Music & Technology I:
Computer Music

Computer Music

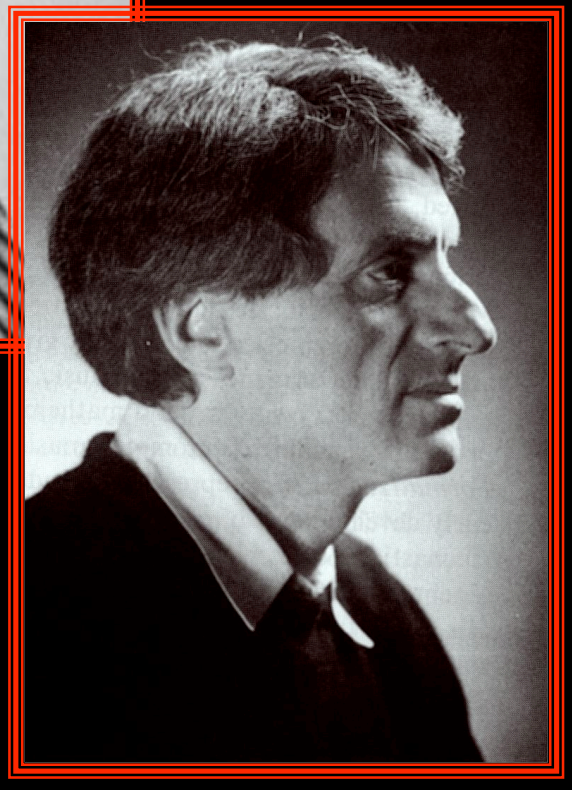
▲ Max V. Matthews (b. 1926), developer of MUSIC V, at Bell Laboratories.

▼ Lejaren Hiller (1924-1994), with the ILLIAC II Computer, University of Illinois (c.1956).

Lejaren Hiller and Leonard Isaacson: *ILLIAC Suite* (1957)

Algorithmic Composition—Stochastic Music

Iannis Xenakis
(1922-2001)



