Introduction

Inventing Media and Their Meanings

Away with old romance!
Away with novels, plots and plays of foreign courts,
Away with love-verses sugar’d in rhyme, the intrigues, amours of idlers...

.................
Mark the spirit of invention everywhere...

—Whitman, “Song of the Exposition” (1871)

The Phonautograph and Nineteenth-Century Media

Returning to an obsolete media technology in a different media environment, reviving an old medium through a newer one, reveals the connections between past and present but also the gaps between them. As the mediated past comes to uncanny life, those discontinuities can become palpable, perceivable, even audible. In March 2008, a forgotten nineteenth-century medium briefly became minor news on a variety of twenty-first-century media, as the First Sounds project announced that its members had pushed back the history of recorded sound by nearly a generation, replaying sounds unheard since the mid-nineteenth century. The project had uncovered no unknown pioneer of phonography, no mute inglorious Edison. Rather, its researchers had returned to the nineteenth-century archive, to the work of the Frenchman Édouard-Léon Scott de Martinville, long recognized as an important figure in the history of sound recording. Translating and adapting that work, they recreated sound from a medium that had previously been silent.

In the 1850s, Scott invented a remarkable machine he called a phonautograph, a device that responded to sound by etching a wavy line on a blackened sheet of paper (Figure 0.1, Figure 0.2). The resulting phonautograms were a marvel of what’s been called “incunabular recorded sound”: they took the ephemeral phenomenon of sound and froze it,
objectified it, rendered it in a visual medium without resorting to human symbols. But they were created only to translate sound to the page so that it could be examined as a discrete, stable entity. The sound patterns on a phonautogram were never meant to be heard again. Indeed, they were set down without any idea of a future in which machines would be able to record sounds and play them back. Eerily, intrusively, the First Sounds project used twenty-first-century technologies to retrieve sounds from a time before the notion of audio playback even existed, a past when a sound seemed the very definition of transience, a singular event on its way to dissipating forever from the first moment it was heard.

The phonautograph and its successors were a landmark in the study of sound. But their inventor Léon Scott was no scientist or engineer. Rather, he came to imagine a machine for capturing sound because of his desire to optimize and automate the great medium of writing. As a printer and typesetter in an age of industrial acceleration, Scott became obsessed with the problem of setting down words and speech as rapidly and accurately as possible. His Histoire de la Sténographie (1849) opens by celebrating the search for a method of transcribing words or sound in real time, “a means that would allow the poet, the dramatist, the novelist, to fix at will their brilliant inspirations, which are always so fleeting.”1 Even in an age of the steel pen, a faster way of writing seemed necessary.4 From composing media history, Scott moved to creating media devices. In the next decade, he developed the phonautograph to explore the possibilities of a mechanized stenography. The fugitive inspirations of the poet, playwright, or
Figure 0.2  Scott, "No. 5 – Au Clair de la Lune" (1883).
Source: First sounds.org.
novelist: the putative gap between the literary imagination and the material practice of writing was part of his primary rationale.

As its name suggests, Scott hoped the phonautograph would let sound write itself. A machine for listening, his device was supposed to mimic the human ear (its collecting chamber and artificial tympanic membrane were modeled on anatomical diagrams) and then to act as an automatized hand, turning sound into sight. Sound is motion, the vibration of pressure waves through a medium. Its precondition, the passage of time, also demands its perpetual vanishing. Sound can’t stand still. But as Scott’s phonautograph transformed the phases of a fleeting sound pattern into a single, persistent image, it converted the passage of time from the guarantor of a sound’s evanescence into the horizontal timeline that gave it continuity and visual unity. Imagining a better stenography, Scott created the phonautograph as a form of mechanized writing that could instantly, faithfully, and durably render the contours of sound on paper.

“This new writing [cette nouvelle graphie],” he proudly described his phonautograms in a handwritten 1857 patent application; the emphasis is his. Even the analogy to the capture of light via “photographic processes” inspired Scott not to consider how sound might be copied from life and technically recreated but to imagine how it could be permanently translated to a flat surface in black and white. Unspooled from the machine’s cylinder, flattened into the shape of other documents, a phonautogram could enter nineteenth-century archives oriented around the storage of paper media. Scott even set up the phonautograph to produce its output “by analogy with the familiar conventions of [European] alphabetic writing,” usually arranging the machine so that as a sheet of paper rotated on its cylinder, the stylus inscribed it from top to bottom, left to right.

