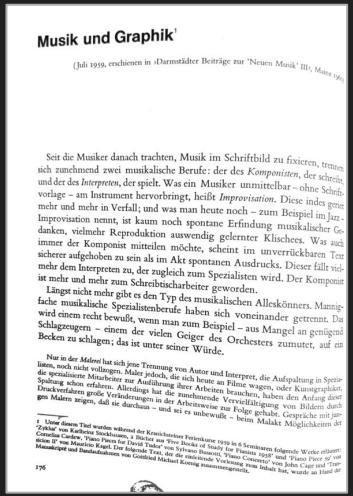


# Theorizing Notation: Darmstadt, 1959 – 1965

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# Two fledgling notation theorists:

„Musik und Grafik“ (1959)



**Musik und Graphik<sup>1</sup>**

(Juli 1959, erschienen in „Darmstädter Beiträge zur ‘Neuen Musik’“ III, Mainz 1960)

Seit die Musiker danach trachten, Musik im Schriftbild zu fixieren, traten sie in zwei verschiedene musikalische Berufe: der des Komponisten, des schreibenden und des darstellenden Künstlers. Was ein Musiker unmittelbar – ohne Vorlage – am Instrument kreiert, heißt *Improvisation*. Diese indus geht mehr und mehr in Verfall; und was man heute noch – zum Beispiel im Jazz – Improvisation nennt, ist kaum noch spezielle Erfindung musikalischer Gedanken, vielmehr Reproduktion auswändig gelernten Klischeses. Was auch immer der Komponist mitteln möchte, scheint im unerschöpflichen Tres sicherer aufgehoben zu sein als im Akt spontaner Anschauung. Dieser Fall verleiht dem Interpreten zu, der zugleich zum Spezialisten wird. Der Komponist ist zum Schreibschriftarbeiter geworden.

Längst nicht mehr gibt es den Typ des musikalischen Altekkämers. Manngliche musikalische Berufsberufe haben sich voneinander getrennt. Das Schlagzeugen – eines der vielen Geiger des Orchesters zunutze, auf ein Becken schlagen; das ist unter seiner Würde.

Nur in der Medien hat sich eine Trennung von Autor und Interprett, die Aufstellung in Spezialberufe und die Musizierer zur Ausdrucks- und zur Ausführungsberufe getrennt. Die Spaltung schafft Arbeit, die sich heute an Filmkomponisten, haben den Anfang dieser Druckverfahren große Veränderungen in Arbeitsweise zur Folge. Die Verarbeitung von Bildern durch Maler zeigen, daß sie durchaus – und sei es unterwühlt – dem Malerei Möglichkeiten für

<sup>1</sup> Über diese Thet werden während der Konkurrenz-Festivale 1959 in 8 Seminaren folgende Werke erläutert: „Zwei Klänge“ Stockhausen & Becker am Tag der Studie für Klavier, „Schallstudie“ von Hans-Peter Pfeiffer, „Szenen“ von Cornelius Cardew, „Musik für eine geistige Praxis“ von John Cage, „Tage der Tanz“ von John Cage, „Tage der Tanz“ von John Cage, „Musik für einen kleinen Frieden“ von Gottfried Michael Koenig ausgestrahlt.

Stockhausen, Karlheinz. 1963. “Musik und Graphik” In *Texte zur Musik 1*, edited by Dieter Schnebel, 176–88. Köln: DuMont Buchverlag.

„Neue Notation — Kommunikationsmittel oder Selbstzweck?“ (1965)



**„Neue Notation – Kommunikationsmittel oder Selbstzweck?“**

Die *Notation* – oder – im Titel im eigentlich keine ausschließende, Philosophie, und besonders gleichzeitig anschauliche und in der Geschichte sich verteilende – wie gerade Zeichensysteme – sind immer mehrfach und lassen verschiedene, reibungsreicher bestehende gültige Interpretationen zu. Noch weniger ist die *Notation* als Mittel der Kommunikation und Selbstzweck, seien je nachdem, in welchen Kontext man sie betrachtet.

Eine Analoge Verbindungsmittel und Belehrmethoden und eine Liederbuch ist ein Beispiel. Keineswegs aber ist die *Notation* eine Liederbuch und Lichtreklamen ergibt aber außerdem, in Zusammenhang, das Liedmuster einer Gedächtnisschule und so weiter. Es ist also kein Problem, die Bedeutung des einzelnen Liederbuches aus dem Bewußten zurückziehen ließ.

Wenn aber selbst so einfache Systeme nicht nur als pure Zeichen, sondern auch als *Signifikanten* (die Zeichen, die auf einen Sachverhalt hinweisen), um welche könnte dann komplexere Zeichensysteme wie Schriften, Sprachen und musikalische Notations mehrfach erachten.

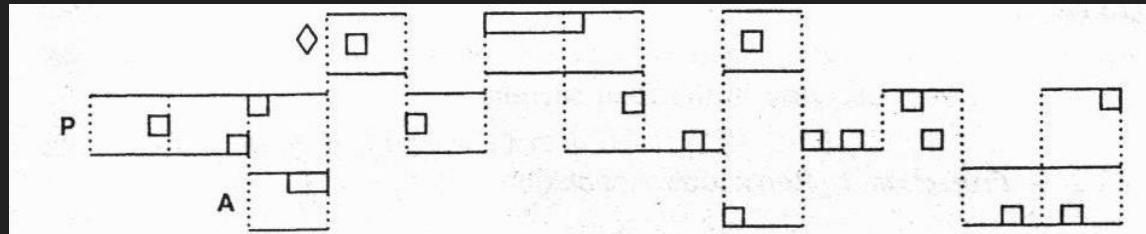
Es gilt zu klären, was »musikalische Graphik« ist, da diese Bezeichnung, und der Begriff »Schall, häufig missverstanden werden, ist nicht nützlich. Wie bekannt, scheinen exakte Definitionen oft dazu, daß bis in der Geschichte sich wahrnehmbar ist, was die Begriffe ausdrücken. Aber es kann nicht anders sein, als daß ein Begriff, der nur mit einem anderen Begriff definiert wird und auf den Rahmen der Definition beschränkt ist, wie ein Fisch an dem Netz. Dennoch kann man davon Phänomene »musikalische Graphik« mit Konsistenz unterscheiden.

Ganz allgemein betrachtet ist jede Art musikalischer Notation eigentlich »graphisch« – auch die traditionale, handelt es sich doch um visuelle Zeichen. Bei sonstigen Zeichen spricht man nicht von »Graphik«, sondern von »Konfigurationen« an sich handelt, die nicht ein Zeichensystem bildet, sondern eine »Zeichen«. Eine Zeichen ist eine Zeichen, die nicht ein Zeichen ist, ein Haus erkennen läßt. »Werden« nicht das Haus, sondern ist Abbildung, Darstellung des Hauses. Das geschriebene Wort »Haus« ist indessen keine Zeichen, sondern ein Zeichen, es stellt nicht das Haus dar, sondern bedeutet »Haus«.

