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Producing Sounds from the Past of Media: *Mary Had a Little Lamb* (2019) and *We Were Away a Year Ago* (2023)

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Introduction

In this essay, we describe two of our artworks, namely, *Mary had a little lamb* (2019) and *We were away a year ago* (2023), both from our project titled *Life in the Groove* (2018). This project aimed to revisit the common materiality of sound reproduction (Jo and DeMarinis). As Jonathan Sterne notes, the frequently told stories of Bell, Edison, and Marconi are powerful because they indicate to us that something happened to the nature, meaning, and practices of sound in the late nineteenth century. However, these stories alone are incomplete. In each case, the inventors had a partially functional device before the moment of their "famous first" (Sterne 353). In this regard, we argue that reality is more complex than that in oft-told tales of ingenious discovery and invention.

The problem of materially recorded traces constituting the "tales" of sounds is compounded. This is because of the rapid proliferation of such recordings, which threatens to overtake and foreclose on sounds yet unheard in the form of bots as producers and streamers of

digital audio media. For scholars or archaeologists of audio media, the authoritative first recording (Feaster) is a shifting and malleable target. Faint traces of long-vanished sounds may exist anywhere, intentionally or not.

In addition, as Christoph Cox writes, the sounds emanating from these mechanical contraptions such as radio, tape, and record, unwittingly revealed an aesthetic value in their ability to articulate sounds and in the noises, hums, hisses, and crackles produced by the apparatus (Cox 2). Such noisy, lo-fi sounds, distant from those of our contemporary practices, are the "voices" of the inventions (Thompson 41). These voices represent the medium and the means of sound reproduction.

Related Works

The appropriation of technology for artistic creation has been a prevalent theme throughout the history of media arts. Media artists often approach uncertain media objects from the past in archaeological ways (Huhtamo). Using resources from different times and spaces, they rediscover abandoned technological ideas and reinvent cultural memories. This approach is exemplified in the works of media artists such as Anderson (2005), Iwai (2000), and Sengmüller (2008). By taking a sideways invention from conventional development (Buechley), the resulting artworks illuminate the hidden branches of media culture that include failures, and allow us to question a linear form of technological determinism.

Over the past two decades, however, there has been a growing interest in art-based practices that either envision the future (Dunne and Raby) or excavate the past (Hertz and Parikka). In the former case, the practitioners aim to critique the potential applications of technologies through their practices. The outcomes provide opportunities for further discussion with various stakeholders, including sociologists, politicians, and economists. In this approach,

however, the functional utility of technology used in their practices/creations is of little importance, and these works do not necessarily need to function in practical manner. Conversely, in the latter case, the goal is to extend the discourse on media archaeology and develop it to a methodology for do-it-yourself (DIY)-based art practices. The practitioners employing this approach revitalize, bring back into use, and rework discarded waste media as "zombie media," resurrecting them for new applications, contexts, and adaptations. Consequently, such works serve as a platform for contemporary media reflection and critique.

In our artistic practice, our focus is not simply envisioning the future or delving into the past. Instead, we aim to revisit the common sense of the "past of media" by producing artifacts that are not only functional but also living. We engage with the materiality of sound reproduction using basic scientific principles and contemporary computational tools (Gershenfeld). Through these two distinct artworks, we have re-examined the notion of the realities emerging from the reproduced internal sounds of the apparatuses. Using the "voices" of the inventions, our aim is to unveil the traces of analog sound within today's digital environment.

***Mary had a little lamb* (2019)**

In *Mary had a little lamb* (2019) the sound is produced through the flow of electronic current in a

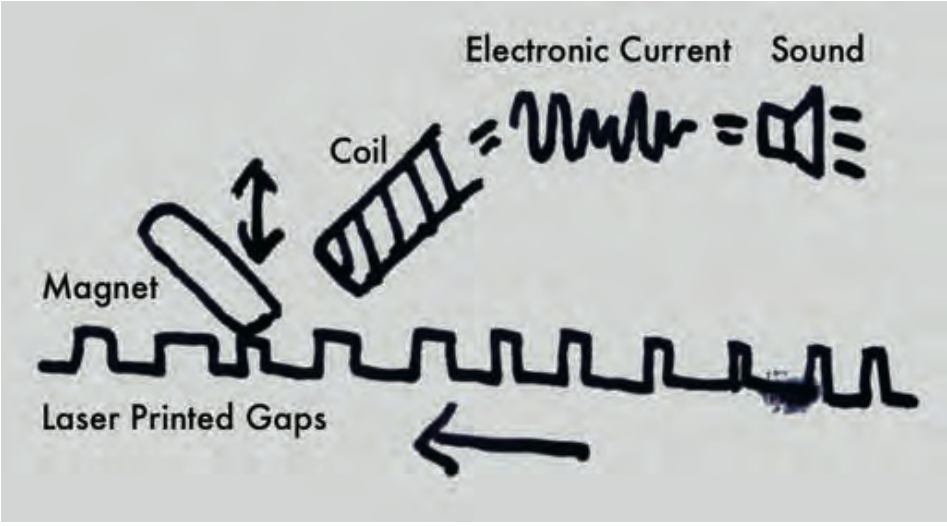

Fig 1. The schematic drawing of *Mary had a little lamb*.

coil, generated by a magnet vibrating over gaps laser printed on paper (Figure 1).