A new medium created to capture human speech, Scott’s phonautograph was nonetheless defined by its relationship to the dominant medium of writing – from its stenographic conception, to its serial inscription on paper, to its destination in the archive. Scott’s choice of sample spoken texts sustains this association: the opening of Tasso’s Aminta, a passage from Jean-François Ducis’s adaptation of Othello. Taking great plays as scripts for vocal performance, Scott celebrates their conversion back to writing, describing the Othello phonautogram as a “declamation written by the voice itself.” On his phonautograms, literary works join vocal scales and folk songs as testing protocols for a new medium. From its technical specifications to a significant part of its content, then, the phonautograph epitomized the assumption that even new, experimental inscription devices...
would function as forms of writing – a testament to writing’s conceptual preeminence in an age when every new inscription technology seemed to claim a status as a *something-graph* that made *something-grams*, as the newest *-graphy*.

But by the final decades of the century, this assumption no longer held sway. The development of new media technologies beyond telegraphy or photography, and the prospect of continued invention and change, helped dislodge writing as the inevitable reference point and printed literature as the test case for every new medium. Matthew Rubery notes the use of nursery rhymes and familiar poems in the earliest phonograph demonstrations in order to cue audiences to understand the tinny voice coming from the speaker, but his account also documents the consistent breakdown of recorded verse recitations into shouts, animal sounds, and other “playful noises” meant “to flaunt the machine’s acoustic versatility.”

The contrast between the phonautograph in the 1850s and Edison’s phonograph a generation later encapsulates an epistemic break. This book analyzes the meanings that emerged from the late nineteenth-century’s encounters between print literature and other media, encounters that no longer presupposed the primacy of writing.

Scott eventually recognized that the phonautograph couldn’t produce the “natural stenography” or visible language he wanted, but he still hoped that looking at the inscrutable lines it generated would help us understand sound, taking for granted that the reader of this mysterious script would necessarily be a human being. Nearly 20 years later, Thomas Edison would replace the paper on the phonautograph’s rotating cylinder with tinfoil (later upgraded to wax). Instead of a line on a flat surface to guide the human eye, Edison’s machine produced an indented groove to guide the needle on a mechanical device. Scott imagined a machine that could listen and write. In contrast, Edison’s great insight was to realize that patterns produced by a machine might also be read by one. Whereas Scott hoped to let sound write itself, Edison wanted to let “wax cylinders speak for themselves.”

His development of the phonograph emerged from his work encoding telegrams for high-speed replay and transmission, an experience that helped him imagine the possibility of recording signals for machine-reading. For his part, Scott grumbled not just that Edison’s phonograph derived from Scott’s expired patents but that the new device was deficient (and misnamed) because the grooves with which it stored sound were not really written “graphs” but only cryptic “glyphs” inaccessible to the human eye. An ageing Scott still viewed the playback of sound as less important than its transcription, audio reproduction as secondary to

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writing. And of course, he assumed that his own phonautograms were fundamentally unplayable.

Yet nearly a century and a half after Scott’s phonautograph first etched the motions of the air onto paper, the First Sounds group began to turn those mechanical transcriptions into audio. Working from a phonautogram dated “April 9, 1860,” its researchers digitally scanned the image at high resolution. Then they converted the image’s lines into a digital sound file that could be edited and restored by sound engineers, allowing a computer to read it as sound via a “virtual stylus” or (in a later iteration) by processing it with software originally designed to convert the optical soundtracks of motion pictures. Finally, they had an audio file for playing a voice from before the age of sound recording, eerily singing the first lines of “Au Clair de la Lune,” badly muffled but recognizable: “Au claire de la lune / mon ami Pierrot / prête moi —,” the earliest recognizable recording of the human voice in history. After experimentation with the playback speed — the centrality of the time axis defines what’s been called the “sonicity” of sound signals — a man’s voice emerged, probably Scott’s.\(^{16}\)

It sings in Second-Empire unconsciousness, not simply the fact that his own words would ever be heard again but that mechanically playing back the sound of a moment or a day ago — to say nothing of a sound from an earlier century — could ever become possible by any means.

