyperbolic assessment of its potential applications for occupations involving listening and inscription. In a written version of the talk, he says: "I believe that the next few years will see a telegraphone installed in the office of every doctor, every lawyer, every banker, in the counting room of every trust company, and of every industrial or commercial establishment, large or small." He also predicts that the telegraphone will render typewriting and letter writing obsolete, and he dramatizes the range of its reach through a variety of conjectures. In railroading, the device will replace the telegraph; for stock quotations, it will supplant the telephone; in medicine, it will diagnose heart and lung ailments; and it will bring about the demise of stenographers in all realms of dictation.

That is, all realms but one: justice. Fankhauser states: “While the human stenographer may never be eliminated in important legal proceedings, it is highly probable that an additional check will be kept in every court room by the installation of a telegraphone which will eliminate all chances of human mistakes” (44). When it comes to standing before the law, a faith in the medium faces its limits. At the turn of the century, even a technocrat is unwilling to reduce justice to pure science, and in the courtroom the telegraphone is relegated from a producer of perfect records to a validation machine. If nothing else, this snippet of Fankhauser’s work exemplifies the various ways in which early magnetic recording was *actively tied to the construction of human perception and memory*. Fankhauser’s claim that stenographers will persist amid technological progress corresponds with occupation-specific modes of listening and writing, as well as the memory training and embodied habits associated with them. What’s more, it corresponds with the imagined range and robustness of the telegraphone’s diverse applications, however speculative they happened to be.

As one may guess, none of Stearns’s or Fankhauser’s positivist fantasies was fulfilled through the telegraphone. One common explanation is that both Smith’s and Poulsen’s ideas were too far ahead of their time. For instance, electronic amplification was not available until a decade after the 1900 Paris Exhibition, meaning the recording and playback of telegraphonic sound was extremely weak. And without an earpiece, people could not hear the sounds played back by the machine. Even if they could, it would not have been easily integrated into existing telephone networks. That is, in today’s parlance, the telegraphone was not built with interoperability in mind. It would not scale. Not only did it lack an amplification device; its parts and associated labor were cost prohibitive. Taken together, then, *the mystifications and hyperbole surrounding the perfect record eclipsed what could actually be accomplished technologically*, and conjectures

about the telegraphone's social implications more or less determined how its material particulars were perceived and communicated. Consumers were supposed to simply *have faith* that the device could eventually achieve what Stearns, Fankhauser, and others claimed it would do, and appeals to natural, authentic, and noise-free records did not hurt their cause.

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One case study for these mystifications is the scientific detective fiction of Arthur B. Reeve, who first published in *Cosmopolitan* in December 1910, just ten years after Poulsen's team publicly demonstrated the telegraphone in Paris and roughly three years after the device received mass attention in various magazines and journals. In a preface to *The Silent Bullet* (1910), Reeve would briefly explain what a scientific detective story entailed: "'I am going to apply science to the detection of crime; the same sort of methods by which you trace out the presence of a chemical, or run an unknown germ to earth.'" Here, his famous protagonist and professor of criminal science, Craig Kennedy, is speaking to Walter Jameson, who is Kennedy's sidekick, a newspaper reporter, and the story's first-person narrator. If this scenario resonates with Arthur Conan Doyle's Sherlock Holmes, then there is certainly no coincidence. Reeve advertised his scientific detectives—such as Kennedy, Guy Garrick, and Constance Dunlap—as the American versions of Holmes, with one key difference: they rely far less on intuition.

In a piece from 1919, "When the Criminal Takes to Science," Reeve argues: "The 'science' in Conan Doyle is of the most elemental sort. Here is a grass blade—somebody has stepped on it. Here are some tobacco ashes, let's work them up." Meanwhile, Reeve is invested in a nascent form of forensic science, premised on tracing out the presence—or the fingerprint—of bodies at the scene of the crime. Grounded empirically in the physical world, such evidence is—at least according to Reeve—irrefutable and objective.