Wenigstens eine »musikalische Graphik« prima »Graphik« ist, hat sie keine graphische »Bedeutung«, doch kann sie musikalische Sachverhalte darstellen. 170

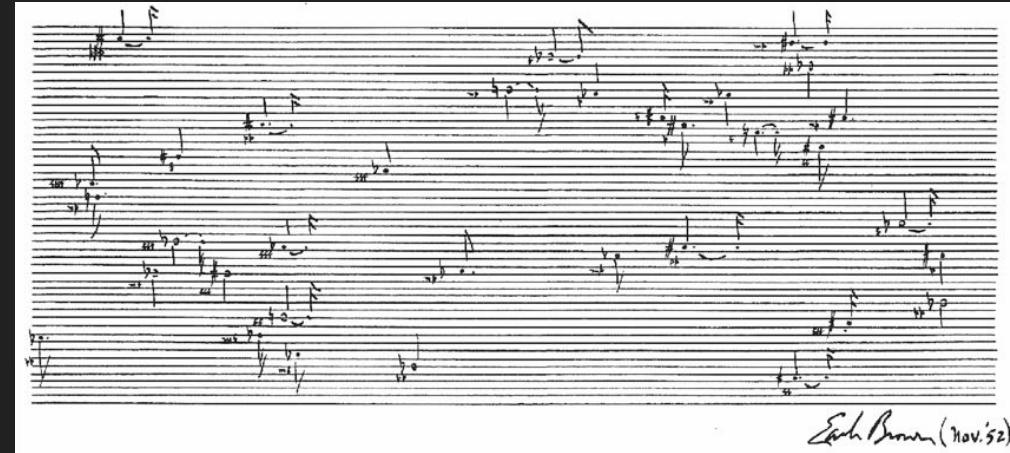
Ligeti, György. 1965. „Neue Notation — Kommunikationsmittel oder Selbstzweck?“ In *Notation Neuer Musik (Darmstädter Beiträge zur Neuen Musik 9)*, edited by Ernst Thomas, 175–84. Mainz: Schott.

# The first wave of new notations:



Morton Feldman — *Projection 1* (1950), p. 1.

Earle Brown — *November 1952* from  
*FOLIO and 4 SYSTEMS* (1952–4)



...and the European response:

7 vedi NOTE

**XIV piano piece for David Tudor 4**  
disegno del 1949  
adozione pianistica: 27.3.1959

1 { S  
M  
P

2 Battuto Muto Gergio Tattica

3 sequenza frequenza timbro durata intensità

4 u # il piano  
dentro il piano

5 ( )

6 }

Sylvano Bussotti — *Five Piano Pieces for David Tudor* (1959), No. 4.

Questions for a robust "notation theory":

What does notation *represent*?

Must notation reference *sound*?

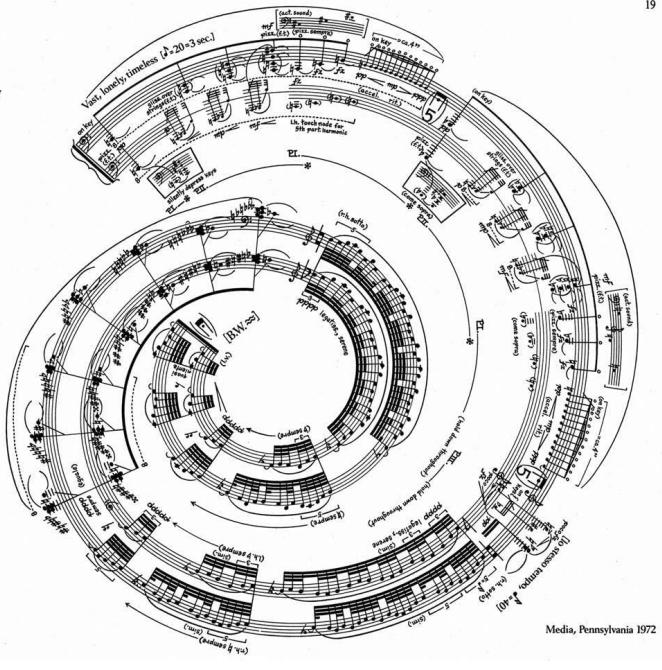
Must notation be a *code*?

Is any *inscription* a *notation*?

*Graphic notation*: revolution or evolution?

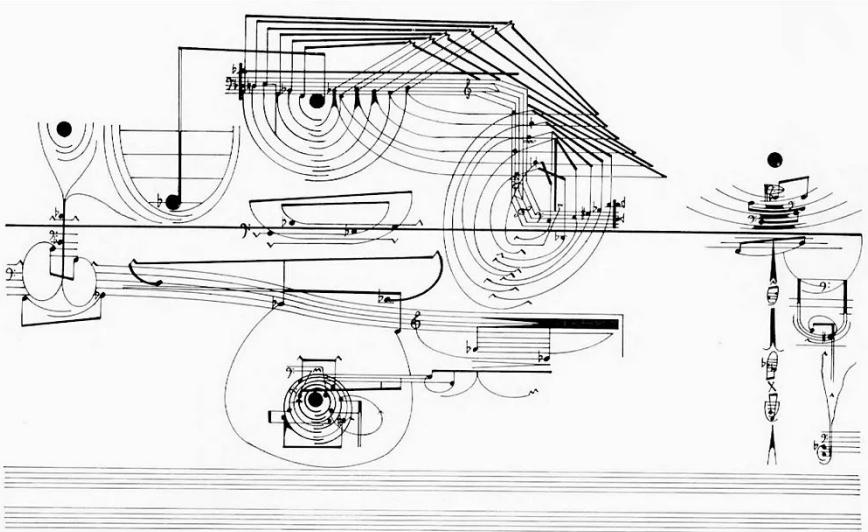
# "Graphic" notation?