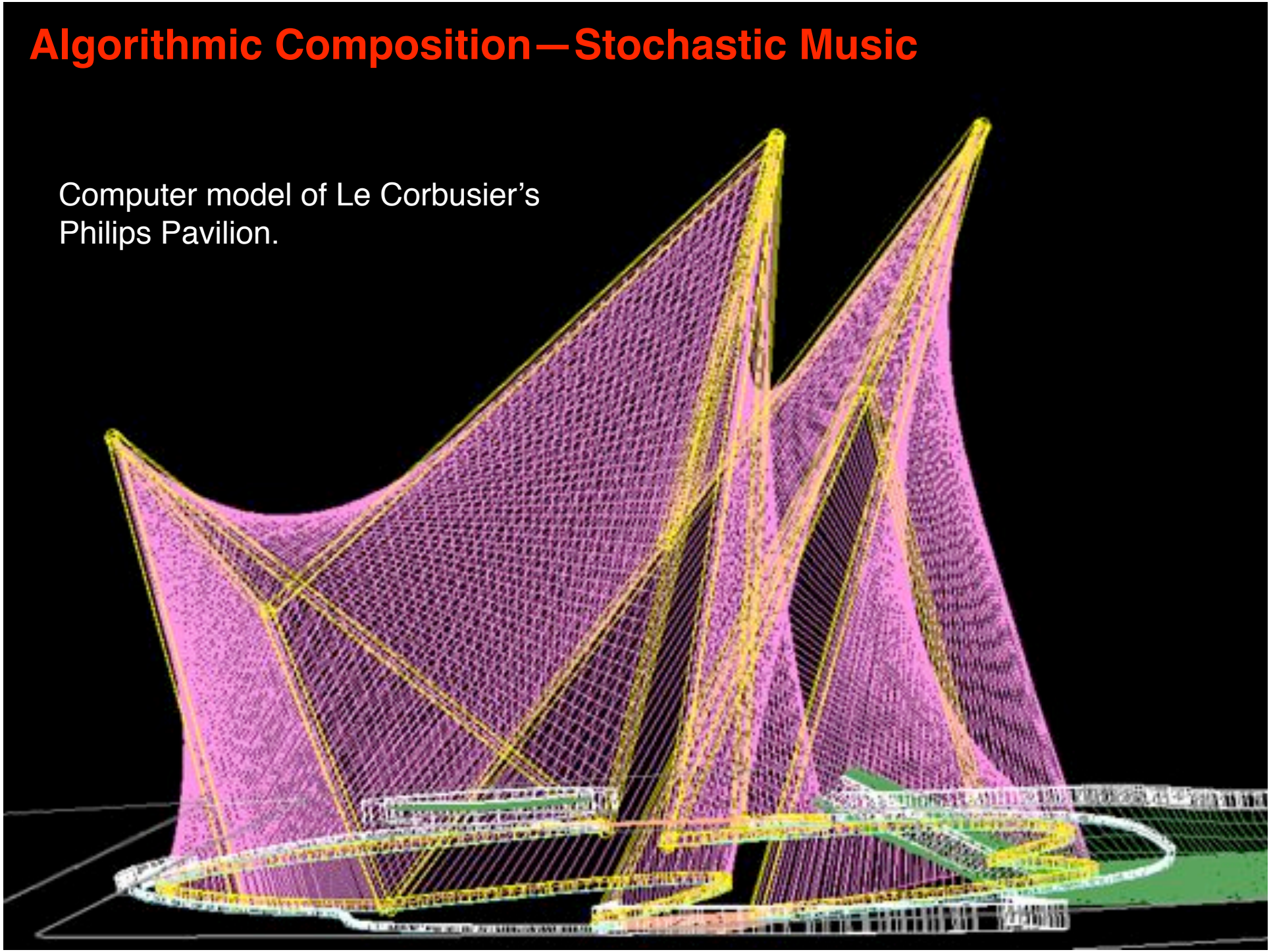
Xenakis (right) with LeCorbusier

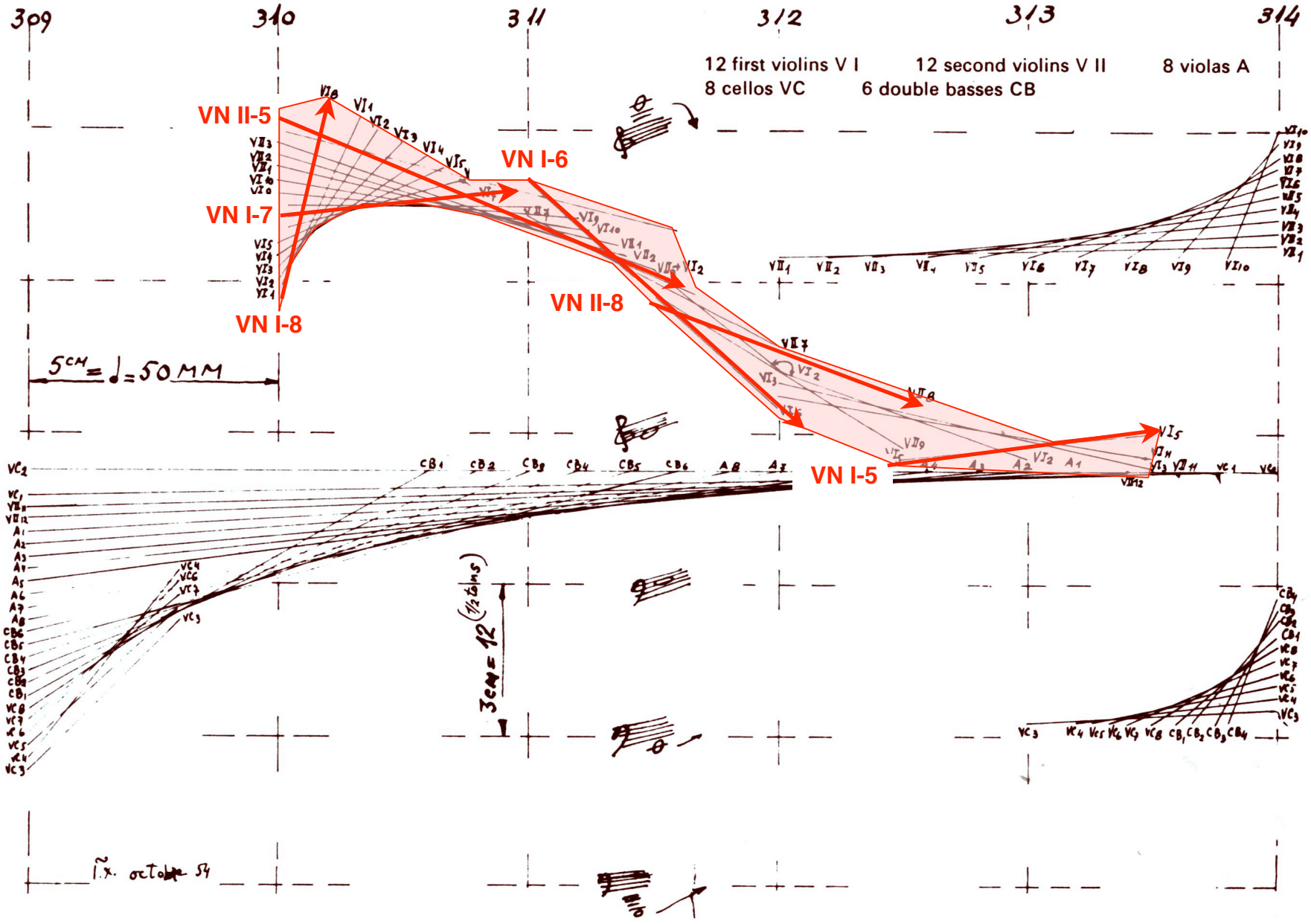
Algorithmic Composition—Stochastic Music

Le Corbusier: Philips Pavilion; Brussels, Belgium (1958)

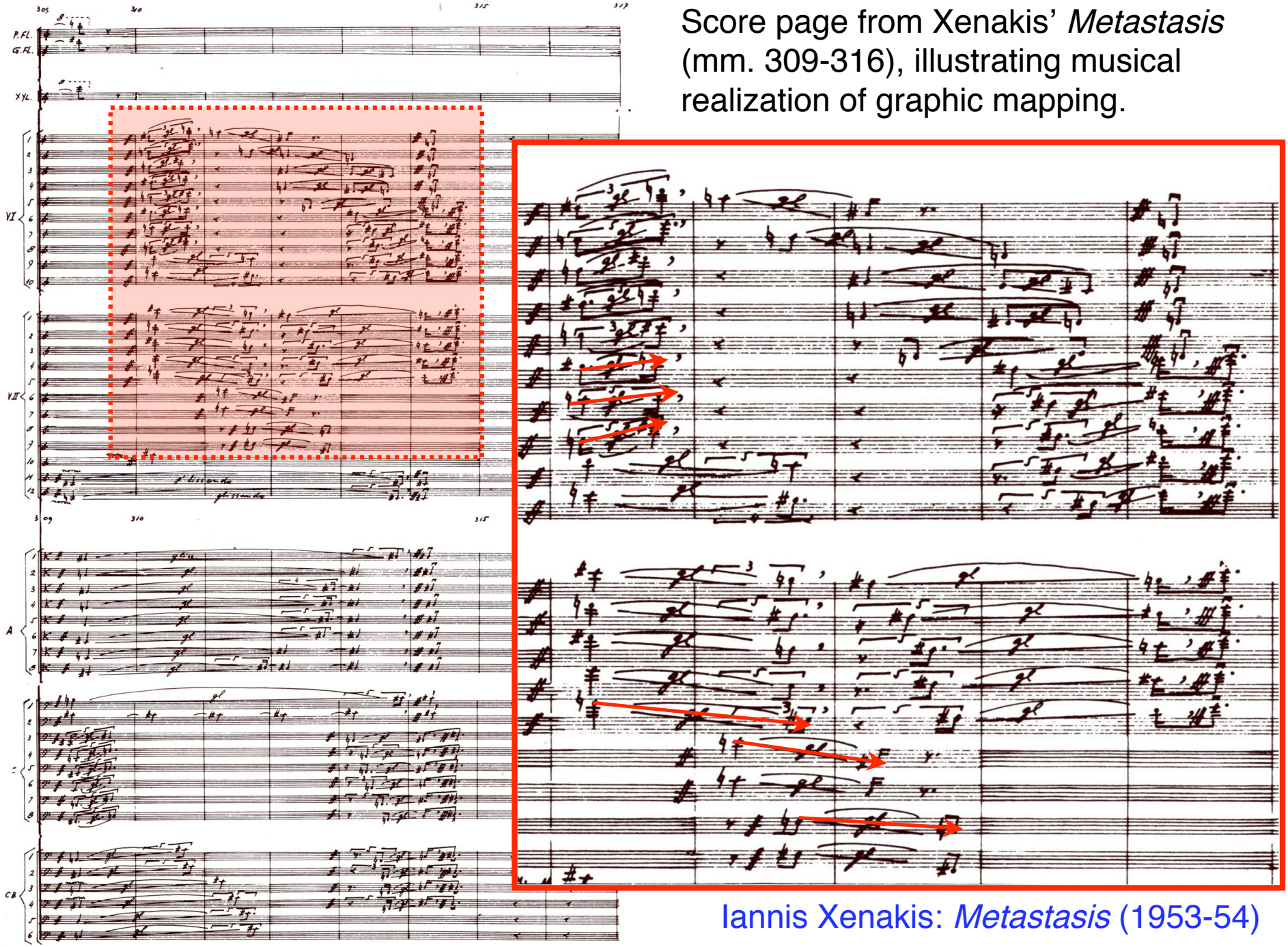
Algorithmic Composition—Stochastic Music

Computer model of Le Corbusier's Philips Pavilion.





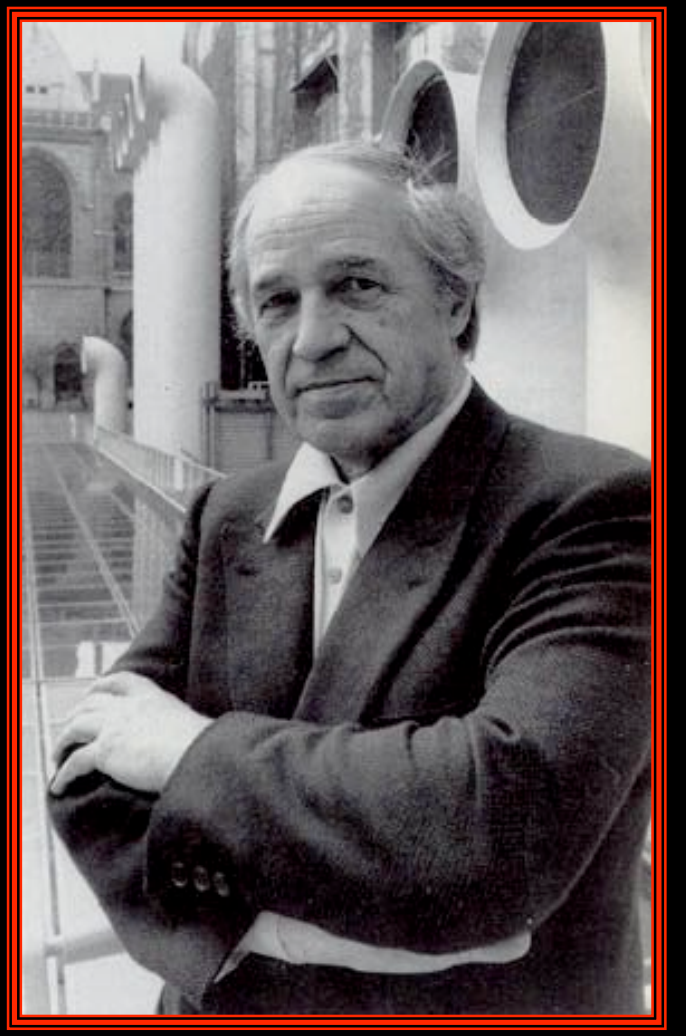
Xenakis' Mapping of Le Corbusier's Philips Pavilion for *Metastasis* (mm.309-313).