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However, instrumental science needs its neutral devices. And in Reeve's writing the telegraphone is one of them. In fact, throughout his scientific detective stories—including the eighty-two Kennedy stories published by *Cosmopolitan* in the 1910s—Reeve uses fiction as a space for disseminating information about new gadgets. By no surprise, then, Reeve's writing is frequently didactic, comparable to, say, the drabness of a 1980s personal computer manual. For instance, in *The Dream Doctor*, Kennedy rambles about the telegraphone for nearly two pages. By way of a demonstration for Jameson, he unpacks the device for his reading audience: "This is the latest improved telegraphone, a little electromagnetic wizard in a box, which we detectives are now using to take down and 'can' telephone conversations and other records. It is based on an entirely new principle in every way different from the phonograph. It was discovered by an inventor several years ago, while experimenting in telephony" (1914, 201). Aside from the comparison with Edison's noisy machine, Kennedy outlines many of the technical specifications I mentioned earlier in this talk. He continues: "There are no disks or cylinders of wax, as in the phonograph, but two large spools of extremely fine steel wire. The record is not made mechanically on a cylinder, but electromagnetically on this wire" (201). Later, he adds: "There are no cylinders to be shaved; all that is needed to use the wire again is to pass a magnet over it, automatically erasing any previous record that you do not wish to preserve. You can dictate into it, or, with this plug in, you can record a telephone conversation on it" (201). Finally, readers get Jameson's perspective as a listener: "[Kennedy] turned a switch and placed an ear-piece over his head, giving me another connected with it. We listened eagerly. There were no foreign noises in the machine, no grating or thumping sounds, as he controlled the running off of the steel wire by means of a foot-pedal" (202). Such lengthy explanations abound in Reeve's prose. One of their

social functions was to educate audiences—especially the white middle class—about gadgets unfamiliar to them, and those gestures tend to manifest awkwardly as lectures given by an erudite, loquacious polymath.

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Writing style aside, Reeve's scientific realism received both scrutiny and praise. In a July 1913 issue of the *Independent*, he published "In Defense of the Detective Story," wherein he responds to allegations that criminals are inspired by and learn from the "cheap" genre. Halfway through the piece, he recalls the following: "The very first scientific detective story which I wrote was returned to me by one editor of a popular magazine with what I considered the most complimentary letter he ever wrote me, that he 'couldn't publish a story like that—some darn fool would go out and try to do it'" (Reeve 1913, 93). Such accusations were apparently familiar to Reeve, who counters by resituating the argument, stressing the connections between his realism, social progress, innovation, and the moral good. Through a series of examples, all of which use letters from his readers as evidence, he explains the various ways in which scientific detective stories lay bare the methods of a growing criminal underclass, making those methods common knowledge to otherwise hapless victims. He also suggests that, by reading the genre, people may discover a theretofore unrealized means for revealing the truth. Among these examples are references to the "scientific eavesdroppers" appearing in his fiction (1913, 93). Reeve writes:

> Every mention of the dictagraph, the detectaphone, and similar scientific eavesdroppers has brought eager inquiries. In one case a letter from a South Carolina man said: "I have a case in which I can use such a device in procuring the real truth. It will be the means of restoring the character of a young man who is now a victim of a foul conspiracy." In

> another case a man who was under indictment in Iowa wanted the author to come to his rescue with such of the scientific paraphernalia as Kennedy uses. "I think," he appealed, "that if you will bring the instruments named, I can get enough evidence to clear myself." (93)

To this list of readers, Reeve adds actual detectives, scientists, and researchers such as Thomas Edison, who also enjoy and learn from detective fiction. Acknowledging this same sentiment twenty-seven years later, well-reputed science fiction publisher Hugo Gernsback introduced a *Scientific Detective Monthly* essay by Reeve with these acclamations: "Mr. Reeve, as the creator of Craig Kennedy, has perhaps done more for the dissemination of science through the medium of detective stories than any other man alive. Mr. Reeve has always kept within the strict bounds of science." Only a sentence later, Gernsback speculates that, because of Reeve's work, police forces in the United States are integrating new technologies into their departments in order to solve crimes and increase efficiency. For Reeve, this tangible correlation between actuality and fiction was—at least for a writer of detective stories—how to differentiate a modern approach from its predecessors, such as fiction by Edgar Allan Poe and Conan Doyle. From his perspective, scientific detective fiction did more than represent rationalist instrumentality. It had a populist, real-world accessibility. It was more applicable to everyday life than Romantic analysis or even Holmesian deduction.[48]

