

**AHST 4342-001 (87272)**

**History of Media and New Media Art**

**Fall 2019**

**Dr. Charissa N. Terranova**

**University of Texas at Dallas**

**Arts & Humanities**

**T-Th 10:00-11:15**

**Tuesday 10/08/18**

**Sound and Algorithms: Between Alvin Lucier and John Cage**



Alvin Lucier (1931-)

John Cage (1912-1992)



## Alvin Lucier (1931-)

- Born in Nashua, New Hampshire
- Educated in Nashua public and parochial schools, the Portsmouth Abbey School, Yale, and Brandeis and spent two years in Rome on a Fulbright Scholarship
- From 1962 to 1970 he taught at Brandeis, where he conducted the Brandeis University Chamber Chorus, which devoted much of its time to the performance of new music.
- In 1966, along with Robert Ashley, David Behrman and Gordon Mumma, he co-founded the Sonic Arts Union.
- From 1968 to 2011 he taught at Wesleyan University where he was John Spencer Camp Professor of Music.

“If you listen to Beethoven, I guess you’re listening to what Beethoven is giving you in time – how it moves from point to point, key changes, modulations and stuff like that. In my music, you have to concentrate on one or two things ... one thing actually. I’ve been told that listening to it is paying attention to how you’re listening. It’s contemplative.”

Alvin Lucier

## SELF-REFLEXIVITY



# Sonic Arts Union

**ALVIN LUCIER**  
VESPERS  
**ROBERT ASHLEY**  
PURPOSEFUL LADY SLOW AFTERNOON  
**DAVID BEHRMAN**  
RUNTHROUGH  
**GORDON MUMMA**  
HORNPIPE

WERGO  
A DIVISION OF  
SCHOTT MUSIC & MEDIA GMBH

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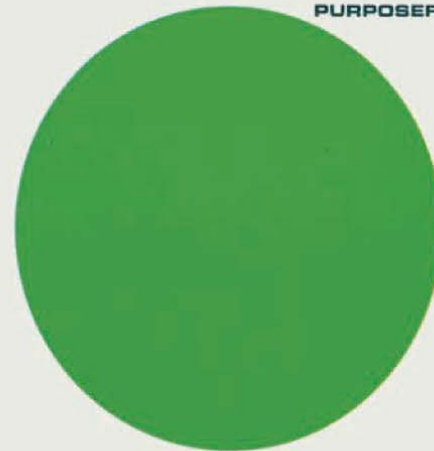
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## SONIC ARTS UNION

ALVIN LUCIER  
ROBERT ASHLEY  
DAVID BEHRMAN  
GORDON MUMMA  
ELECTRIC SOUND

WERGO

VESPERS  
PURPOSEFUL LADY SLOW AFTERNOON  
RUNTHROUGH  
HORNPIPE



RECORDED AT THE  
ROSE ART MUSEUM  
BRANDEIS UNIVERSITY

The Sonic Arts Union was a collective of experimental musicians that was active between 1966 and 1976. The founding members of the group were Robert Ashley, David Behrman, Alvin Lucier, and Gordon Mumma, all of whom had worked together in the instrumental performances of the ONCE festivals. They initially toured under the name Sonic Arts Group, until, at Ashley's suggestion, the name was changed to Sonic Arts Union.

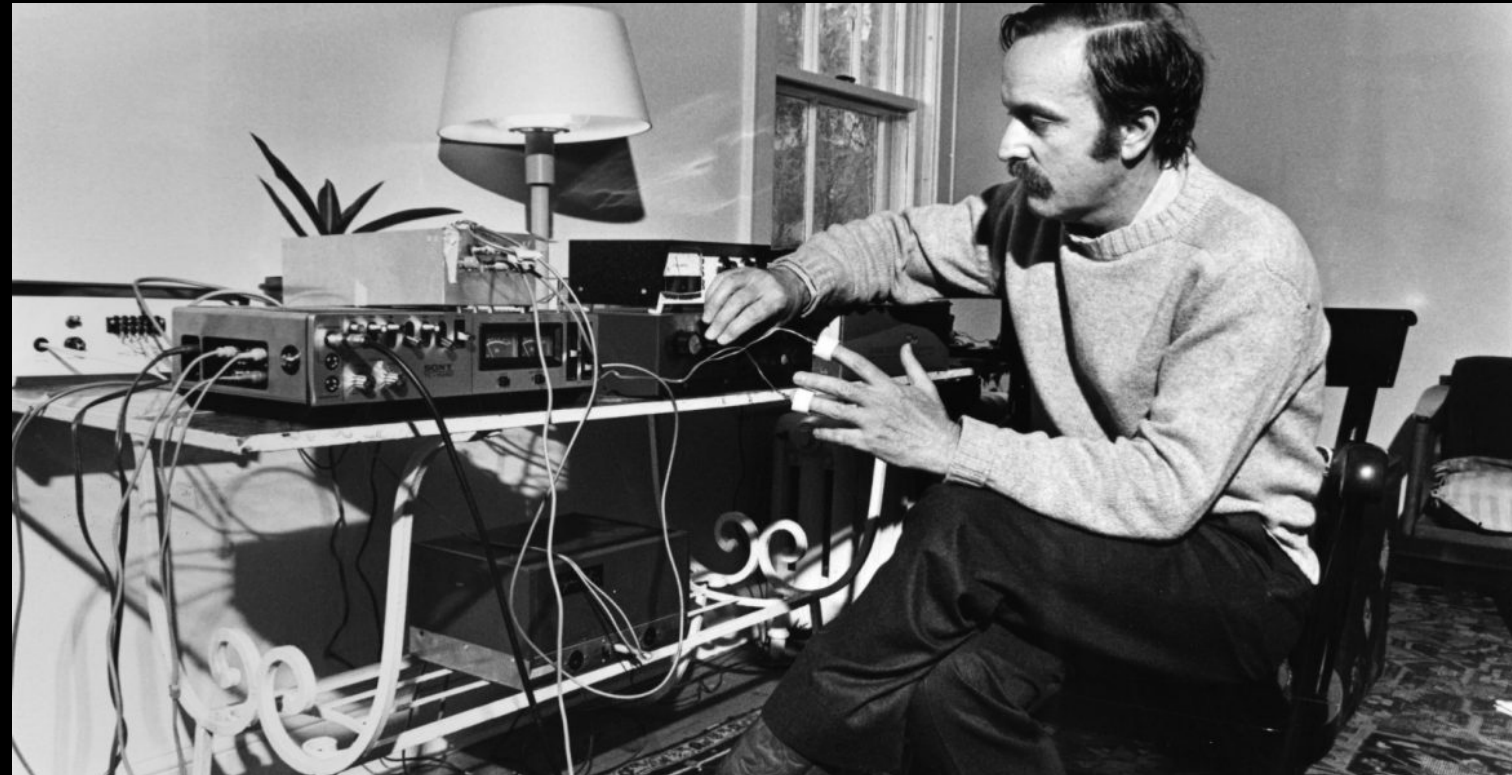
Inspired by the success that John Cage and David Tudor had in touring and designing their own equipment, The Union toured Europe and the United States, though each contributor was performing his own work, either by himself or occasionally with help from other members where required. On some tours, the Union expanded to include Mary Ashley, Shigeko Kubota, Mary Lucier, and Barbara Lloyd, who contributed their own works. The element uniting these individual works, according to David Behrman, was the desire to create pieces "in which established techniques were thrown away and the nature of sound was dealt with from scratch."