Score page from Xenakis' *Metastasis* (mm. 309-316), illustrating musical realization of graphic mapping.

Iannis Xenakis: *Metastasis* (1953-54)

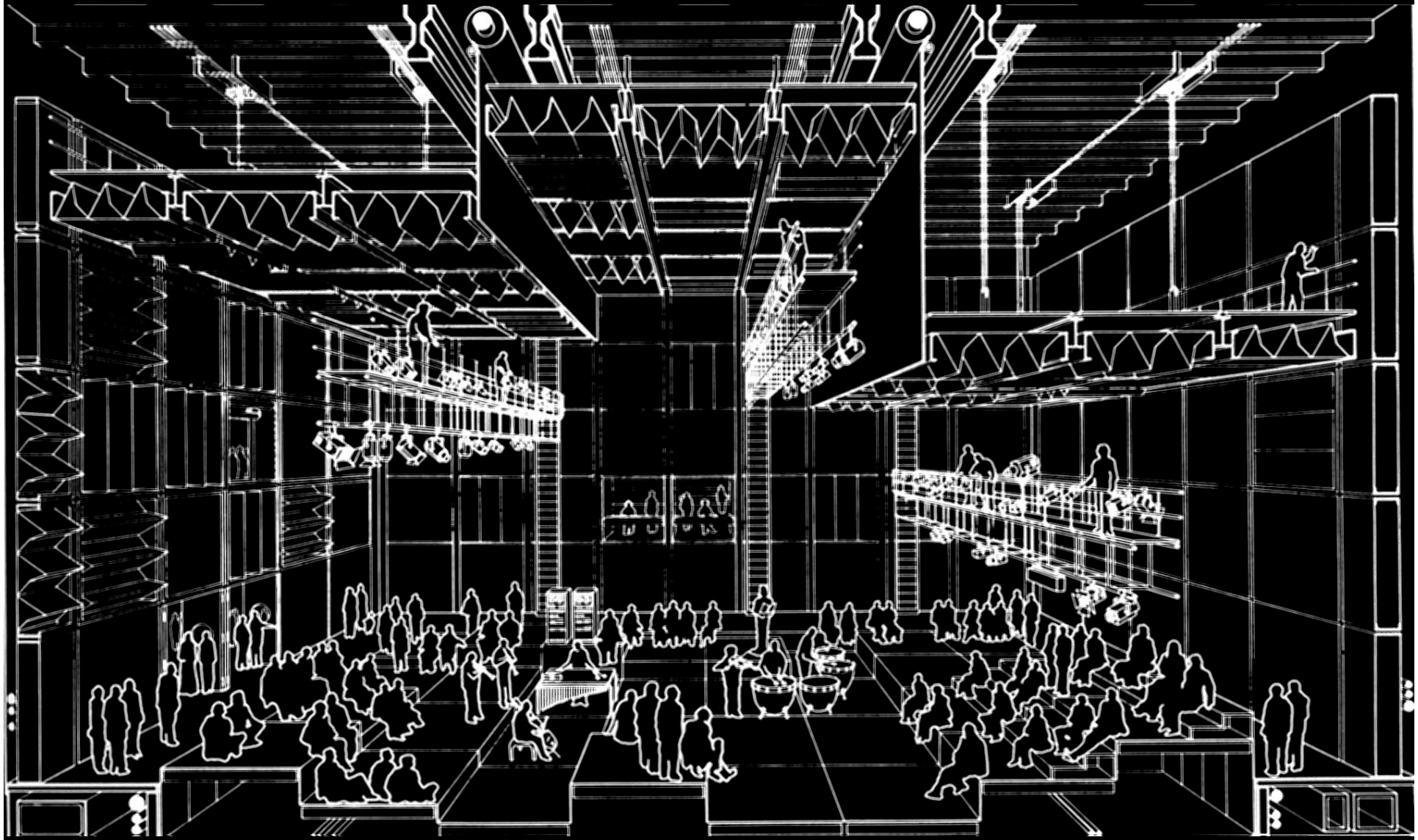
Instutut de Recherche et de Coordination Acoustique/Musique (IRCAM)



- Founded in 1976 at the Georges Pompidou Centre in Paris by Pierre Boulez (▸).
- Established as a cultural center for musical modernism during the rise of postmodernism.
- Facilities for researchers and composers to work together, along with performers.
- Ensemble Intercontemporain is the resident ensemble, specializing in the performance of contemporary music.

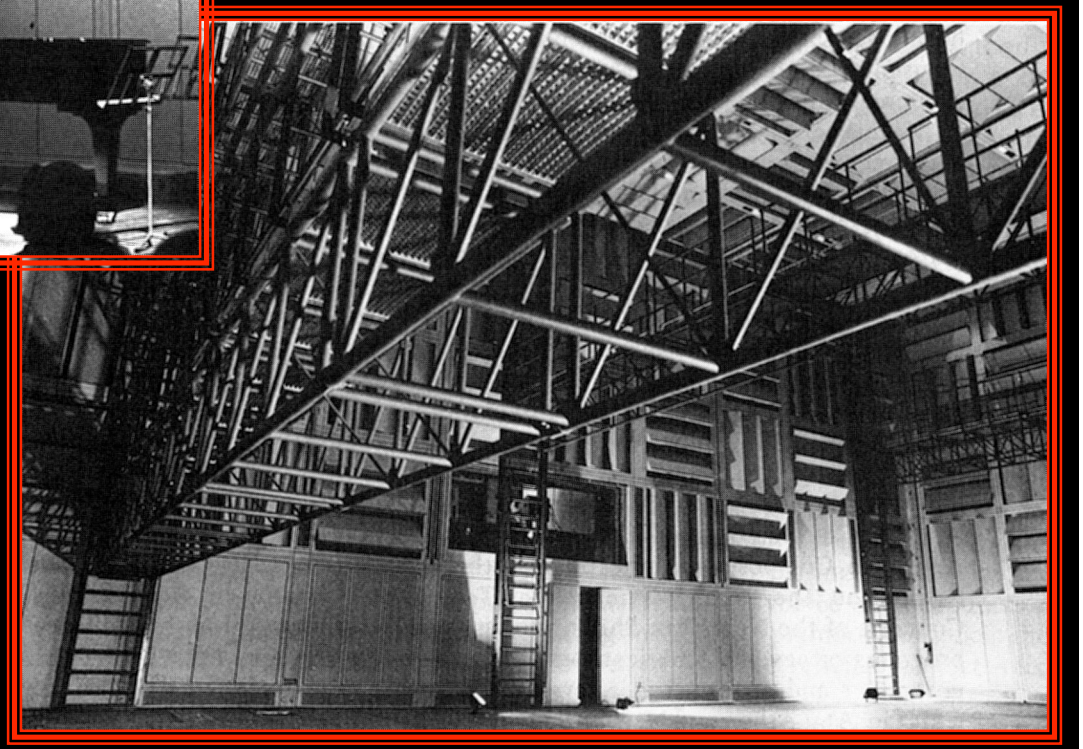
Instutut de Recherche et de Coordination Acoustique/Musique (IRCAM)