12. Spiral Galaxy  
[SYMBOL]  
[Aquarius]



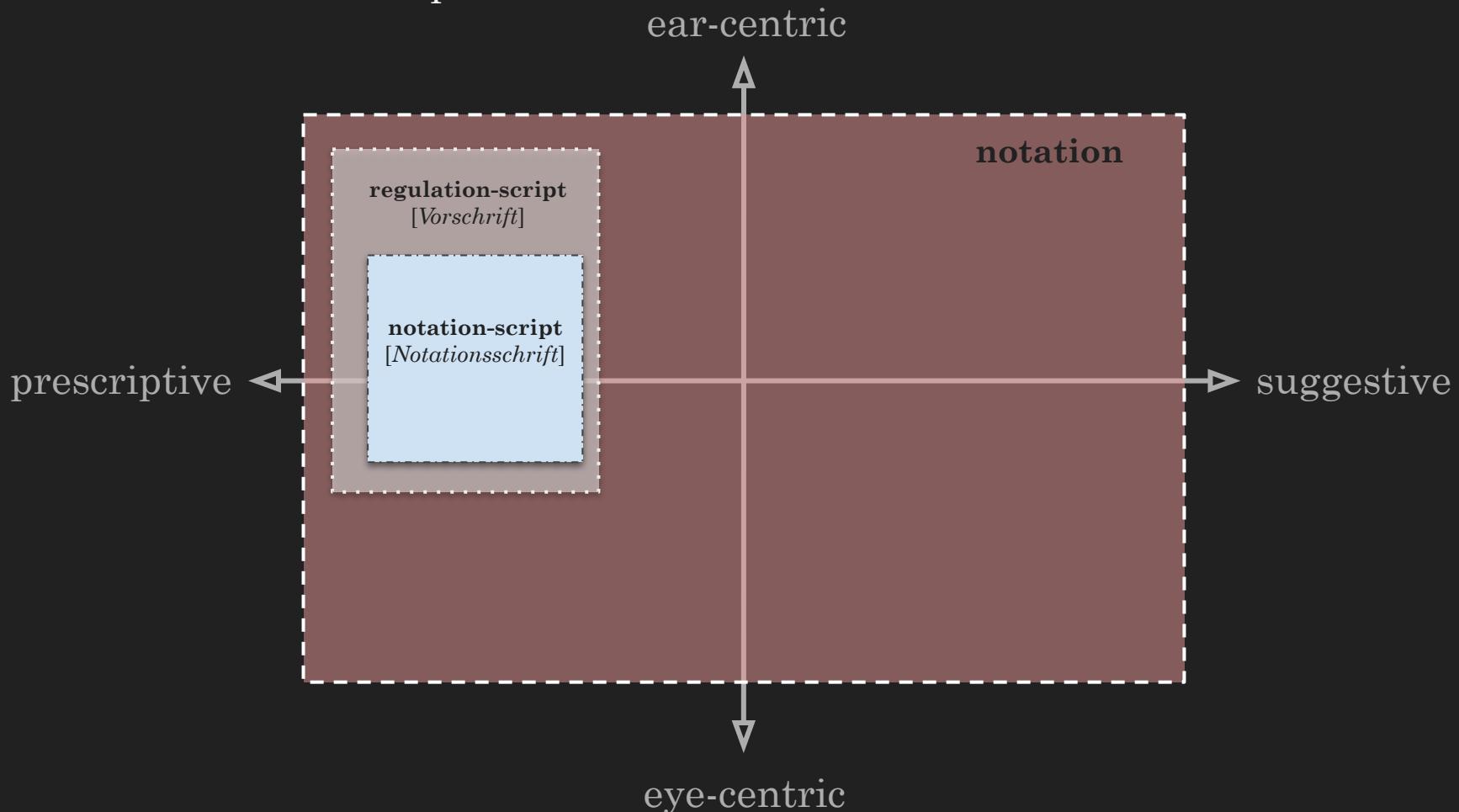
19

Cornelius Cardew — *Treatise* (1963–7), p. 183.

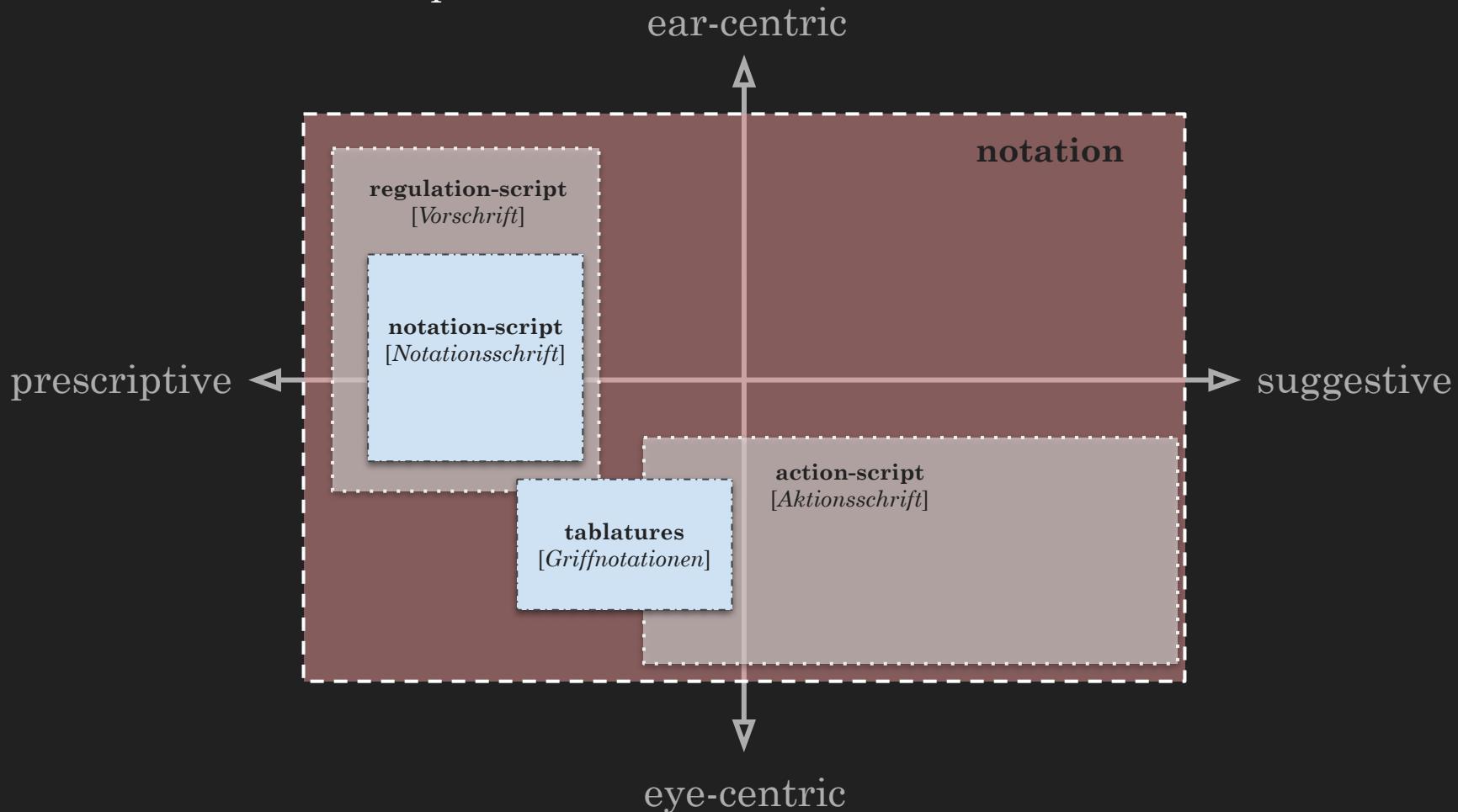


183

# Stockhausen's notational poles:



# Stockhausen's notational poles:



# Twentieth-century action-script:

denotes physical  
gesture via spatial  
metaphor



graphicality no longer  
incidental to function

denotes physical gesture via spatial metaphor

graphicality no longer incidental to function

95.