Alvin Lucier (1931-)  
WORKS

- North American Time Capsule (1967)  
<https://www.youtube.com/watch?v=zVOPMhAerpQ&t=89s>
- I am Sitting in the Room (1969)  
<https://www.youtube.com/watch?v=fAxHILK3Oyk>
- Music on a Long Thin Wire (1980)  
<https://www.youtube.com/watch?v=dwE4Jwkzel>

“Things were happening in the 1960s. It was wonderful in New York, John Cage, David Tudor, the Merce Cunningham Dance Company. Things were chaotic. You loved this work, but you didn’t know quite what it was all about. Which is fine. I think that the way it is always when you’re making something.”  
Alvin Lucier

## SELF-REFLEXIVITY



- North American Time Capsule (1967) for voices and vocoder  
<https://www.youtube.com/watch?v=zV0PMhAerpQ&t=89s>
- It was composed at the invitation of Sylvania Applied Research Laboratories, which offered Lucier the use of a prototype vocoder.
- The score calls for members of the Chorus to “prepare a plan of activity using speech, singing, musical instruments, or any other sound producing means that might describe—to beings very far from the earth’s environment either in space or in time—the physical, social, spiritual, or any other situation in which we find ourselves at the present time.”
- Lucier described it metaphorically as a message to listeners who do not know about us. These could be very remote and exotic humans or the fabled "beings" in some other part of the universe. The message is encoded in accordance with the empirical fact that purely electronic signals are more easily transmitted through space (and through time) than the more complex waveforms of speech.

Does the North American Time Capsule broaden the spectrum of music culture or does it clash with it?

Lucier's work – Music or Not?

# What is a VOCODER?





# VOCODER



The word “vocoder” is a portmanteau of “voice” and “encoder.” It was invented by Homer Dudley, a telephone engineer at Bell Labs, in 1928. Through a machine, the voice is deconstructed into information, reconstructed into sound, and compressed for communication.

The vocoder examines speech by measuring how its spectral characteristics change over time. This results in a series of signals representing these modified frequencies at any particular time as the user speaks. In simple terms, the signal is split into a number of frequency bands (the larger this number, the more accurate the analysis) and the level of signal present at each frequency band gives the instantaneous representation of the spectral energy content. Thus, the vocoder dramatically reduces the amount of information needed to store speech, from a complete recording to a series of numbers. To recreate speech, the vocoder simply reverses the process, processing a broadband noise source by passing it through a stage that filters the frequency content based on the originally recorded series of numbers. Information about the instantaneous frequency of the original voice signal (as distinct from its spectral characteristic) is discarded; it was not important to preserve this for the purposes of the vocoder's original use as an encryption aid. It is this "dehumanizing" aspect of the vocoding process that has made it useful in creating special voice effects in popular music and audio entertainment.

Demonstrations:

<https://www.youtube.com/watch?v=miCMbuFMITo>

<https://www.youtube.com/watch?v=rkzLdOSraGc>

<https://www.youtube.com/watch?v=xgjAg9bMvYo>

How does Lucier convey meaning through sound without language?

How can we understand Lucier's North American Time Capsule as not just noise but art?

- I am Sitting in the Room (1969)  
<https://www.youtube.com/watch?v=bhtO4DsSazc>
- In 1969 American composer Alvin Lucier first performed his landmark work / *Am Sitting in a Room*, conceived for voice and electromagnetic tape. Lucier read a text into a microphone.
- Attempting to smooth out his stutter, he began with the lines, “I am sitting in a room, the same one you are in now. I am recording the sound of my speaking voice.”
- As described in the text, his voice was recorded, then played back into the room. This process was repeated, and with each iteration Lucier’s recorded speech grew muddled, sounding distant, and specific sonic frequencies started to dominate the recorded sound.
- These tones that began to overwhelm the text and abstract the sonic landscape are the room’s resonant frequencies and are entirely specific to the architectural particularity of a given space. As these frequencies grew, reinforced with each playback, the result was an erasure of the human performer and the dominance of an environmental music.