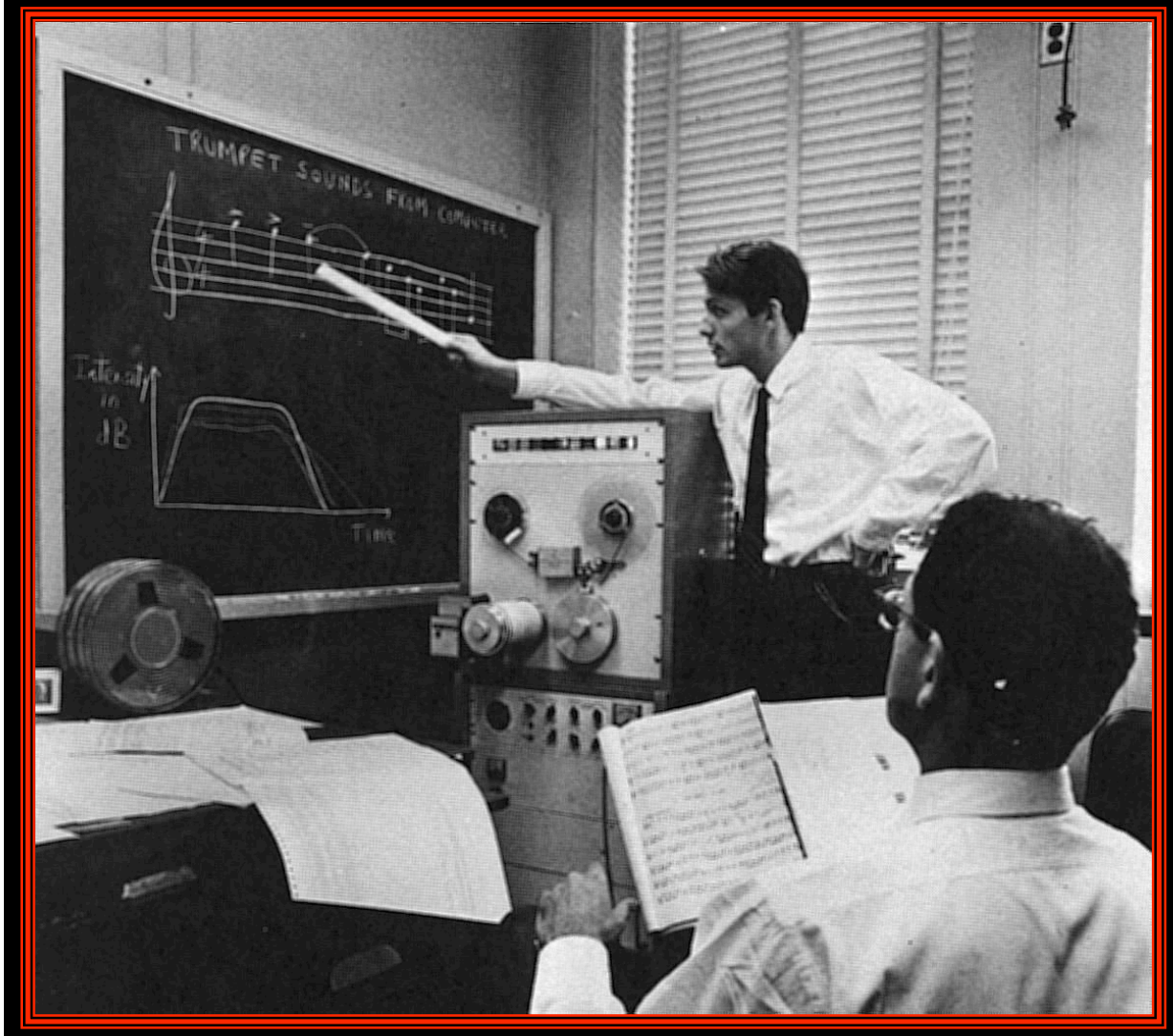
Espace de Projection



Instutut de Recherche et de Coordination Acoustique/Musique (IRCAM)

Espace de Projection





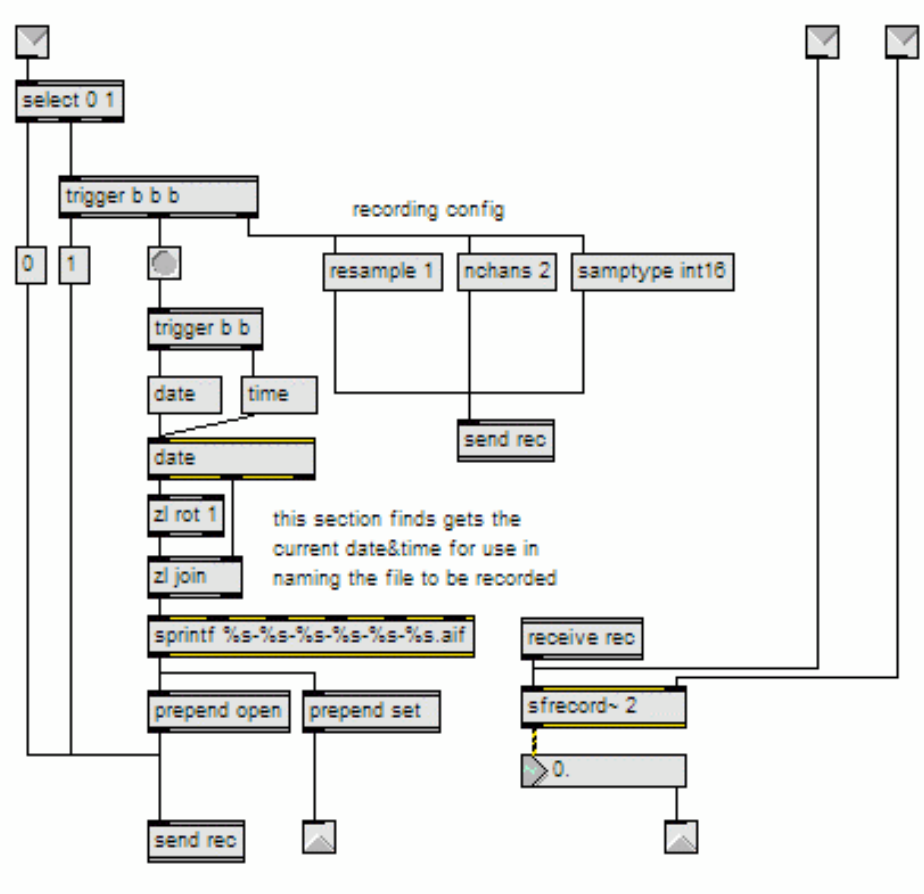
Jean-Claude Risset (b. 1938)
Sud (1985)

Interactive Composition

▲ Todd Machover modeling the Exos Dexterous Hand Master data glove.

▼ Miller Puckette, developer of Max/MSP.