96.

I

II

B<sub>v</sub>

C

(v) linke Zunge

f' (faust)

nach Zunge

f' (faust)

sempre faust

Seite(n) hinzu Steg dampfen mit linker Hand

nach und nach immer näher zum Seitenheller

dolcissimo

arco flaut auf Saitenknorpel (watt...)

PPP (präzisches Gerütteln)

Beigedrückt klapp rechte Hand leicht umklappen

97.

98.

- 9 -

97.

98.

I

II

B<sub>v</sub>

C

immer höher zum Seitenheller →

unhebbare weiter,schreiben, gelegentlich höhbar werden (→ ←)

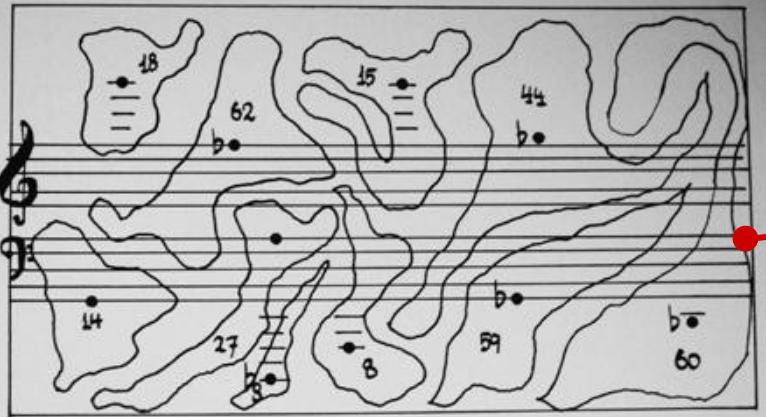
nach am Seitenheller

Richtung Seitenheller →

PPP (dram.)

PPP (faust)

Draft-script [*Entwurfsschrift*]:



non-prescriptive graphicity,  
presents an "idea" of some  
performance practice

J. Cage — *Concert for Piano and Orchestra* (1958), module T.

Vb piano piece for David Tudor 1  
(Tutto nell'orbita del pp, sempre)

1

MD

MS

2

15"

MD

E<sup>2</sup>

F<sub>1</sub>

G<sub>4</sub>

3

MS

(gliss.)

MD

B<sup>5</sup>

C<sub>4</sub>

30"

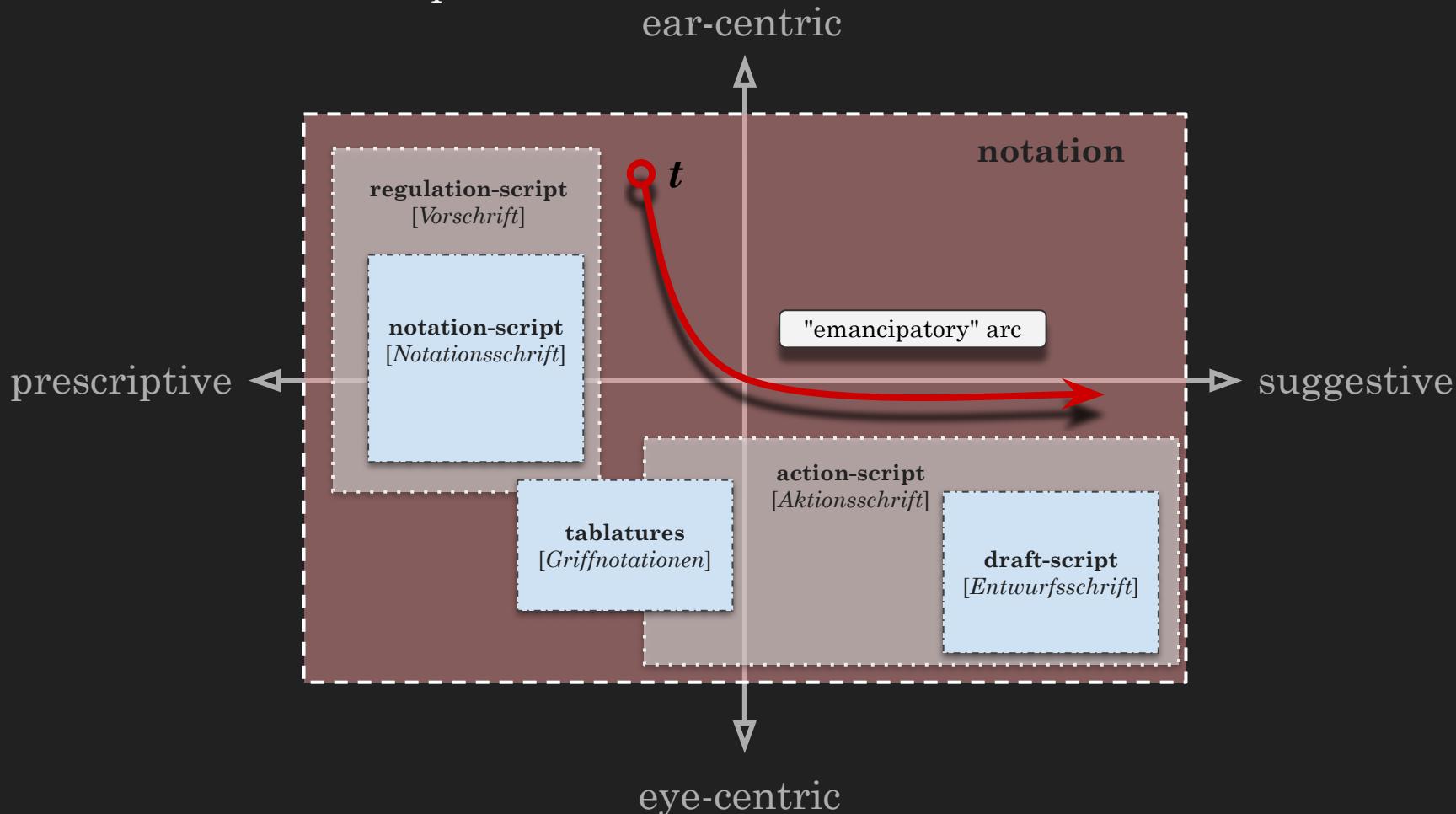
45"