[https://www.moma.org/explore/inside\\_out/2015/01/20/collecting-alvin-luciers-i-am-sitting-in-a-room/](https://www.moma.org/explore/inside_out/2015/01/20/collecting-alvin-luciers-i-am-sitting-in-a-room/)

# ENTROPY AND SOUND

Entropy is a measure of the randomness of molecules in a system and is central to the second law of thermodynamics and the combined law of thermodynamics, which deal with physical processes and whether they occur spontaneously. Here are further definitions:

1. A measure of the disorder or randomness in a closed system.
2. A measure of the loss of information in a transmitted message.
3. The tendency for all matter and energy in the universe to evolve toward a state of inert uniformity.
4. Inevitable and steady deterioration of a system or society.

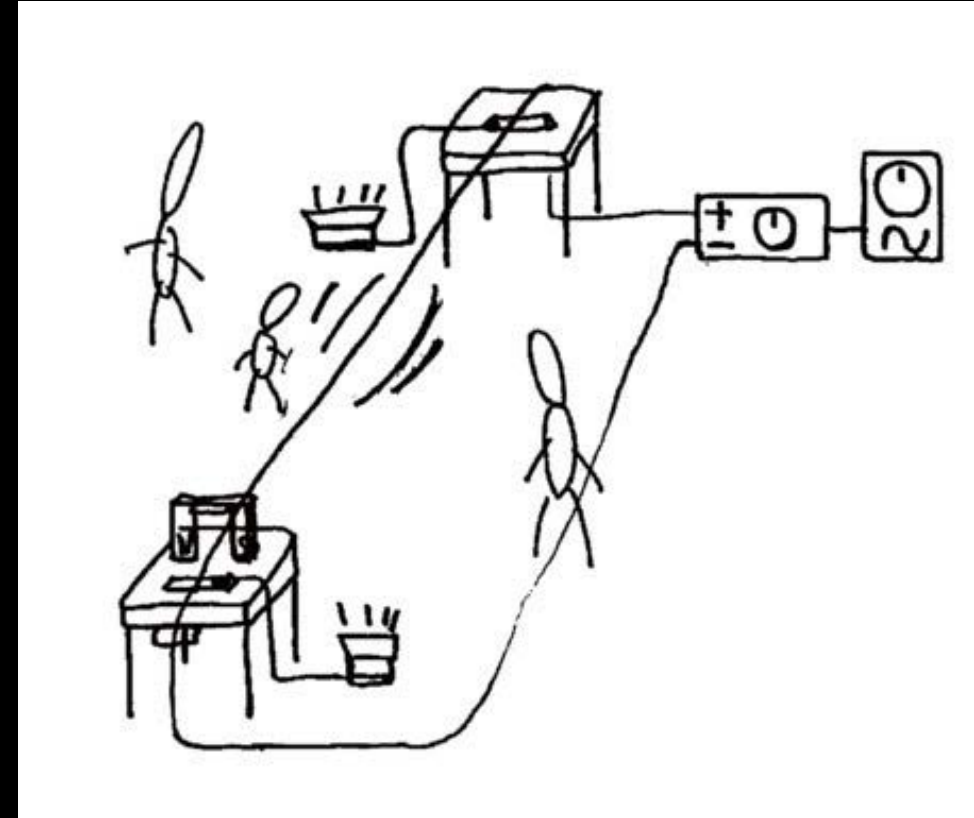
### **What is Entropy?**

Entropy is a thermodynamic quantity representing the unavailability of a system's thermal energy for conversion into mechanical work, often interpreted as the degree or gradual decline into disorder or randomness of the system.

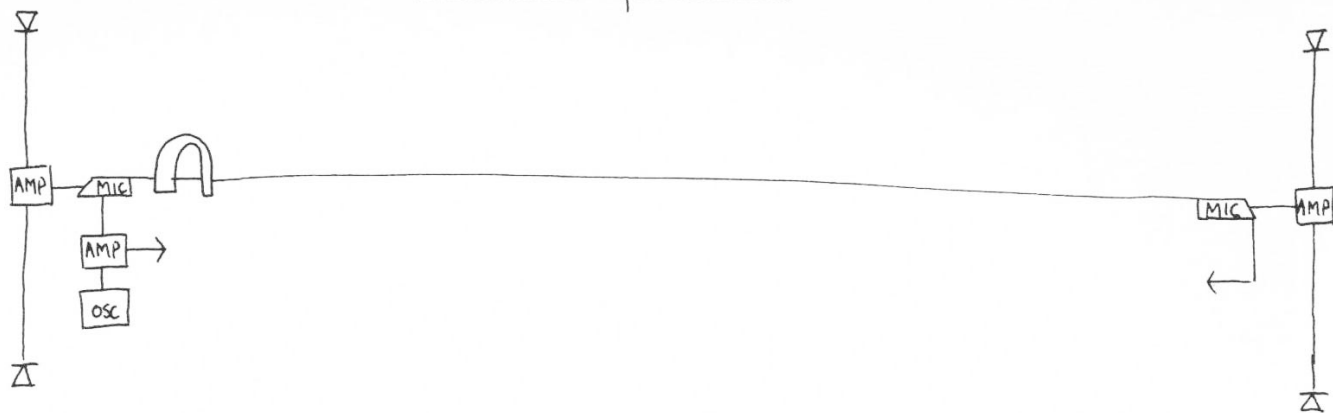
Randomness, messiness, chaos and disorder—yikes—someone fetch the broom!

Does Lucier deploy “constraints” in his work?  
If so, how?