This work combines the principle of applying ink to paper, a common process in various printing methods ranging from woodblock to laser printing, with electromagnetic induction. Electromagnetic induction is a physical phenomenon discovered approximately between 1831 and 1832 by Faraday and Henry. The process produces electrical current due to changes in a magnetic field. This combination enables the printed material to serve as a medium for sound production. The objective of this work was to produce "speech," a goal that was originally sought by many sound reproduction technologies. This process is described as follows:

- The oft-quoted phrase "Mary had a little lamb" is attributed to Edison, and brought to life by WaveNet (Oord et al.), a deep learning system that generates human-like voices by directly modeling waveforms. The result (i.e., voice data) was saved as uncompressed audio.
- The produced sound data were then transformed into a compressed 1-bit format (1 and 0) using the BTc Sound Encoder (Black) and displayed as black-and-white striped vector data (1 for black and 0 for white).
- The stripes were organized in a circular pattern and printed on paper using a PostScript laser printer (Figure 2).

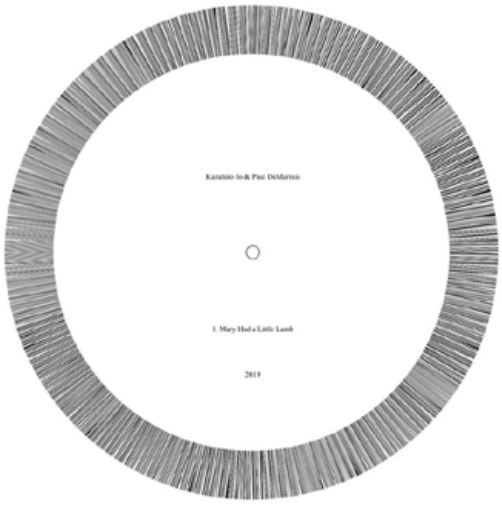

Fig 2. Kazuhiro Jo and Paul DeMarinis. *Mary had a little lamb* (2019).

- The paper was rotated on a turntable and a permanent magnet was pressed against the stripes.

- Changes in the magnetic field, caused by the small vibrations of the magnet as it moves along the gaps of the stripes (ink), were converted into a flow of electronic current by a simple coil of wire attached in place of the cartridge of the turntable (Figure 3).

Fig 3. The magnet (left), the stripes, and the coil (right).

- The electronic current was then amplified by an amplifier, and sound was produced through the speaker as air vibrations.[1]

[1] Watch the movie here: https://youtu.be/eWxNdnZHodE

The result may initially sound like a collection of collisions and friction. However, once you recognize the phrase "Mary had a little lamb," you cannot help but hear the voice. This is similar to apophenia, where a listener perceives a familiar pattern in random noise, even though none exists. This phenomenon calls to mind an early idea about the phonograph that Edison shared with his friend Alfred Mayer (1878) as follows:

> *They do not expect or imagine that a machine can talk hence cannot understand words*. […] *but if the first sentence is told him & then reproduced he generally says why that's perfect*. (Edison)

***We were away a year ago* (2023)**

We were away a year ago (2023) is another work in which sound is produced through the flow of electronic current in a coil, generated by the magnetization of magnetic ink on a thin film caused by a magnet next to the coil (Figure 4). Unlike the previous work, there is no physical contact between objects in this project.

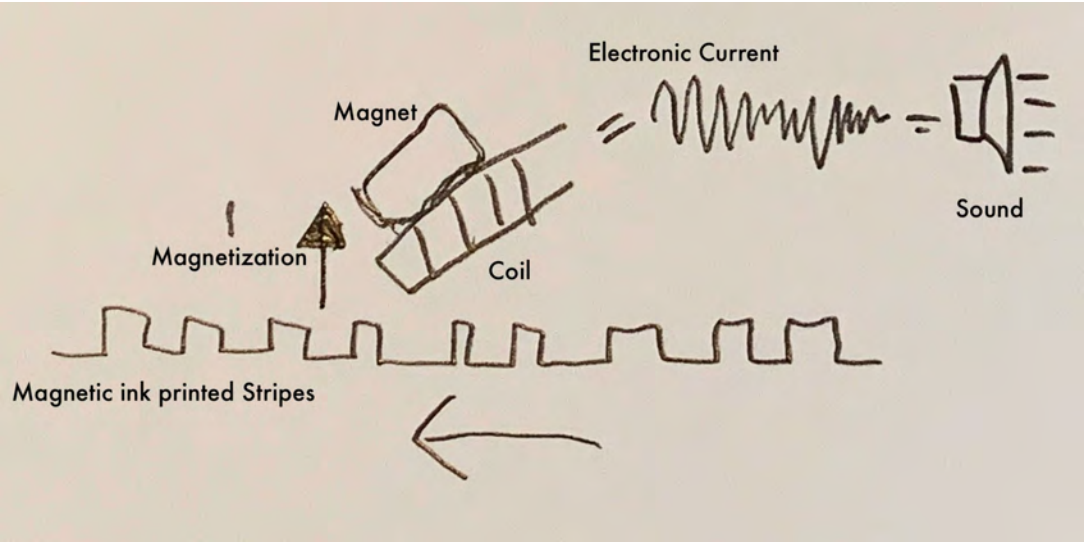

Fig 4. The schematic drawing of *We were away a year ago*.