Songs, speech, and tuning tones emerged as First Sounds converted Scott’s other phonautograms into playable sound, although in some recordings, the attempts at restoration failed (perhaps the machine had been unevenly cranked or poorly calibrated).\(^{17}\) It’s a ghostly sensation, listening to these sounds retrieved from a nineteenth-century archive in which they had rested for so long, reclaimed from a silence assumed to be inherent and eternal. Suddenly, as listeners, we were eavesdropping on a past whose sounds it had never been possible to hear, listening to vibrations set down at a time when Edison, Alexander Graham Bell, and Emile Berliner were children.

This recovery work suggests a further break between the nineteenth century and the twenty-first. Even if Scott had come up with the idea of playing back a recorded sound, he would have lacked the means to replay it from wave patterns on paper. What permitted their playback is a system of media oriented neither around writing (as in the mid-nineteenth century) nor around the multiplicity of analogue media (as in the Edison era) but around the computer. The First Sound group’s digital image-scans rendered a phonautogram as a set of numbers, making it available for algorithmic manipulation.\(^{18}\) Spatial marks on archived paper could now
become cues for the mathematical generation of sound. Place a digital file in the proper format, and an obliging computer can be made to render it as audio. With the change of a piece of metadata such as a file extension, we are freed from the kind of ontological incommensurability that twentieth-century media theorists often attributed to different sensory modalities such as sight and sound. As an audio file, the digitized phonautogram could be systematically adjusted and expertly fine-tuned in order to compensate for the defects of the original process of recording, the shortcomings of its physical preservation, or the effects of digital conversion itself.

Finally, the encoded sound files could be digitally published on the Internet in a standard format to enter our own mediascape, since publishing too has escaped the necessity of writing in the nineteenth-century sense, no longer requiring that we reproduce durable marks on a surface for physical distribution. The interest aroused by digital restorations of Scott’s phonautograms both encouraged and was reinforced by the easy availability of the resulting clips as brief MP3s for streaming, downloading, even copying and adaptation. Rather than a repository that preserves materials by removing them from circulation and filing them away, the digital archive becomes an instrument of interlinking and transmission, one that preserves its materials by maximizing their accessibility and circulation. In contrast to the traditional archive, “electronic memories become more permanent the more they are constantly refreshed.”

Moreover, as Jason Camlot has pointed out with particular reference to recorded sound, the digital archive is less “a preservation medium” than “a transformation medium that opens texts and material artefacts to new contexts, new interpretations, and new transformative uses.”

The rise of increasingly ubiquitous and interlinked digital media has helped compel rethinking not only of publishing and the archive but also of recording, liveness, broadcast, and any number of media properties and protocols. Without forcing the parallel, this book will argue that the late nineteenth century was also a period in which developments in media and culture drove widespread discussion of technologies of communication and inscription – about how they aligned with one another and about how they mediated human experience. New inventions didn’t make print and writing obsolete. Rather, they prompted new ways of understanding various modes of writing in relation to other media. From the perspective of our own media environment, an earlier era of multiplying technologies and media change can begin to speak to us – like one of Scott’s
phonautograms – in ways its original creators, users, and theorists couldn’t have foreseen.