- Music on a Long Thin Wire (1980)  
[https://www.youtube.com/watch?v=dwE4Jwk\\_zel](https://www.youtube.com/watch?v=dwE4Jwk_zel)
- Lucier explains: "*Music on a Long Thin Wire* is constructed as follows: the wire is extended across a large room, clamped to tables at both ends. The ends of the wire are connected to the loudspeaker terminals of a power amplifier placed under one of the tables. A sine wave oscillator is connected to the amplifier. A magnet straddles the wire at one end. Wooden bridges are inserted under the wire at both ends to which contact microphones are embedded, routed to a stereo sound system. The microphones pick up the vibrations that the wire imparts to the bridges and are sent through the playback system. By varying the frequency and loudness of the oscillator, a rich variety of slides, frequency shifts, audible beats and other sonic phenomena may be produced."



## Music on a Long Thin Wire



Extend a long metal wire (#1 music wire or equivalent) across a lengthways down a performance space. Affix both ends to the far edges of the tops of tables or other similar platforms and tighten them with clamps, hanging weights over pulleys, or other tension-creating devices. Route the ends of the wire to the outputs of an amplifier, forming a current-carrying loop. Insert wood, metal, or other resonant bridges under the wire at both ends. Set a large magnet down on the table at one end; adjust the height of the wire so that it passes directly between the poles of the magnet. Attach microphones to the bridges and route them through amplifiers to loudspeakers.

Drive the wire with a sine wave oscillator, causing it to vibrate from the interaction between the current in the wire and the magnetic field across it, in ways determined by the frequency and amplitude of the driving signal and the length, size, weight and tension of the wire.

Pick up the sounds of the vibrating wire with the microphones on the resonant bridges and amplify them for stereo listening through the loudspeakers.

Light the wire so that the modes of vibration are visible to viewers.

Alvin Lucier

[https://www.youtube.com/watch?v=dwE4Jwk\\_zel](https://www.youtube.com/watch?v=dwE4Jwk_zel)



Does music need to have an intended meaning to be meaningful?

What is the role of human will and intention in Alvin Lucier's music practice?

How do we understand meaning in Lucier's  
work?

# Who is Robert Moog? What is a Moog?



## Robert Moog (1934-2005)



- Moog was an American engineer and leading figure in the molding and creation of electronic music.
- He invented the Moog synthesizer.
- The Moog is an analog synthesizer based on the technological development of the transistor.
- The transistor made it easy for Moog to build small and inexpensive electronic music systems that were lighter in weight and more reliable than vacuum tube-based systems.
- Company founder Robert Arthur Moog had begun manufacturing and selling vacuum-tube theremin in kit form while he was a student in the early 1950s and marketed his first transistorized theremin kits in 1961.
- Dr. Moog began to develop the experimental synthesizer that would become known as the Moog in 1964.
- Dr. Bob Moog demonstrates his synthesizer:  
<https://www.youtube.com/watch?v=0z0cbMkOvY0>
- Classical Music via Moog:  
<https://www.youtube.com/watch?v=m-TgvSJJdis>

# What is a theremin?



# Theremin



A theremin is an electronic musical instrument controlled without physical contact by the thereminist (performer). It is named after the Westernized name of its Soviet inventor, Leon Theremin, who patented the device in 1928.

Leon Theremin playing his instrument:

<https://www.youtube.com/watch?v=w5qf9O6c20o>

- Born in Los Angeles to John Milton Cage, Sr., an inventor, and Lucretia ('Crete') Harvey, an amateur artist and occasional journalist for *The Los Angeles Times*.
- Worked during the heyday of Abstract Expressionism
- Honed his skills in the midst of the growing American avant garde. Neither a painter or a sculptor,
- Incorporated unconventional instrumentation and the idea of environmental music dictated by chance.
- Approach to composition was deeply influenced by Asian philosophies, focusing on the harmony that exists in nature, as well as elements of chance.
- Famous not only for his radical works, like *4'33"* (1952), in which the ambient noise of the recital hall created the music, but also for his innovative collaborations with artists like Merce Cunningham and Robert Rauschenberg.
- These partnerships helped break down the divisions between the various realms of art production, such as music, performance, painting, and dance, allowing for new interdisciplinary work to be produced.
- Cage discovered that chance was as important of a force governing a musical composition as the artist's will, and allowed it to play a central role in all of his compositions. Although each piece has a basic, composed structure, the overall effect varied with each performance as different variables like the location and audience directly affected the sounds that were produced.
- By breaking with the historically determined preconception that music was made by musicians using traditional instruments to perform structured and prearranged compositions, Cage opened up a new wealth of possibilities within modern art. His revolutionary performances ushered in an era of experimentation in all media and shifted the focus away from the artist's inner psyche to the artist's contemporary environment.
- Cage focused his compositional career on the incorporation of unconventional elements such as kitchen gadgets, metal sheets, various common objects, and even silence into his works to change the way modern audiences listened to music and appreciated their surroundings.
- Taught a groundbreaking courses on composition at the New Bauhaus, Black Mountain College, and The New School in NY
- Many artists, such as R. Rauschenberg, E. Kienholz, and members of the Fluxus group, too Cage's course in experimental composition at The New School, which he taught from 1956 to 1961.