1.5.1959

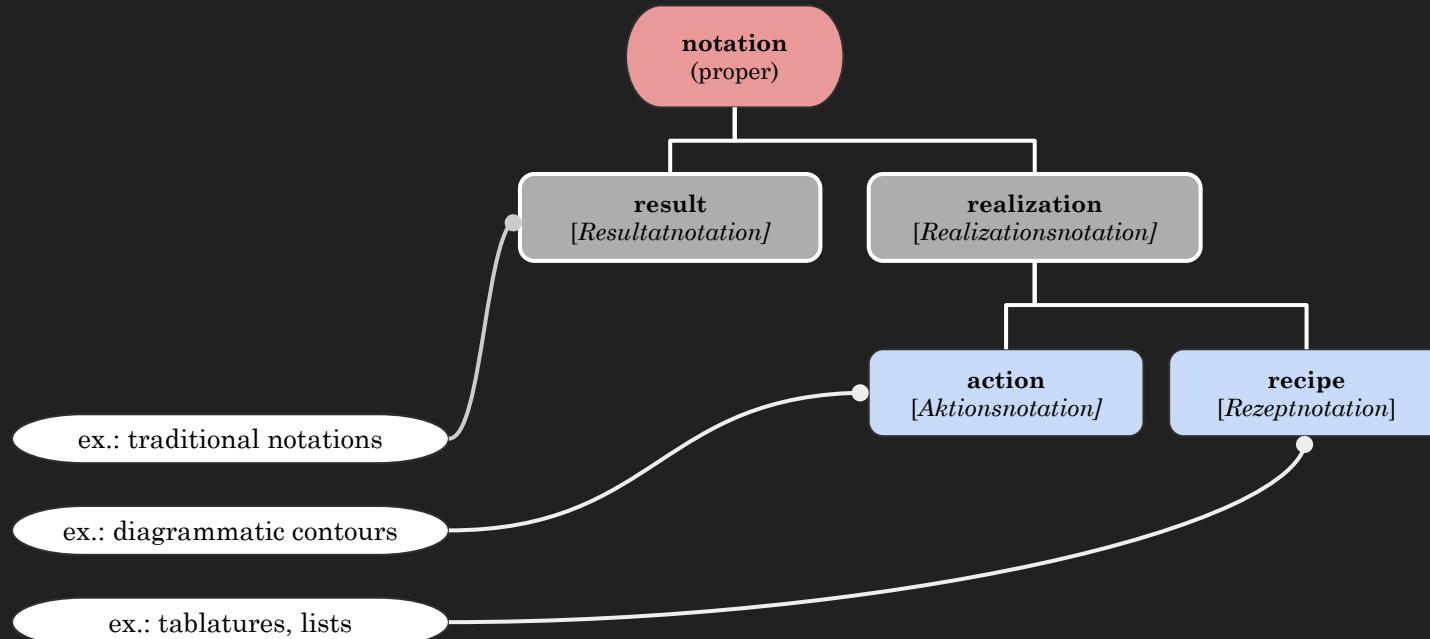
This is a complex non-prescriptive graphical score for piano by Salvatore Bussotti, titled 'Vb piano piece for David Tudor 1'. The score is divided into three systems (1, 2, 3) and spans 30 minutes. It uses a variety of symbols and markings, including MD, MS, and specific letter and number labels like C4, G4, E2, F1, and B5. Measure times are indicated as 15", 30", and 45". A red dot on the right side of the score points to a callout bubble.

S. Bussotti — *Five Piano Pieces for David Tudor* (1959), No. 1.

# Stockhausen's notational poles:



# Ligeti's notation typology:



# Ligeti's types *in situ*:

result

action

recipe

The image shows a page from Mauricio Kagel's score for 'Improvisation Ajoutée'. The score is a multi-layered musical score with five staves, each containing complex rhythmic patterns and microtonal notation. Red arrows point from three labels to specific features in the music:

- A red arrow labeled "result" points to a section of the score where several vertical columns of notes are grouped together by brackets, representing a resulting musical texture.
- A red arrow labeled "action" points to another section where specific note heads are circled or highlighted, indicating a particular action or performance technique.
- A red arrow labeled "recipe" points to a section at the bottom of the page where a single note is circled and labeled 'W', with a bracket above it labeled 'SINGEN'.

Annotations in the score include:

- Handwritten markings like 'A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y', 'Z' placed above certain notes.
- Textual instructions such as 'sehr unregelmäßig' (very irregularly), 'GA', 'GK', 'GK', 'glücklich', 'HUTEN', and 'Töne bis zum nächsten Anschlag abheben'.
- Technical markings like 'Auch für linke Hand' (also for left hand) and 'Beim Anschlag der Anfangs der Takte der Akzente R.X mit den Unteren und oberen Stimmen'.

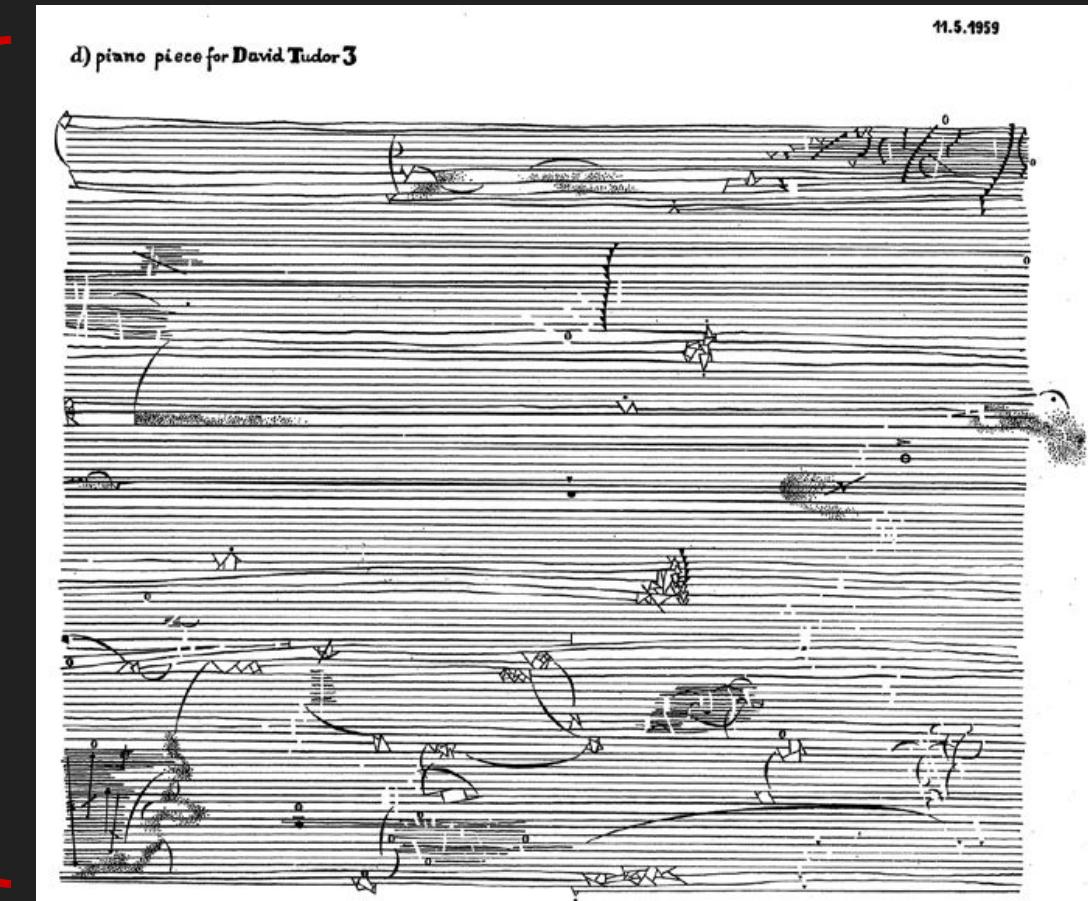
# Ligeti's graphics (narrowly-defined):