Media beyond Writing

Scott’s phonautograph could only record a few seconds of sound at a time, but the lines of “Au Claire de la Lune” that would have followed this epochal recording were implicit in the whole exercise: “prête-moi ta plume / pour écrire un mot”; lend me your pen / to write a word. But by the age of Edison, Scott was falling behind the times. As this book will argue, late nineteenth-century writers were less likely to treat new media as writing than to view print and writing in terms of newer media. Furthermore, by the 1880s and 1890s, authors concerned with the status and the future of print often treated some forms of writing and print as more like new media technologies than others. Until the century’s final decades, as I’ve suggested, comparisons between writing and new media usually moved in the opposite direction. Electric telegraph, photograph, phonograph: like Scott’s phonautograph, all of these -graphic technologies reflexively assert a connection to writing or inscription in their very names. This connection is hardly intrinsic. The most popular electric telegraphs transmitted a real-time message with needles, bells, or clicking levers that left no physical mark but depended on transcription by a clerk. Heliography or photography literally meant writing by the sun or by light. Both names emphasize the inscribing agency of the light source, not the technical or aesthetic work of the photographer, the chemical sensitivity of the surface, or the appearance of the strange monochrome images yielded by the process. As if following out the idea that the photograph was essentially a mode of writing, William Henry Fox Talbot strove to become its Gutenberg, working to make photography into a technology for reproducing copies of an image on paper, as opposed to the daguerreotype’s one-of-a-kind pictures on metal. Taking this effort to its logical conclusion, as early as the 1840s, Constance Talbot worked with her husband to “print” texts via photography, chemically transferring letter-images onto paper without a press. Perhaps in order to explain their function and make them seem more familiar, the electric telegraph and phonograph each took its name from a technically unrelated forerunner that used physical symbols for visual reading. The optical telegraph of the late eighteenth and early nineteenth century allowed speedy long-distance signaling via a network of towers, at least on clear days. And since the 1840s, Isaac Pitman had
Described and marketed his shorthand system as “phonography,” a connection that helped inspire fantasies that Edison’s phonograph might eventually replace particular print forms, especially as a means of preserving and circulating orally performed texts such as sermons or speeches.

Some nineteenth-century new media seemed to arrogate certain functions of writing, while others seemed to create hybrids between writing and something else: the “telautograph” transmitted the movements of a writer’s pen to a stylus across the electric wires to supply a long-distance facsimile of handwriting (Figure 0.3), while the typewriter allowed an operator’s fingers to tap out documents that resembled print. But other nineteenth-century media technologies promised to bypass inscription altogether. While a telegram might seem to communicate its messages immaterially, through fugitive pulses of electricity, usually it at least began with a paper form and ended with a written (later a typewritten) slip. By comparison, the telephone attenuated the place of writing in electric communication, converting not symbols but soundwaves into electrical patterns and back again. As its name made clear, the telephone wasn’t a -graphic technology at all.

Storage, communication, reproduction: in the final decades of the nineteenth century, new technologies broke up the functions united in writing or print. They encouraged new ways of understanding nontextual media, beyond their promises to extend, improve upon, or incorporate writing. A “telephonic message differs as widely from an ordinary telegraphic message as a highly finished oil-painting differs from a page of print,” averred an early account of the telephone:
In this description, the telegram and the printed page feature as monochromatic, serial, repetitious, discrete, and coded, while the phone call and the oil painting are continuous, heterogeneous, user friendly. We might also add that the printed page and the telegram are perfectly repeatable, while the painting and the telephone conversation, however generic either may seem, are singular and one of a kind. The technical affiliation between two electric communication technologies subsists here alongside a suite of differences encapsulated by contrasts between two older media.

The so-called second industrial revolution of the late nineteenth century – with its systematic application of science to industrial production, its emphasis on transport and communication technologies, and its new uses for electricity – made the development, marketing, and adoption of new media almost routine. Earlier in the century, it had taken decades for media technologies such as photography or telegraphy to become familiar. But now the cycle of production, commercialization, and refinement became part of the cultural understanding of new technologies. Media that had existed largely as industrial prototypes (mechanized typesetting) or scientific toys (stereoscopes) began to be more aggressively exploited, marketed, and refined. For a decade after its creation, the phonograph was a lecture-hall curiosity, until Edison’s engineers went to work to find a more durable recording medium than metal foil – and to create a new consumer product. The Remington Company achieved enough success with the Sholes and Glidden capitals-only typewriter (Mark Twain bought one) to suggest that a new machine with lower-case letters might do even better.

The adoption and spread of new technologies became part of modern life; Walt Whitman and other nineteenth-century writers could “mark the spirit of invention everywhere.” Rapid innovation made it easier to think of emerging media in terms of other new technologies. Alexander Graham Bell’s initial work on the telephone began as experimentation with “harmonic telegraphy”; Bell’s telephones soon inspired Edison to go to work on the phonograph; Christopher Latham Sholes’s earliest model for what