## John Cage (1912-1992)





John Cage, David Tudor, Robert Rauschenberg,  
et. al., Theater Piece No. 1, 1952

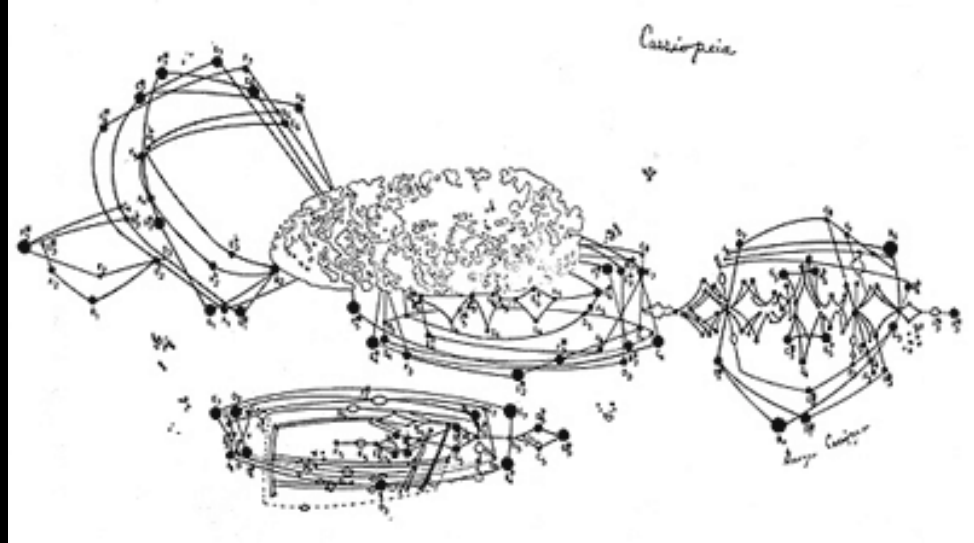
Robert Rauschenberg, White Painting (Seven  
Panels), 1951