Interactive Composition



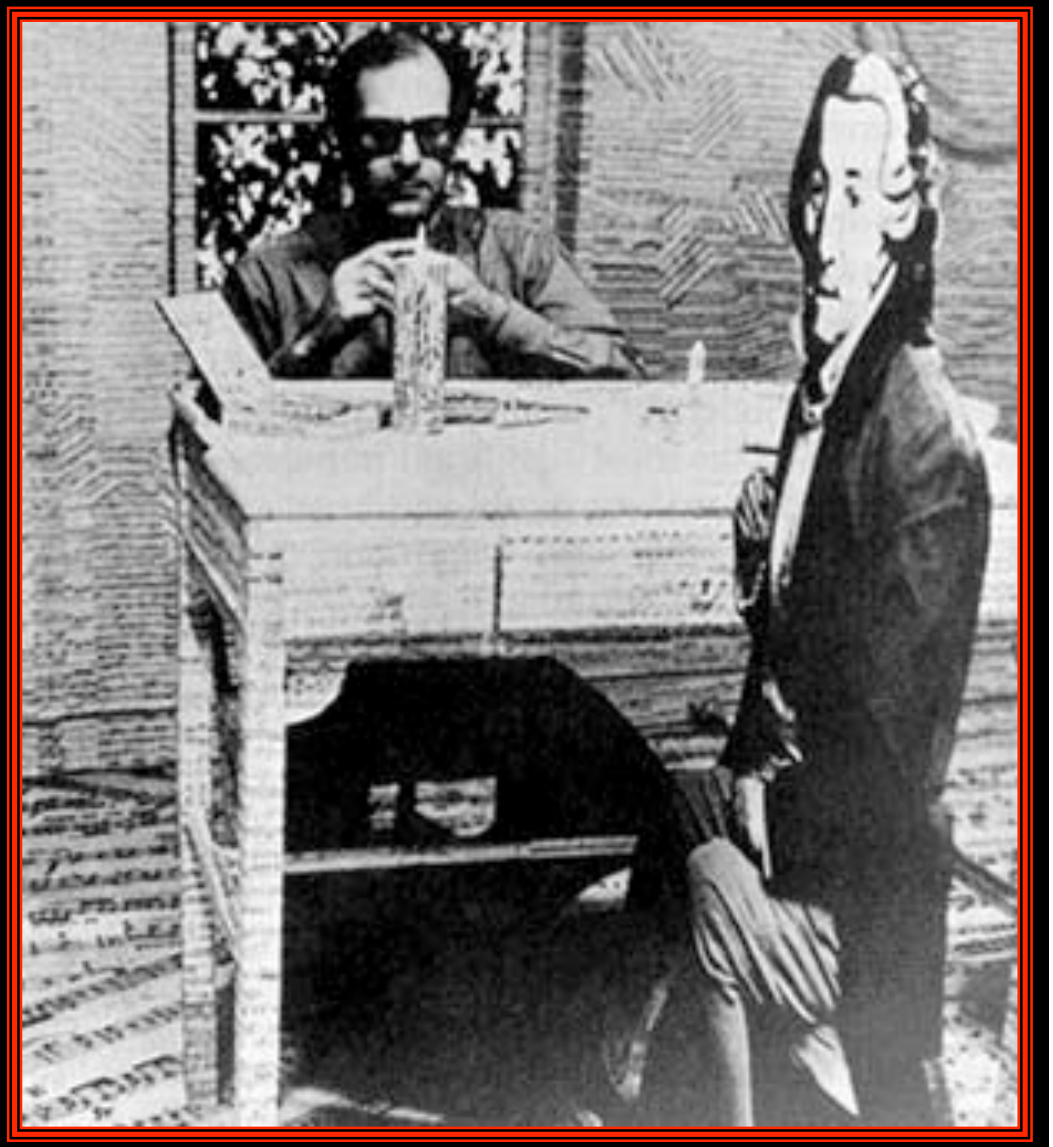
Example of Max/MSP Interface

Experimental Music and Media Forms

Terminology

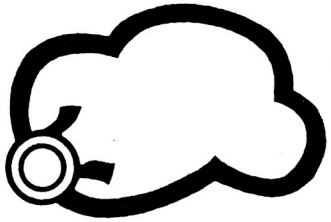
- intermedia—multimedia—mixed media
- conceptual music
- performance art
- happenings
- biomusic
- ecomusic
- antimusic

Mauricio Kagel (b. 1931)



Kagel on the set of *Ludwig van* (1970)

Mauricio Kagel: *Acustica* (1969-70)

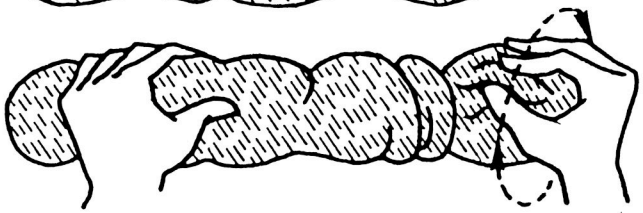


LUFTBALLON

Ⓐ

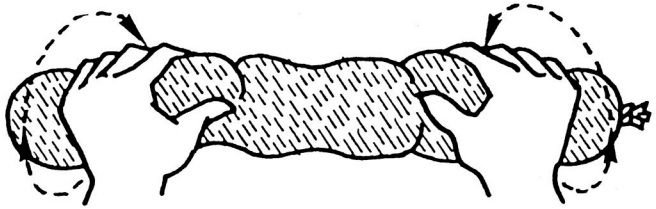
Mit einem, zwei oder mehreren Fingern der gleichen Hand längs des Ballons reiben.

Ⓑ

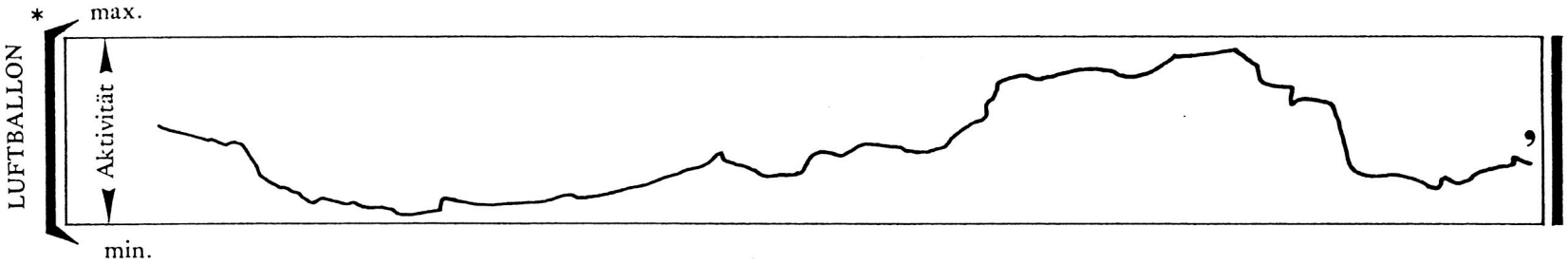


Ballon mit einer Hand drehen und mit der anderen leicht berühren.

Ⓒ



Beide Hände alternierend: Ballon leicht drücken und gleichzeitig etwas drehen.