Yet—not entirely unlike a speech by Fankhauser, an office scenario by Stearns, or an article in *Electrical World*—Reeve's realism is not without its dramatizations and hyperbole. For example, of the twenty-six times the word *telegraphone* appears in a twelve-volume collection of Kennedy stories published in 1918, only ten of them are used within the context of either a demonstration or an explanation of the device. The other occurrences figure more centrally in the narrative, and

a majority of these occurrences are imbricated with now amusing references to truth, eavesdropping, and accuracy.

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Consider a scene from *Constance Dunlap, Woman Detective*, the twelfth volume in the Kennedy collection. Although Kennedy is not the protagonist in this volume, the style and narrative techniques of the Dunlap stories resonate with the balance of Reeve's short fiction from the 1910s, one likely reason they are included in the collection. For instance, as with Kennedy, Reeve presents Dunlap as a scientific detective who uses forensic gadgets like the telegraphone to unveil criminal plots through trace evidence.

In one particular Dunlap story, "The Gamblers," the telegraphone plays an integral role in solving crimes of forgery and blackmail. Participating in what she knows is a fixed poker game, Dunlap waits for several characters to play manipulated cards (with trimmed edges) from the deck. She then declares: "'You are a lot of cheats and swindlers,'" to which one of the players by saying, "'Prove it'" (Reeve 1912a, 115). And so Dunlap retrieves and demonstrates her telegraphone. From it float preserved voices, as if uncanned from the dead. Reeve writes: "Deliberately she opened the box, disclosing two spools of wire inside. . . . She turned a switch and the wire began to unroll from one spool and wind up on the other again. A voice, or rather voices, seemed to come from the box itself. It was uncanny" (116-17). The group of cheats and swindlers listen to recordings Dunlap acquired while eavesdropping on the wire and spying on them. They become frantic and instantly paranoid, imagining what truths and private conversations will be revealed. Practically of all them hear their illicit agreements played back at them, with one exclaiming: "My God! it's a plant! . . . I'm ruined. There is no way out!" (118). With the telegraphone recordings in hand, Dunlap needs to say little. The evidence speaks for

itself. It proves not only that the poker game was rigged but also that some stock certificates—which were guaranteed to the winner—were forged. For her findings, Dunlap gives the forensic gadget a bit of credit: "I learned all that over the telegraphone. *I learned their methods, and, knowing them, even I could not be prevented from winning to-night*" (121).

However, by the conclusion of "The Gamblers," no one is formally charged or convicted of their crimes. There is no grand court scene. Instead, Dunlap administers justice by alternative means. With the evidence she has on record, she can easily leverage nearly everyone in the room. And among them is Mr. Drummond, who also happens to be a detective. Feeling some pity for him, Dunlap decides to let Drummond go. Or, to be exact, she decides to expunge his record. The implications of this forgiving gesture are less interesting than its ultimate expression: "'Drummond,' remarked Constance significantly, as though other secrets might still be contained in the marvelous little mechanical detective, 'Drummond, don't you think, for the sake of your own reputation as a detective, it might be as well to keep this thing quiet?'" (1912, 121). As one may predict, keeping things quiet does not imply merely hiding the evidence. With other secrets potentially impressed on the magnetic medium's nonvolatile memory, it implies complete erasure. Fortunately for Drummond, Dunlap says telegraphone records can indeed be erased. Reeve describes that process with some flourish: "Deliberately she passed the magnet over the thin steel wire, wiping out what it had recorded, *as if the recording angel were blotting out from the book of life*" (122).[56] Dunlap then allows Drummond to test the wire himself to determine whether it is, in fact, blank. It is indeed, and the scientific detective implores him, too, to permanently forget what happened.