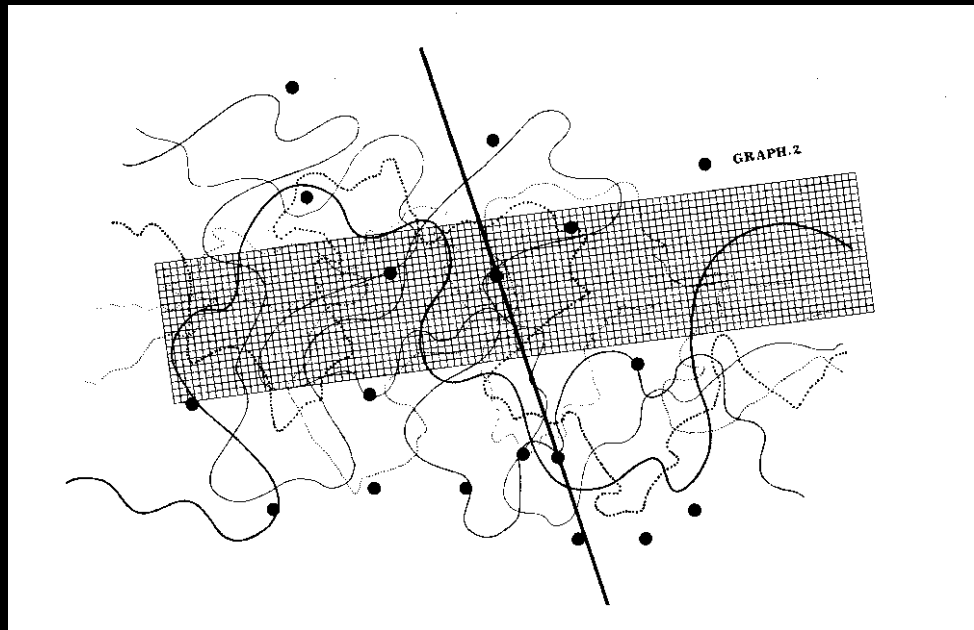




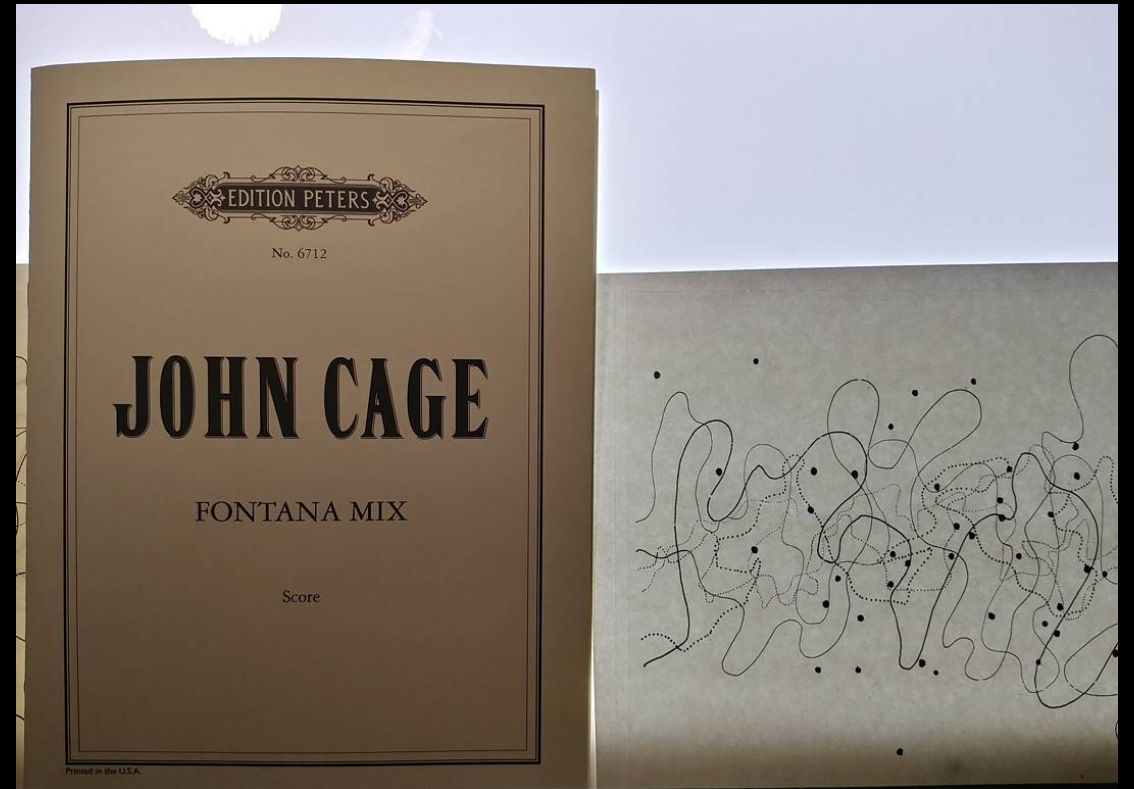
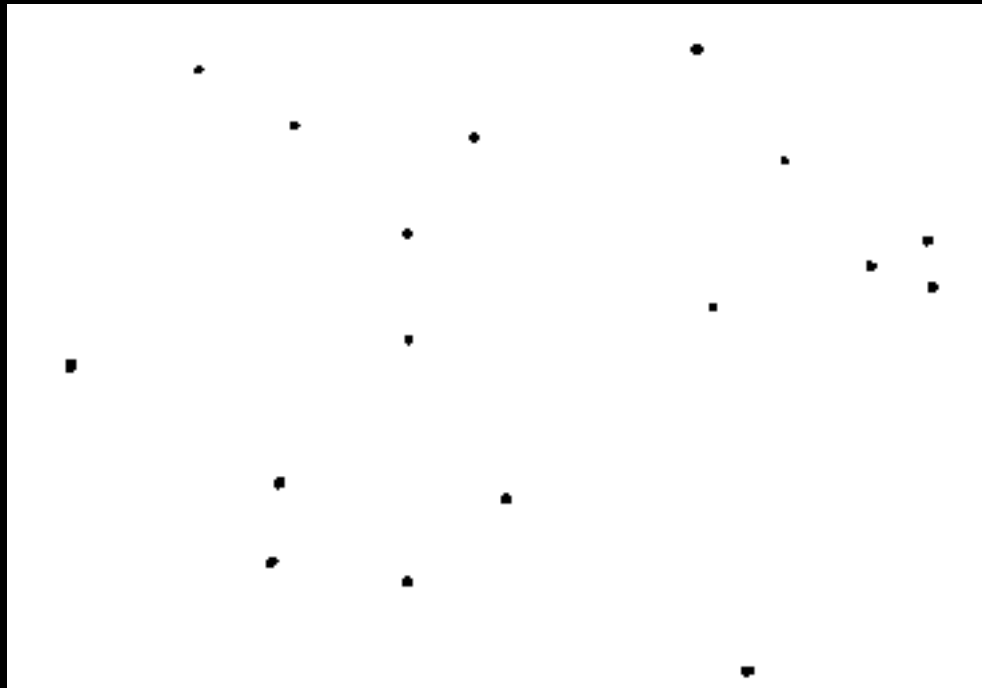
John Cage, New School for Social Research, 1956-1960