Ⓐ, Ⓑ und Ⓒ in beliebiger Reihenfolge ausführen

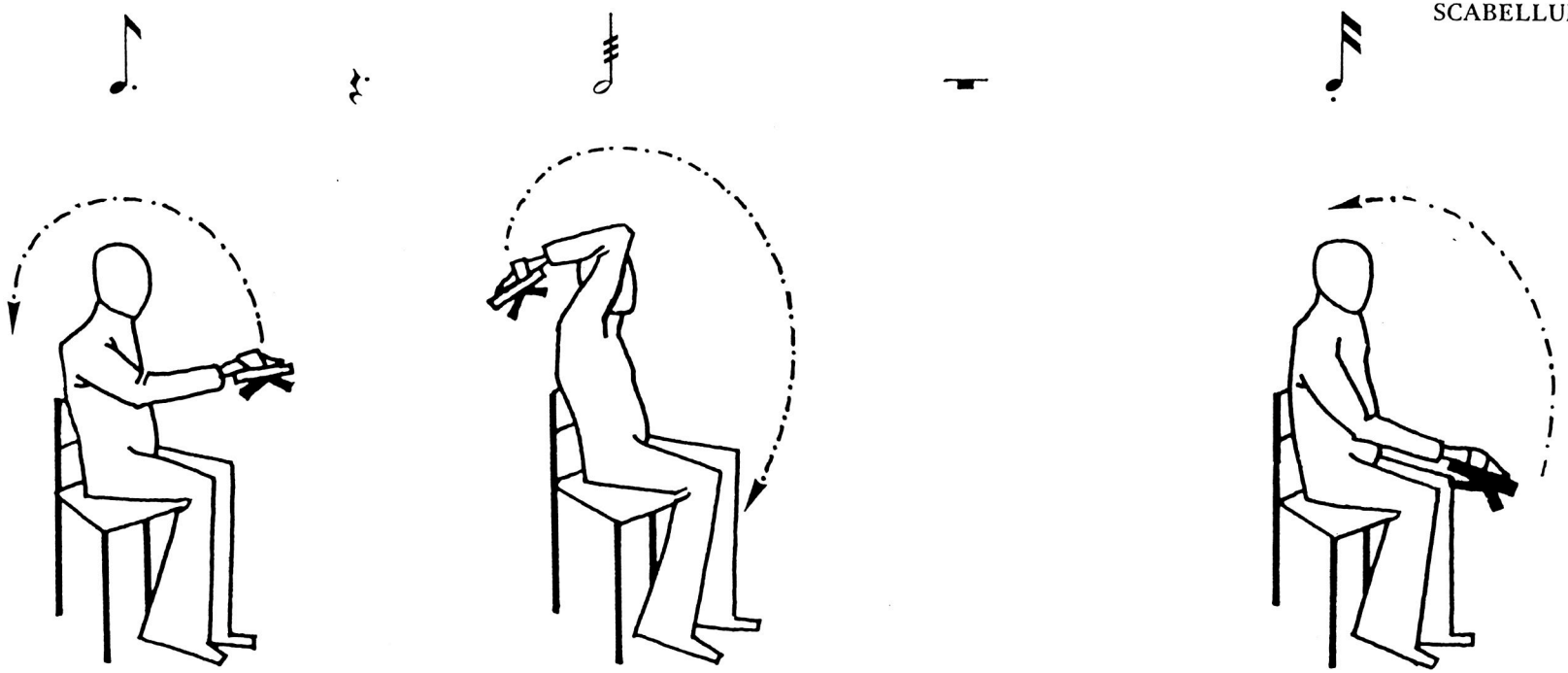
* *Ad lib.: während dieser Aktionen ruht der Luftballon auf einem Fellinstrument (z.B. Große Trommel).*

Mauricio Kagel: *Acustica* (1969-70)

1

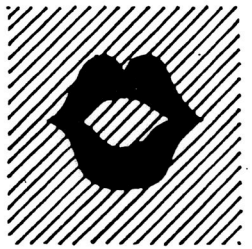
SCABELLUM

ruhig!



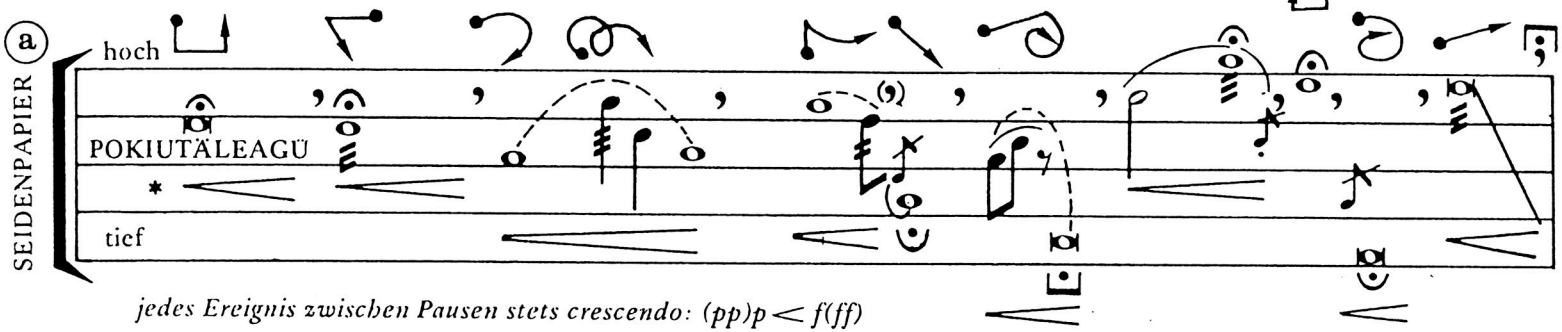
Wiederholung(en) und Veränderungen ad lib.

Mauricio Kagel: *Acustica* (1969-70)



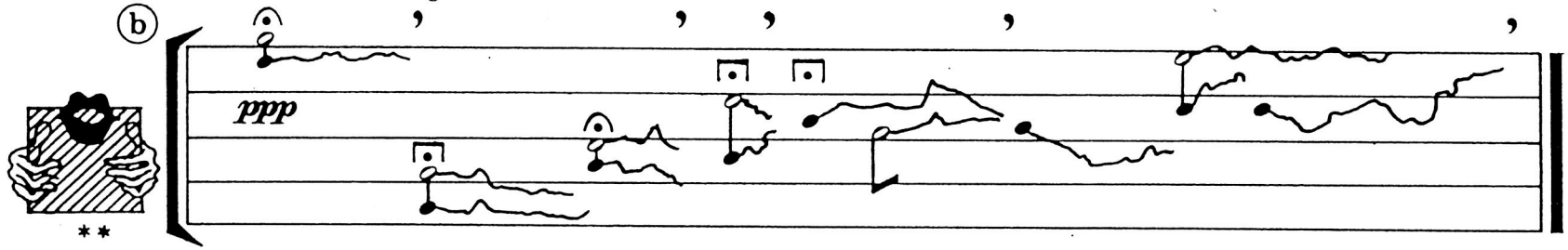
* ⌐↑, ↖ *usw. = Mundbewegungen hinter der Papierseite:*
Zwischen den Pausen jeweils einmal den gleichen „Text" singen: PO-KIU-TÄ-LE-A-GÜ

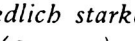
Modell *sehr langsam*



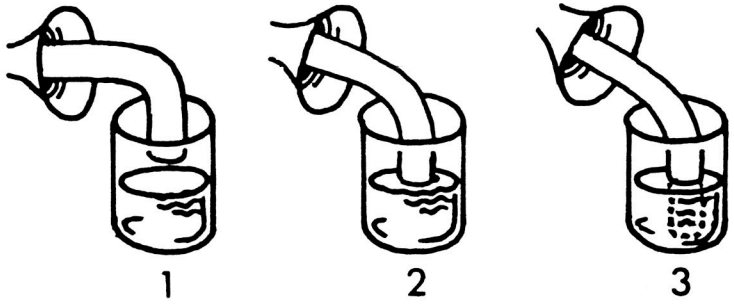
jedes Ereignis zwischen Pausen stets crescendo: (pp)p < f(ff)