result

action

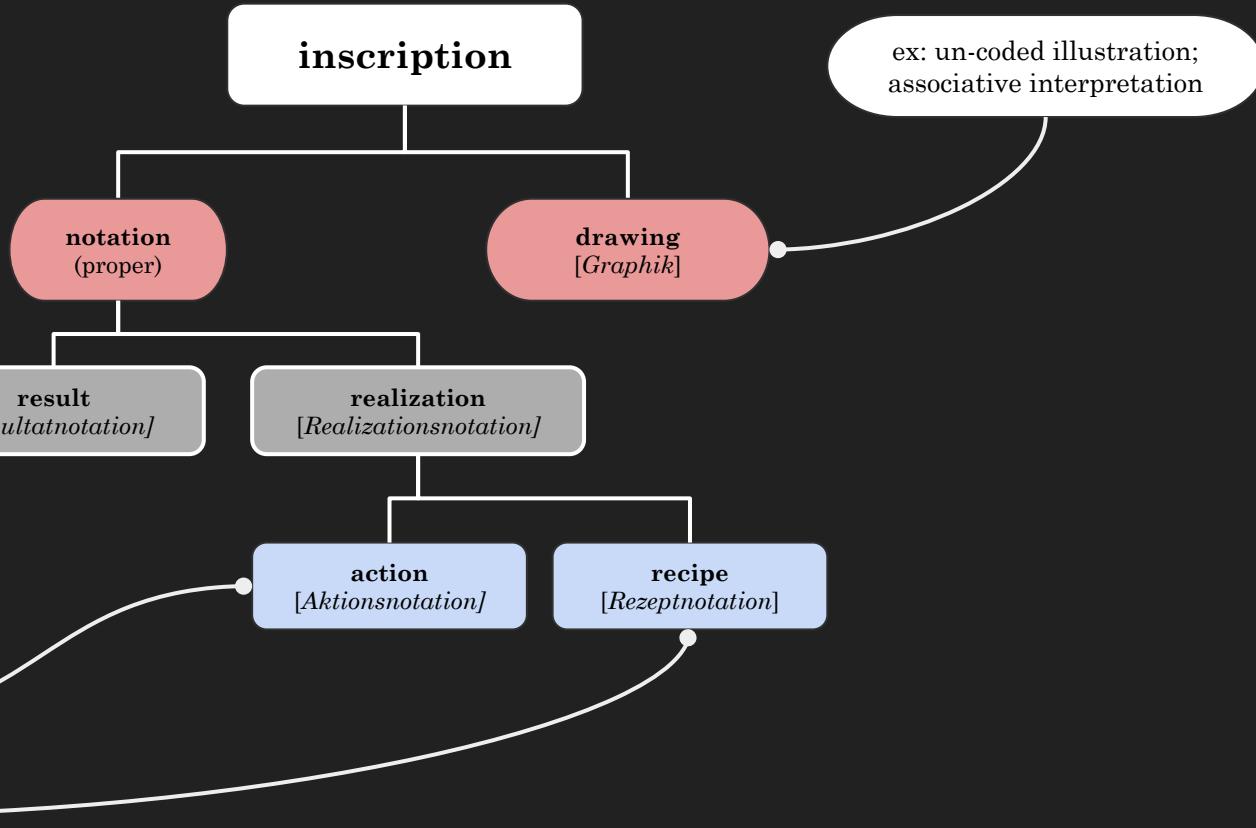
recipe

asemantic

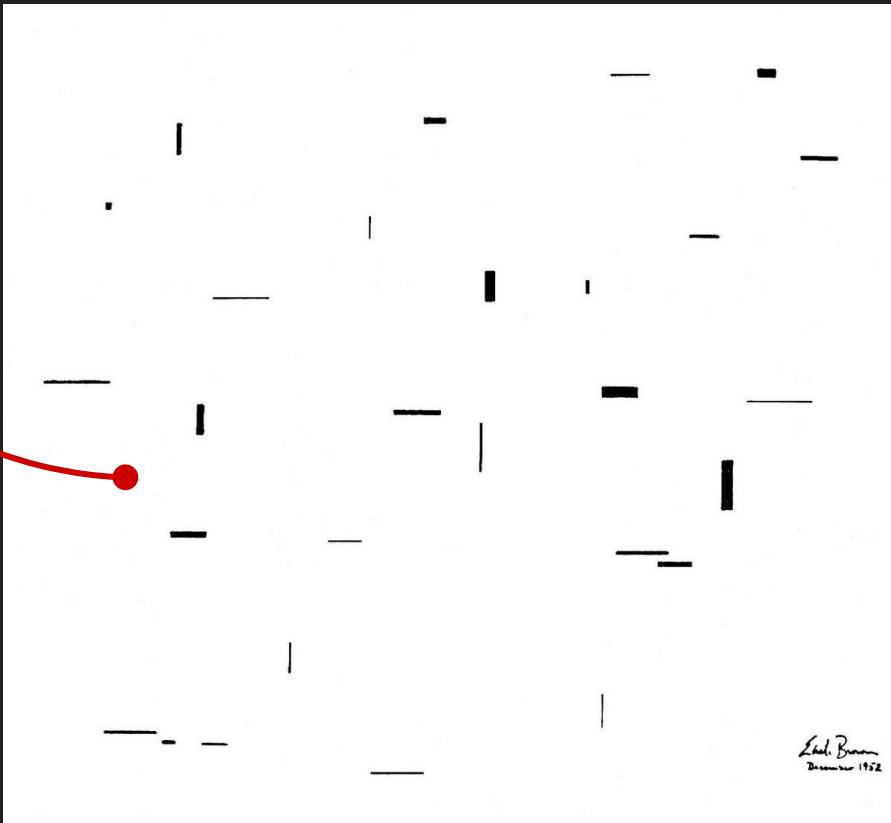


Sylvano Bussotti — *Five Piano Pieces for David Tudor* (1959), No. 3.