George Gacioppo, Cassiopeia, sound pictogram, 1962



John Cage, Fontana Mix, sound pictogram, 1958



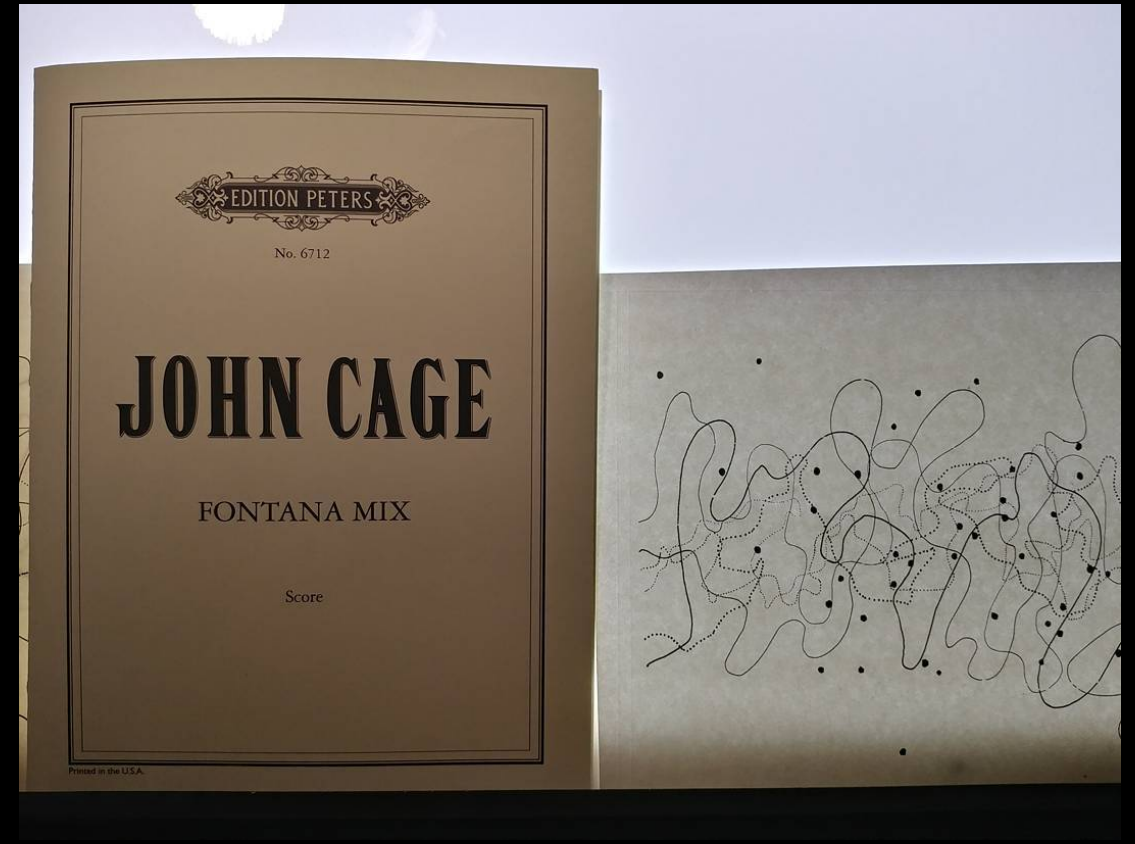
Artist: John Cage

Title: "Fontana Mix"

Date: 1958

Details: Experimental musical  
composition

This is a composition indeterminate of its performance, and was derived from notation CC from Cage's Concert for Piano and Orchestra. The score consists of 10 sheets of paper and 12 transparencies. The sheets of paper contain drawings of 6 differentiated (as to thickness and texture) curved lines. 10 of these transparencies have randomly distributed points (the number of points on the transparencies being 7, 12, 13, 17, 18, 19, 22, 26, 29, and 30). Another transparency has a grid, measuring 2 x 10 inches, and the last one contains a straight line (10 3/4 inch).

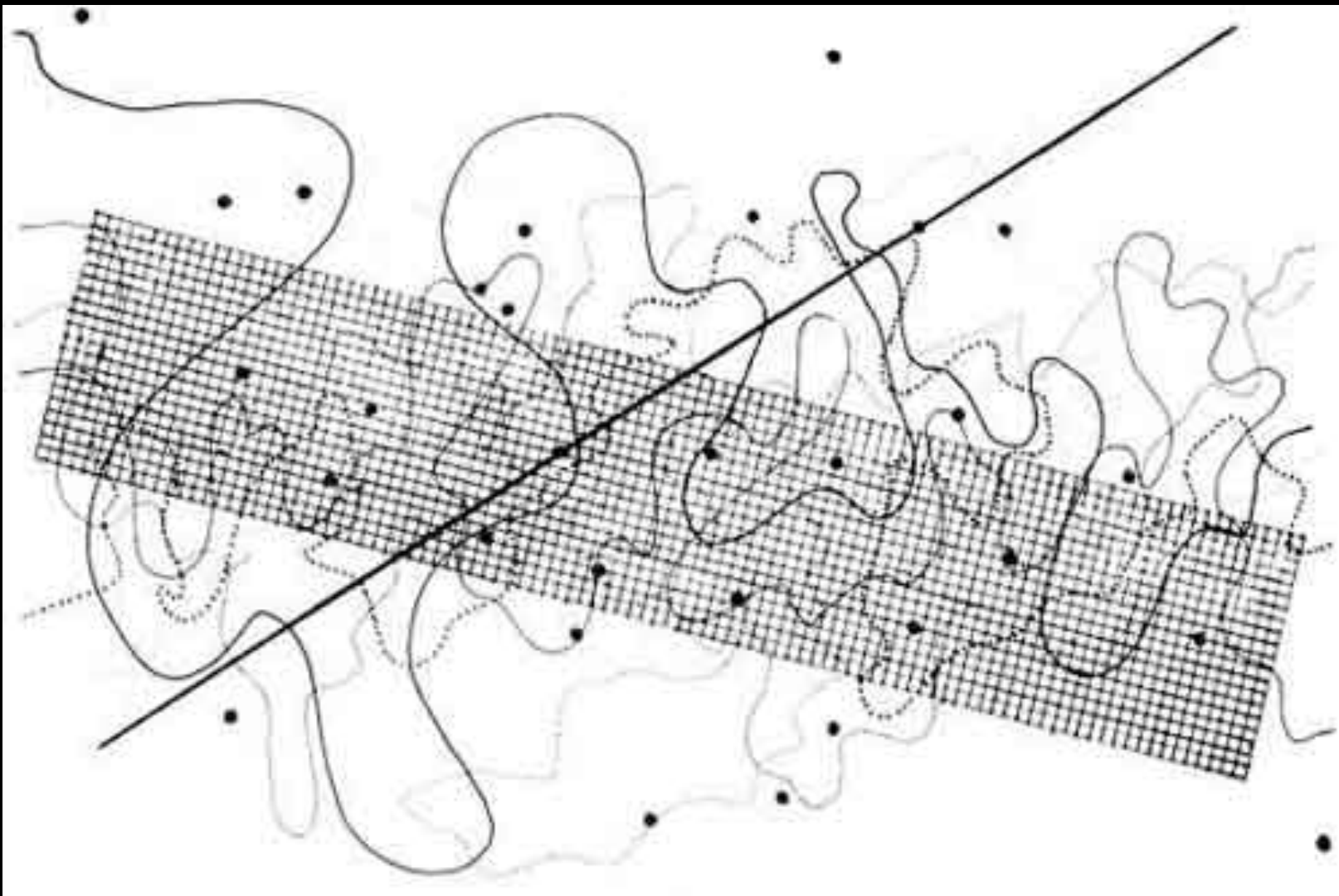


Artist: John Cage

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Artist: John Cage

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<https://www.youtube.com/watch?v=a15xkowPEPg>

By superimposing these transparencies, the player creates a structure from which a performance score can be made: one of the transparencies with dots is placed over one of the sheets with curved lines. Over this one places the grid. A point enclosed in the grid is connected with a point outside, using the straight line transparency.