When caught on the wire, such is the simultaneity of burden and relief. Although the record may be wiped, the witnesses remain, with Drummond's career still at risk. In the end, perhaps

detective Dunlap recognizes that—when compared with the ears of mechanical detectives—shared and internalized memories are not at all easy to forget. The recording angel can only blot but so much, even when the case does not go to court. And as Cornelia Vismann observes of office and legal cultures during the early twentieth century, "most files no longer contain any secrets. . . . What is secret is neither that which is screened off by barriers nor that which has been put on file, but that which is off the record." Perhaps this "off the record" approach to proof in the age of mechanical reproduction is why, as Fankhauser claims during his Franklin Institute speech, human stenographers trump magnetic mechanisms in the courtroom, reducing telegraphones to validation machines.

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Among all of Reeve's scientific detective stories published in the 1910s, this scene from *Dunlap* is one of several anchored in the telegraphone. Given the lack of stylistic and narrative variability in his fiction, the scenes tend to resonate with (or even mimic) each other, all of them involving a set of primary elements imbricating the specifications of magnetic media with listening and memory: the telegraphone as an objective eavesdropper (or a neutral instrument), the threat of magnetic recording to privacy, the promise of magnetic recording in the search for truth and rationality, and the acquisition of trace evidence, which exists noise-free through indexical relationships with people's voices and their furtive machinations. "I learned their methods," Dunlap declares (1912, 121). "There were no foreign noises in the machine," Jameson observes (1914, 202). "'I am going to apply . . . the same sort of methods by which you trace out the presence of a chemical,'" Kennedy asserts (Reeve 1910, 3). Scholars may read these scenes solely as representations of the telegraphone on the page—how the device is depicted in fiction, how that depiction differs from the actual device, and so on. However, such interpretations risk

ignoring how Reeve's scientific detective tales historically functioned within a larger constellation of strategies aimed at creating and fostering popular perceptions across socially disparate communities of practice.

That said, a Kennedy or Dunlap story resonates with magazines like *Electrical World*, speeches at the Franklin Institute, the everyday life of Mr. Jones, and even US patent applications precisely because early magnetic recording was not developed in isolation. It was not reserved for the fields of science and engineering alone, and fiction was a way that people learned about magnetic recording and its social functions.

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Indeed, once-new gadgets such as the telegraphone emerge recursively with other cultural phenomena, including new literary genres—such as scientific detective fiction—labor practices such as dictation in the workplace—communication networks—such as telephony—consumption habits—such as listening to messages on wire—and initiatives in education—such as technical instruction in the mechanical arts. The existence of such cultural forces does not suggest they are totalizing, revolutionary, or unicausal. Instead, the implication is that—with devices like the telegraphone operating as an instrumental object across disciplines—those forces are at once abstract and concrete, simultaneously weak and strong. That is, Reeve, Fankhauser, and Poulsen used the telegraphone differently in unique instances; nonetheless, shared informational needs, listening practices, memory techniques, and ideologies existed across those uses. Perhaps most widespread among them was the belief that magnetic storage would do more than extend the ear or reproduce noise-free audio. It would, to borrow from Jonathan Crary, allow people to express their "autonomous power to actively organize and impose [themselves] on a perceived world" — to make, if you will, records of their own.

At the turn of the century, such expressions intersected with a growing distrust in the empirical knowledge afforded by the senses, a rising demand for individuating and systematizing listening behaviors, and the increasing frequency of multitasking. As one among many engagements with these tendencies, magnetic recording most obviously promised what Edison's phonograph could not: sound so high in fidelity it would seem immediate and immaterial. Beyond that, it promised a means to treat sound discretely, a way to listen in fragments, to edit, and—as demonstrated by Dunlap—to erase. Yet more important, the plasticity of magnetic audio was entangled with the enculturation of listening and memory.

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That very claim should remind media historians that the expression of power over a perceived world is never distributed equally. Even something as banal as listening is saturated with the politics of its time, from the gendered divisions of office labor and the obsolescence of stenography to the instrumentality of a scientific detective, the decline of type, and the dissolution of technology-free leisure time. Whether these ventures were commercially successful or "impactful" is merely one question among many. Throughout the early development of magnetic recording, they were impulses for social, economic, and technological progress. Moreover, as I hope this talk has demonstrated, new technologies frequently serve as vehicles for a variety of often incongruous agendas, failed or not.