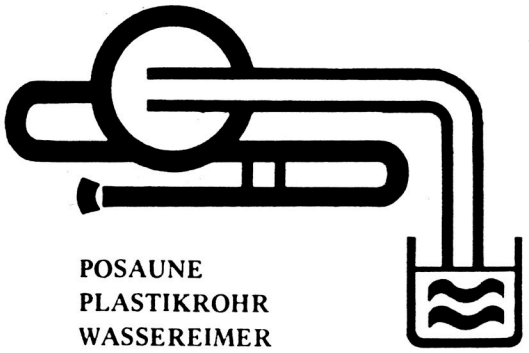
Modell *extrem langsam*



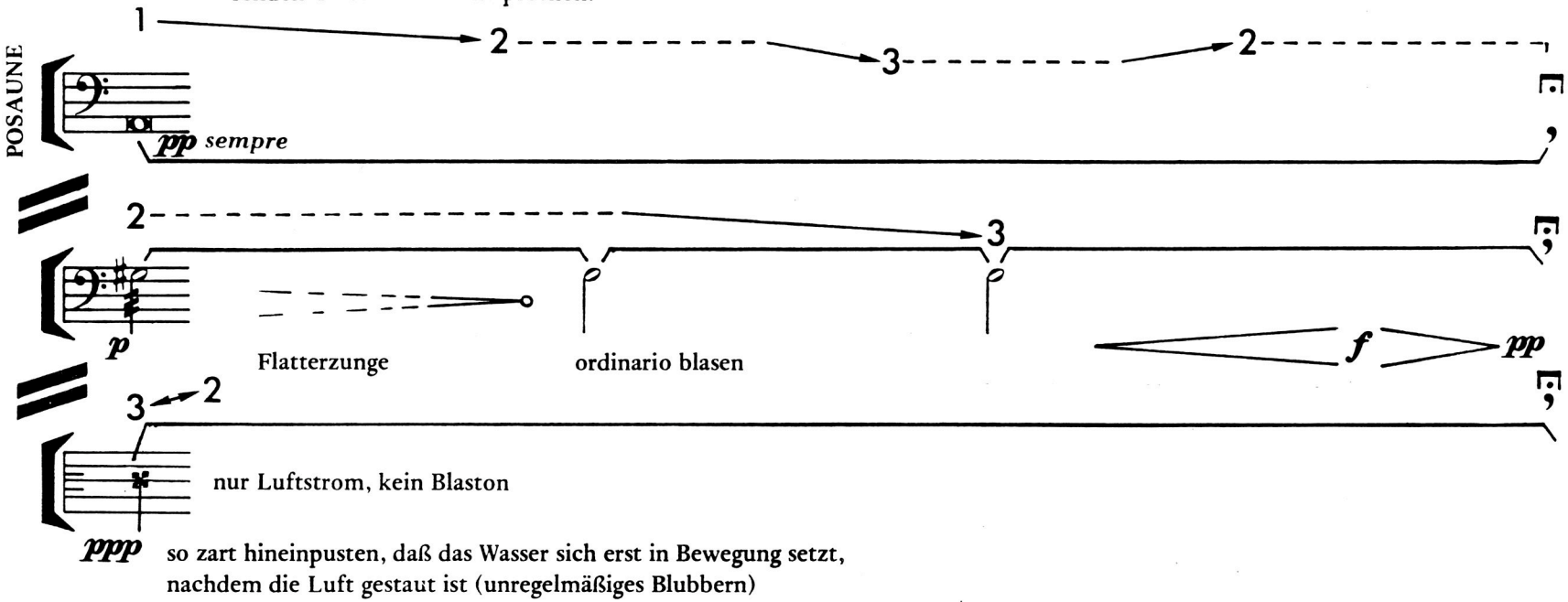
** *Die Kante der Papierseite wird mit je zwei Fingern zwischen den Lippen gehalten. Zur Produktion unterschiedlich starker Tonverzerrung ist der Abstand zwischen den Händen zu verändern ().*

Mauricio Kagel: *Acustica* (1969-70)





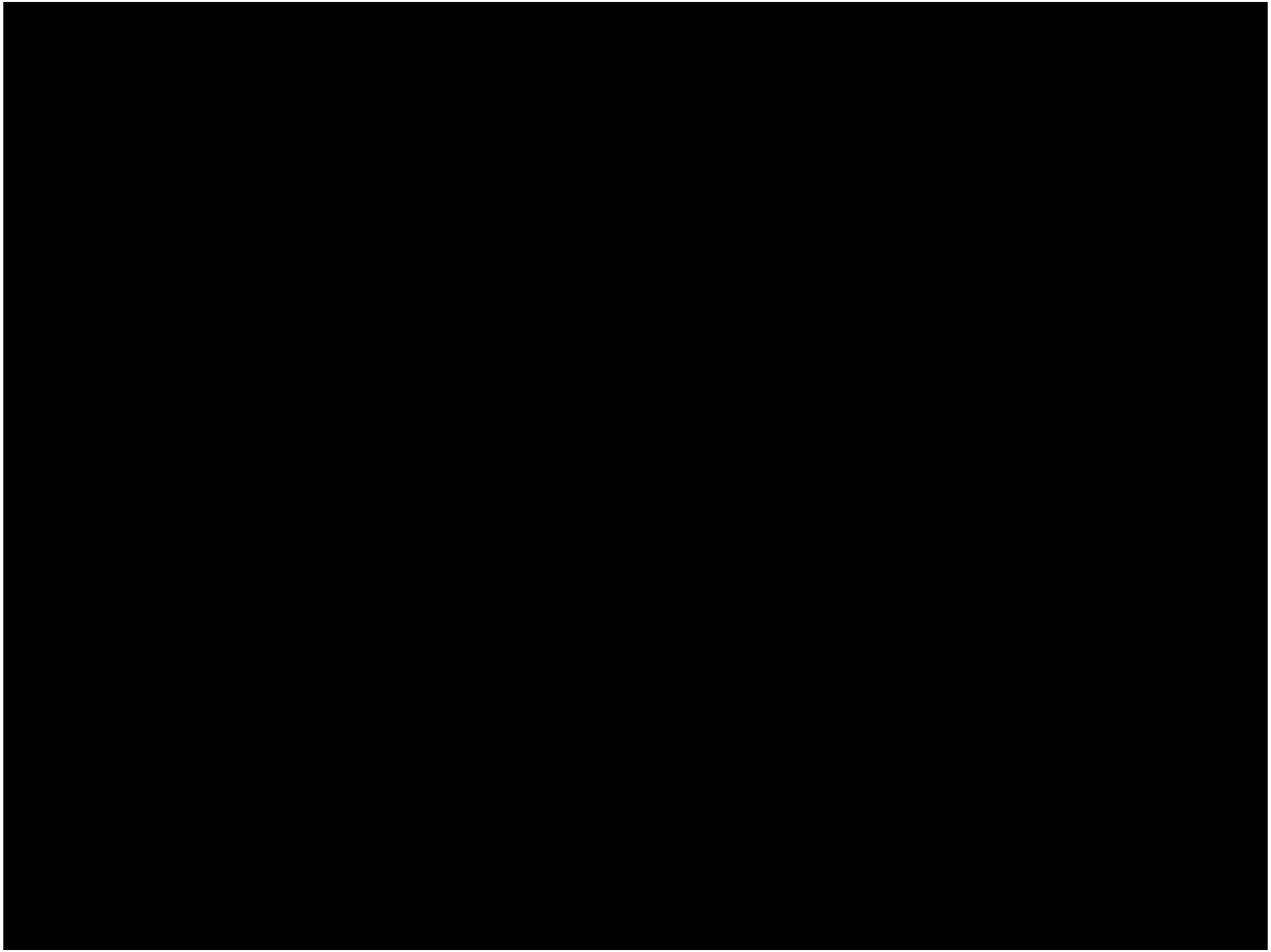
gekrümmtes Plastikrohr (≈ 6 cm) fest in das Schallstück einpassen: die angegebenen Tonhöhen werden den resultierenden Tönen kaum entsprechen.