Horizontal and vertical measurements of intersections of the straight line with the grid and the curved line create a time-bracket along with actions to be made. Fontana Mix may be performed with parts written for Cage's Concert for Piano and Orchestra, Aria, Solo for Voice 2, and/or Song Books.

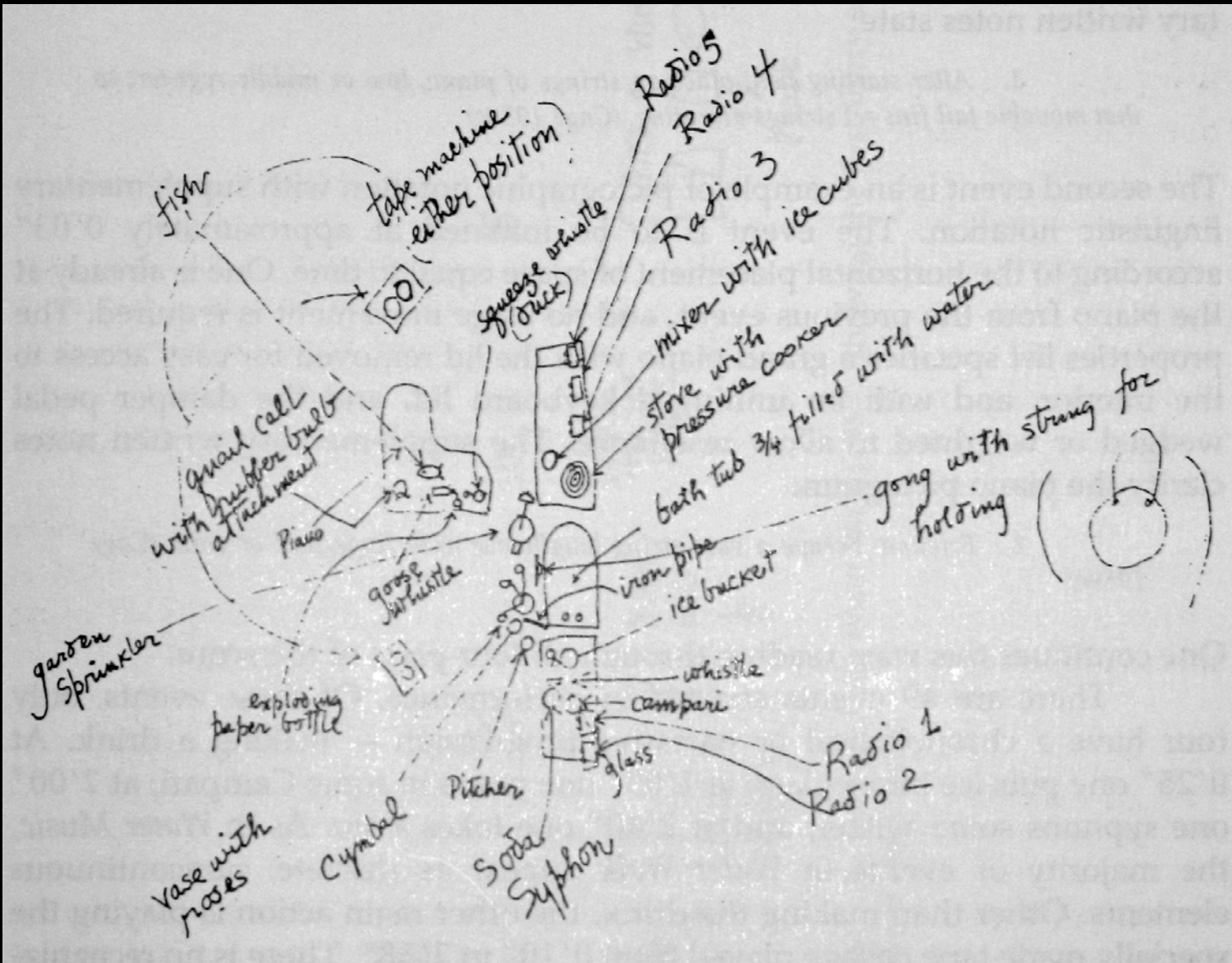


John Cage performing "Water Walk" in January, 1960 on the popular TV show *I've Got a Secret*:

<https://www.youtube.com/watch?v=gXOIkT1-QWY>

Cage performed "Water Walk" on *I've Got a Secret*, the long-running occupation-guessing game show whose guest roster also included chess prodigy Bobby Fischer, "fifth Beatle" Pete Best, and fried-chicken icon Colonel Harland Sanders. For this particular episode, wrote Dan Colman in our earlier post, "the TV show offered Cage something of a teachable moment, a chance to introduce the broader public to his brand of avant-garde music." For *Water Walk*, Cage rounded up a variety of "instruments" all to do with that liquid — a bathtub, a pitcher, ice cubes in a mixer — and the unconventional symphony they produce culminates in the Rube Goldbergian mixing of a drink, the sipping of which the composition dictates about two and a half minutes in. Naturally, Cage being Cage, the piece incorporates audience reaction noises; when host Gary Moore warns him that certain members of the studio audience will laugh, Cage responds, "I consider laughter better than tears."





<http://www.youtube.com/watch?v=SSulycqZH-U>

Contemporary version of John Cage  
Water Music (1952):

[https://www.youtube.com/watch?v=h\\_ik4VMclKA](https://www.youtube.com/watch?v=h_ik4VMclKA)

[Evan Ziporyn Interviews  
Minimalist Composer Alvin  
Lucier](https://www.youtube.com/watch?v=daDdilTVuWU)

[https://www.youtube.com  
/watch?v=daDdilTVuWU](https://www.youtube.com/watch?v=daDdilTVuWU)