To be sure, the telegraphone was embedded in what might be called "*speculative determinism*," or the articulation of a yet-to-be-disseminated technology with its allegedly inevitable effects. Here, examples include the multiple practices, people, and technologies the device would ostensibly replace or at least dramatically alter: the phonograph, the gramophone, stenography, the book, the typewriter, the typist, the secretary, the police, the detective, the telegraph,

listening, reading, and writing, to name a few. Such an articulation—in advance of the telegraphone's widespread consumption—allowed people such as Fankhauser and Reeve to shape magnetic recording's commodity character. Part of that character was the appeal of a storage medium that facilitated individual authority over what ultimately went on record. Consider Fankhauser during his Franklin Institute speech, where he asserts that because of the telegraphone an "operator has perfect control of his record, may erase or retrace any part of it at any time by simply pressing the button" (1909, 43). This fetish for control was repeatedly expressed in writings related to the device. For some, it meant the ability to defer calls, consolidate time, and delete evidence. For others, it meant immersed listening on the clock, awkward dictation into a receiver, a loss of privacy, and possible obsolescence in the job market. For all, it meant that, *when welded with new media and technologies, perceptual habits and memory techniques could not be neatly parsed from Fordist efficiency*.

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All of this faith and speculation was possible without a standardized device. No doubt, the case of the telegraphone is all the more curious because fiction related to it circulated more than the physical object itself. Despite the 1900 Paris Exhibition gold medal, exhaustive research by Poulsen's team, and endorsements from a number of known scientists and engineers in related fields, the telegraphone never achieved a default state—say, a reliable medium with a known storage capacity and consistent playback—intended for a specific group of users. Likely for this reason, as well as its lack of commercial success, it is rarely mentioned in media or literary studies. Still, as I suggested today, the telegraphone did gain some traction, offering us a prehistory for its now ubiquitous successor—the hard drive—and attendant ideologies anchored in the immediate transubstantiation of magnetic impressions into seemingly immaterial

expressions. To be sure, neither the details of this prehistory nor the objects and ideologies associated with them are reducible to technical matters alone. Again, people *learned* to at once ignore, trust, and desire magnetic recording—*to make magnetic records, not just give or take them.*

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Ultimately, then, this talk demonstrates how the physical materiality of early magnetic recording was itself enmeshed in popular culture and perception, even if it never generalized or achieved commercial success. Conspiracies on wire appealed because they represented the impression of evanescent phenomena onto high fidelity, reusable storage media. Fleeting events and ephemeral voices would leave a trace, which could be captured and played back without audible aberrations. *Yet the desire for a trace needed inventing, too*. Magnetic storage did not attract attention simply because it was innovative or superior to its phonographic counterparts. It attracted attention because—*much like data expressed on contemporary computer screens—it was perceived as an immediate medium for ideal record making*.

Yes, ridding a sound of its ephemerality meant the opportunity to listen to it later. It also meant trace evidence or, as exhibited Reeve's story "The Gamblers," the translation of listening into leverage. In that story, indexical relationships weld canned sounds to bodies, and illicit agreements caught on wire accrue value. For Dunlap, magnetic recording also enables the administration of justice without an official court or a trial by the state. Meanwhile, for someone such as Stearns or Fankhauser, it is imbricated with measurability and productivity, where perception could be systematized through private acoustic spaces intended for isolated, immersed listening. Of course, listening was all the more authoritative when the content sounded as if it were floating into the ears, free from any intervening substance. It helped, too, that such sounds

could be remembered with the simple press of a button. But most important, the audio could be easily erased, and the record could be expunged. Otherwise, magnetic recording would be *too permanent*; it would decrease individual authority over what remained in storage, *as proof*. That is, *the perfect record implied not only the power over how and when to listen, but also the freedom to plausibly deny ever making a record in the first place*. Such is faith in a magnetic machine.

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