# Ligeti's notation typology (cont'd):



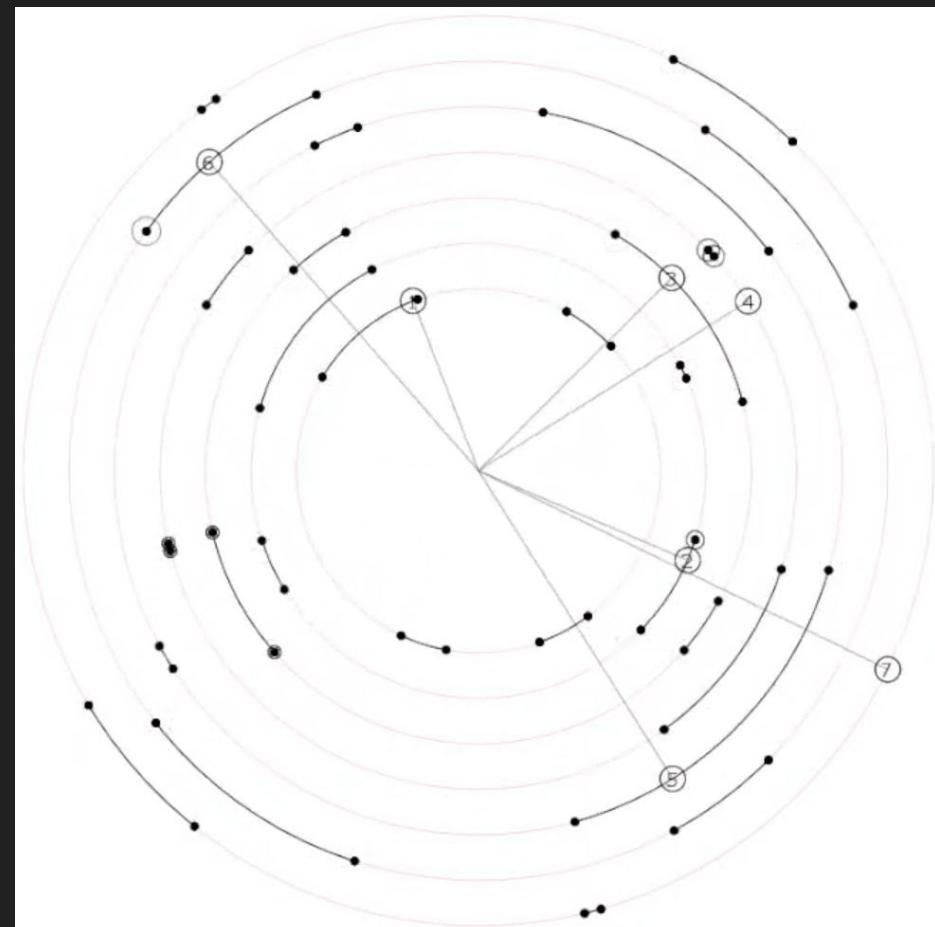
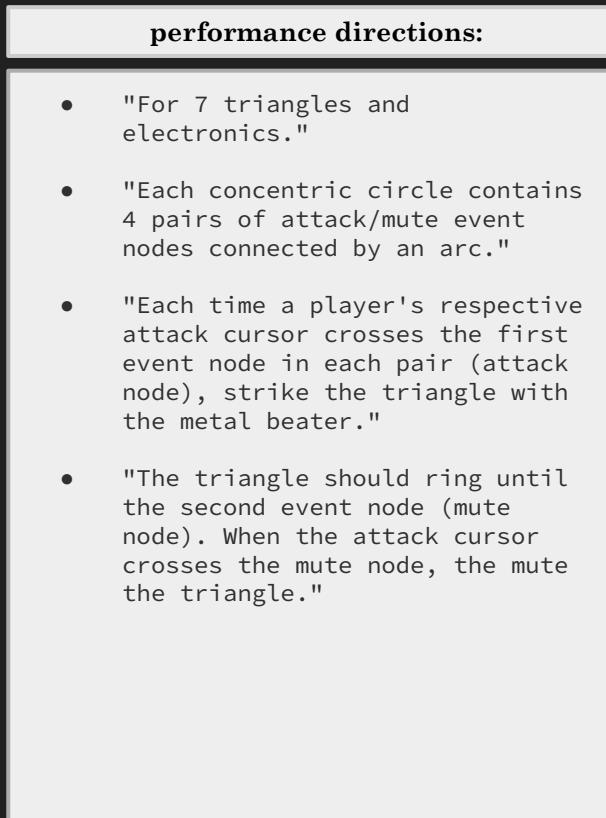
# Mixed forms [*Mischformen*]:



## performance directions:

- "[coefficient of] intensity and duration [is] space forward and back."
- "...may be performed in any direction from any point in the defined space..."
- "In a performance utilizing only three dimensions ... the thickness of the event indicate the relative intensity and/or ... clusters."
- "Where all four dimensions are active ... relative thickness and length of events are functions of their conceptual position on a plane perpendicular to the vertical and horizontal plane to the score."
- "**It is primarily intended that ... no further preliminary defining of the events, other than an agreement as to total performance time, take place.**"

# "Vividly descriptive result notation":



# S/L overview:

*Stockhausen, 1959:*

Emphasis on **visual trace**.

Emphasis on **unity** of form/function.

Notation moves historically **toward performer liberation, eye-centricity**.

**The graphic is notation** which composes space rather than time.

Reading and "gazing" folded into **one communicative gesture/mode of engagement**.

*Ligeti, 1965:*

Emphasis on **semanticity**.

Emphasis on **duality** of form/function.