Similar to the previous work, in this work, we attempted to produce “speech” using a printed stripe. This time, however, we accomplished this by employing digital silk screen printing with magnetic ink, based on the origins of magnetic recordings, as pioneered by Smith and Poulsen (Danie et al.).

Silk screen printing is a technique in which a screen is made of mesh cloth with holes of the desired shape for the ink to pass through. It is characterized by its ability to print not only on paper but also on a variety of substrates such as wood, glass, and metal. In this project, we employed a digital screen maker (RISO GOCCOPRO QS2536) that uses heat to create holes based on binarized image data (black and white). Magnetic ink mixes the ink with a magnetic material such as iron oxide that can be magnetized.

In a way similar to the previous work, this project also employs printed materials as a medium for sound production. However, instead of relying on the physical vibrations of a magnet, the project produces sound by detecting changes in the magnetic field caused by the presence or absence of magnetized ink. The procedure is outlined as follows:

- In contrast to the non-human speech of *Mary had a little lamb*, the phrase “We were away a year ago” was spoken by one of the authors, Paul DeMarinis, the artist behind “Songs Without Throats” (DeMarinis 2019).
- This phrase is one of the sentences used in Consensus Auditory Perceptual Evaluation of Voice (CAPE-V) (Kempster et al.) to assess the severity of auditory-perceptual attributes in voice problems, particularly focusing on all voiced sounds.
- The pronounced speech was converted into compressed sound data in a 1-bit format using a BTc Sound Encoder (Black). Just as in the other work, the data were represented as black and white stripes.

- These stripes were arranged in a circular pattern and printed on the reverse side of a very thin polyimide film using magnetic ink (Figure 5).

Fig 5. Kazuhiro Jo and Paul DeMarinis. *We were away a year ago* (2023).

- The film was then rotated on a turntable, and the coil converted the magnetic field changes, induced by the presence (or absence) of ink magnetized with a neighboring magnet, into electronic current (Figure 6).

- The change in current was subsequently amplified by an amplifier, producing sound as air vibrations from a loudspeaker.[2]

In *We were away a year ago* (2023), the "machine can talk" once confirmed in *Mary had a little lamb* (2019), was validated again by a method that takes twists and turns of the magnetic sound reproduction in the current digital environment.

[2] Watch the video here: https://youtube.com/shorts/_5IKex56GKY

Fig 6. The film, the magnet, and the coil.

In our daily lives, the generation of music as a sequence of numbers has become a truth, with Jukebox (Dhariwal et al.) released by OpenAI in April 2020. As long as there is a large amount of data, this system and its successors can generate any sound, at least in the domain of digital audio in a computer.

Through our practice, rather than engaging in scholarly or archaeological investigations of oft-told tales of media technology, we have created objects that functionally reproduce sounds along with their distinctive noises (or voices). To accomplish this, we reappropriated basic scientific principles in conjunction with current computational tools to revisit a machine that can talk.

Each of the two works relates to, and extends, the material and historical records of sound reproduction in a manner that challenges the factuality of sound and the subjectivity of sound perception. In these works, the arrangements of apparatus, practices, and reception position themselves in ever-changing configurations. The current constellation of sound recording and attention is subject to continually evolving practices.

In considering the impact of sound technology on our culture in this context, it is significant to question the "novelty" of new media by revealing the "past" inherent within them and deviate from the linear history of technology by producing sounds from the "past of media" that have been excavated.

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Kazuhiro Jo is a practitioner with a background in acoustics and interactive design. He has been presenting his practices in forms of artworks at museums and festivals, as well as papers at international journals and conferences with his projects such as “The SINE WAVE ORCHESTRA” as a practice of the music one participates in, and “phono/graph” to explore fields of sound, letters, and graphics with artistic practice. After working at IBM Japan, Newcastle University, Tokyo University of the Arts, and IAMAS, he became an associate professor at the Department of Acoustic Design at Kyushu University, Fukuoka, Japan, and an advisor at the Yamaguchi Center for Arts and Media. Email: jo@jp.org.

Paul DeMarinis has worked as an electronic media artist since 1971 and has created numerous performance works, sound and computer installations, and interactive electronic inventions. He has performed internationally at The Kitchen, Festival d’Automne à Paris, Het Apollohuis in Holland, and Ars Electronica in Linz, and created music for Merce Cunningham Dance Co. His interactive audio artwork has been displayed at the I.C.C. in Tokyo, Bravin Post Lee Gallery in New York, and The Museum of Modern Art in San Francisco. He has been an artist-in-residence at The Exploratorium and Xerox PARC and has received major awards and fellowships in visual

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