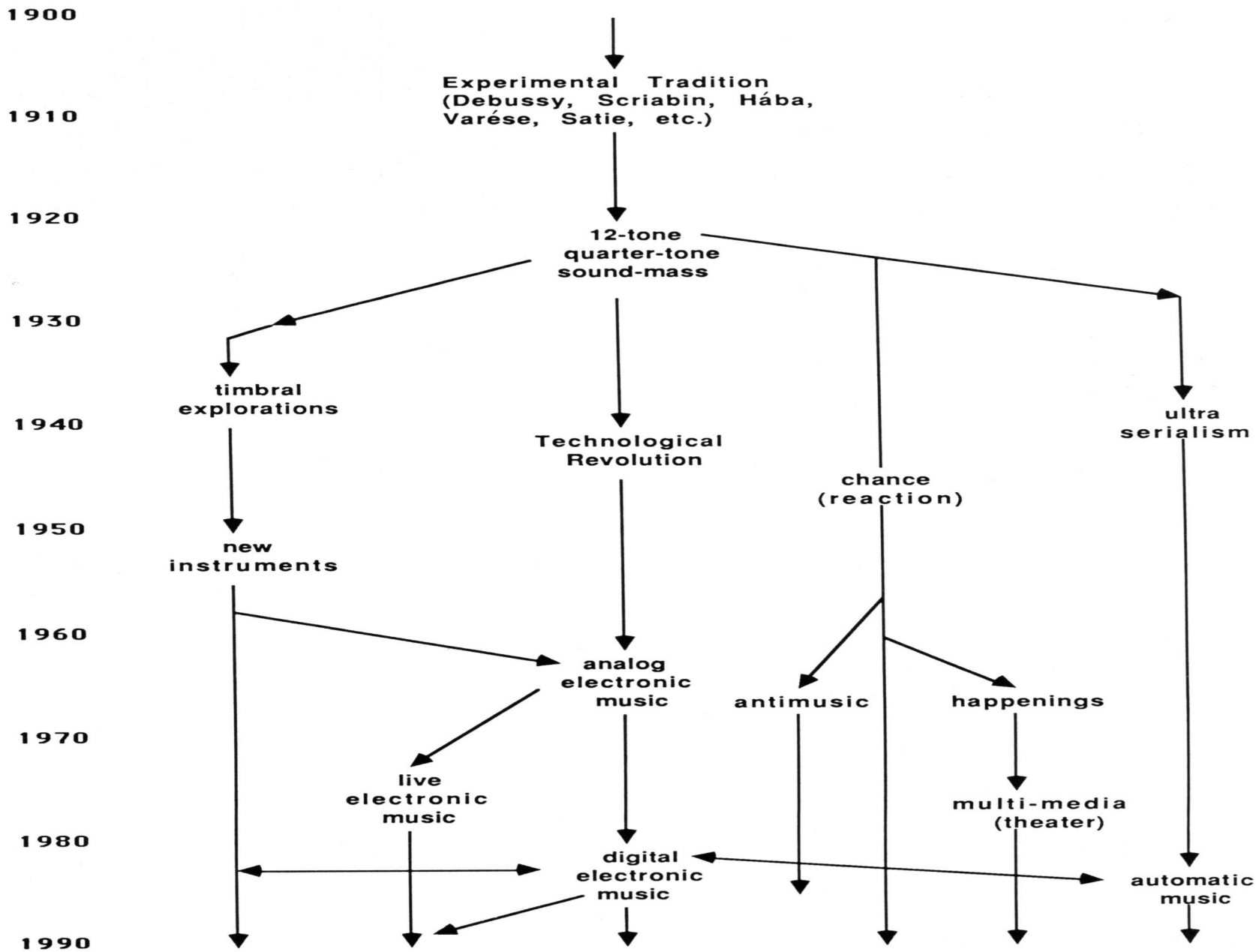
- Holds degrees in Art History (Mils College) and Sculpture (Barnard College).
- Active as a performance artist based in New York City during the 1970s.
- Her work combines music, dance, video, lighting, costumes, and technology.
- Crosses genres between “art” music and “popular” music.

Laurie Anderson (b. 1943)

- Among her inventions is the tape-bow violin
- Associations with William S. Burroughs, Lou Reed, Peter Gabriel, John Cage, Brian Eno, Bobby McFerrin, Philip Glass, Hunter S. Thompson, and many others.
- Her popular culture breakthrough came with the release of “O Superman”—part of the stage work *United States* (and released on the album *Big Science*); this single reached #2 on the UK charts.



Avant-Garde Mobile

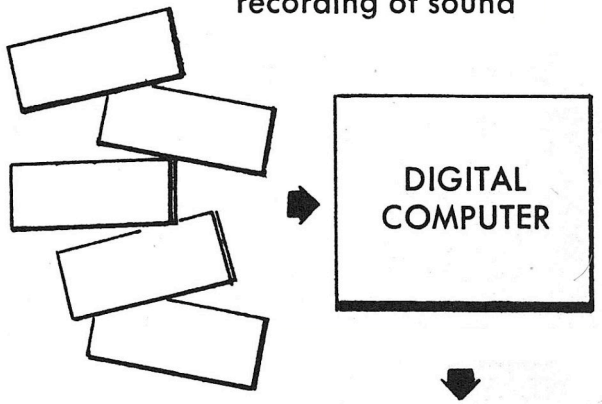


From David Cope, *New Directions in Music*

PROGRAM CARDS
general instructions for generating sequences of numbers specifying sounds

"INSTRUMENT" CARDS
particular instructions for wave form, attack, vibrato, tremolo, etc.

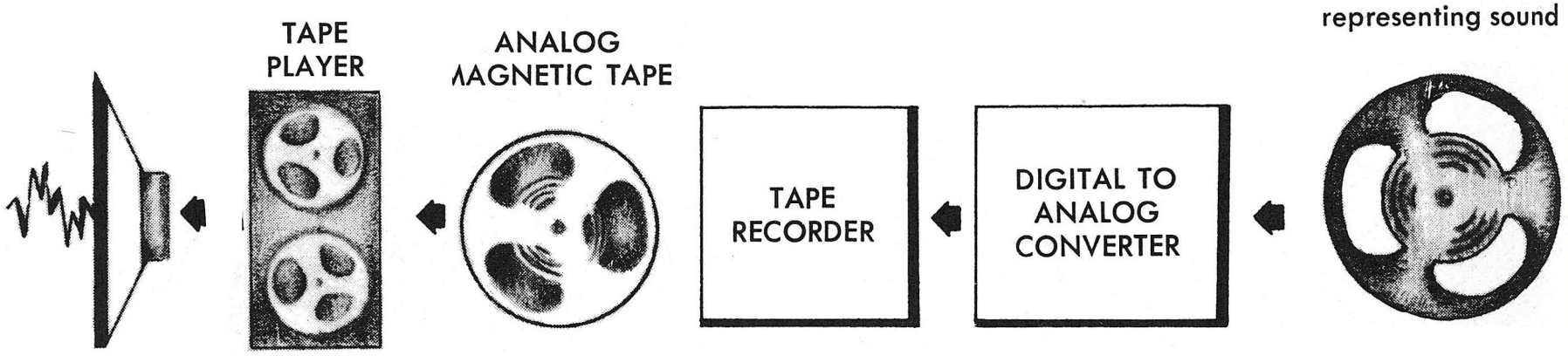
"NOTE" CARDS
"notes" or sequences of pitch, amplitude, duration, or rate of change of sounds that the "instruments" play



recording of sound

DIGITAL
MAGNETIC TAPE
recording of sequence
of numbers
representing sound

GENERATION OF COMPUTER MUSIC



Computer Music Diagram from Bell Laboratories