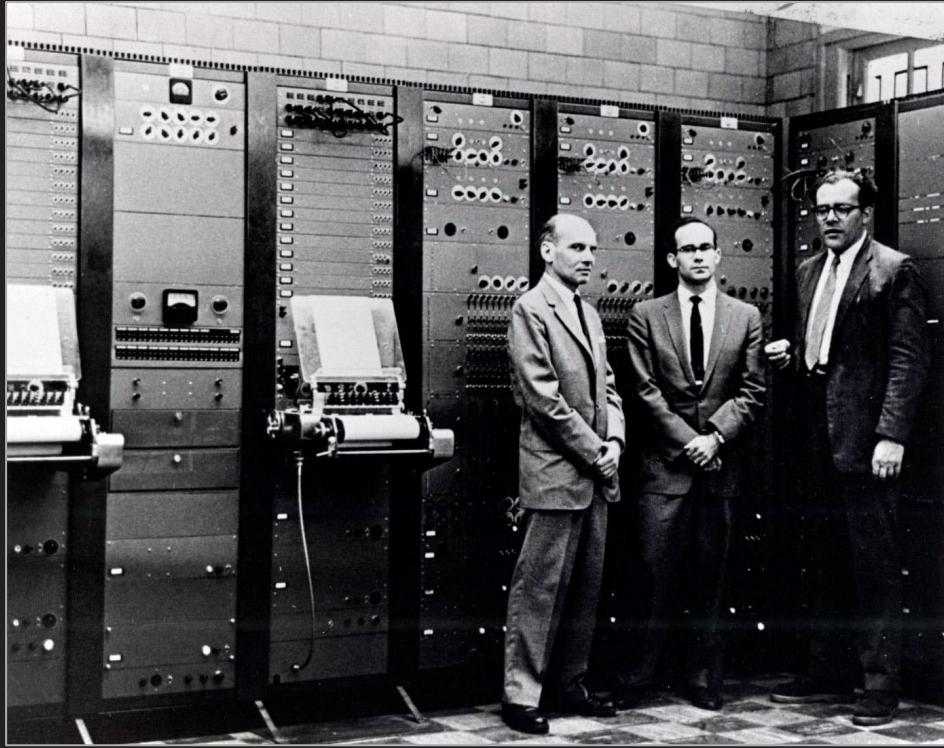
Notation is chosen to **fulfill users' needs** throughout history.

The graphic is by definition **anti-notation**.

Reading is communicative; graphic "translation" is purely associative.

**Two modes of engagement.**

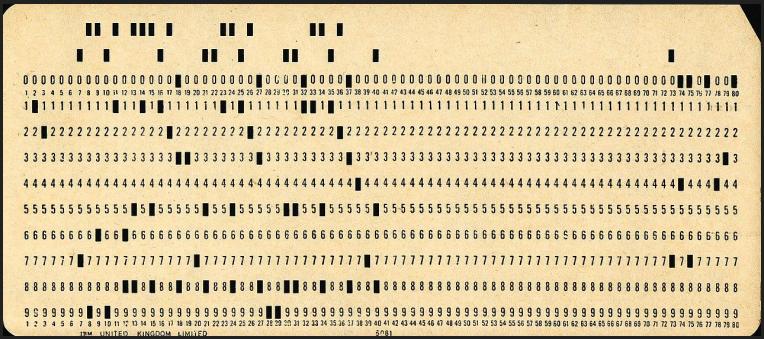
Punch card notation?:



RCA Mark II Synthesizer, Princeton (1958) and generic punch card.

Polysemous, therefore  
nonrepresentational?

Translatable, therefore  
representational?



# Per-module instructions provided with Cage's *Concert*:

**B**

**PIANO**  
EACH PAGE IS ONE SYSTEM FOR A SINGLE PIANIST TO BE PLAYED WITH OR WITHOUT ANY OR ALL PARTS WRITTEN FOR ORCHESTRAL INSTRUMENTS. THE WHOLE IS TO BE TAKEN AS A BODY OF MATERIAL PRESENTABLE AT ANY POINT BETWEEN MINIMUM (NOTHING PLAYED) AND MAXIMUM (EVERYTHING PLAYED), BOTH HORIZONTALLY AND VERTICALLY: A PROGRAM MADE WITHIN A DETERMINED LENGTH OF TIME (TO BE ALTERED BY A CONDUCTOR, WHEN THERE IS ONE) MAY INVOLVE ANY READING, I.E., ANY SEQUENCE OF PARTS OR PARTS THEREOF.

**A** FOLLOWING THE PERIMETER, FROM ANY NOTE ON IT, PLAY IN OPPOSITE DIRECTIONS IN THE PROPORTION GIVEN. HERE AND ELSEWHERE, THE ABSENCE OF INDICATIONS OF ANY KIND MEANS FREEDOM FOR THE PERFORMER IN THAT REGARD.

**B** AN AGGREGATE MUST BE PLAYED AS A SINGLE ROW. WHERE THIS IS IMPOSSIBLE, THE UNPLAYABLE NOTES SHALL BE TAKEN AS HARMONICS PREPARED IN ADVANCE. HARMONICS MAY ALSO BE PRODUCED WHERE THEY ARE NOT SO REQUIRED. RESONANCES, BOTH OF AGGREGATES AND INDIVIDUAL NOTES OF THEM, MAY BE FREE IN LENGTH. OVERLAPPING, INTERBREATHINGS, ARE ALSO FREE. THE SINGLE STAFF IS PROVIDED WITH 2 CLEF SIGNS, WHILE THESE DIFFER, AMBIGUITY EXISTS IN THE PROPORTION INDICATED BY THE 2 NUMBERS ABOVE THE AGGREGATE. THE FIRST OF THESE APPLIES TO THE CLEF SIGN ABOVE THE STAFF. AN AMK IN A RECTANGLE ABOVE A BAR OF NOTES INDICATES A CHROMATIC CLUSTER.

**C** M = MUTE. P = PIZZ. ALL SINGLE TONES.

**D** LIKE B, BUT WITH VERTICAL ARREGGATION AND TIME TENDENCIES MAKING USE OF HARMONICS UNNECESSARY. THE ARREGGATION IS INDICATED BY DOUBLE ARROWS ACCOMPANIED BY A SERIES OF NUMBERS. THE SIGN ♫, I, I MEANS 1 NOTE IN THE MIDDLE FOLLOWED BY 1 NOTE HIGHER OR LOWER, FOLLOWED BY 1 NOTE LOWER IF THE 2ND WAS HIGHER, HIGHER IF THE 2ND WAS LOWER. ♪, 2, I MEANS TWO NOTES OF WHICH AT LEAST 1 IS THE HIGHEST OF THE THREE FOLLOWED BY A THIRD LOWER NOTE.

THE HORIZONTAL ARROWS REFER TO TIME AND THE TENDENCY OF THE NOTES TO SOUND SOONER, LATER, OR AT THE POINT OF NOTATION.

**E** PLAY WITH HANDS INDICATED, WHERE CLEFS Differ, A NOTE IS EITHER BASS OR TREBLE. THE NOTES HAVING A SINGLE STEM ARE TO BE ARPEGGIATED (UP OR DOWN). PLAY NOTATIONS FROM LEFT TO RIGHT.

**F** NUMBERS ARE READS IN OTHER TIME UNITS.

**G** OF NOTES WRITTEN PLAY NUMBER GIVEN IN ANY MANIER (KEYS/HARD) BEGINNING AND ENDING AS INDICATED BY ARROW. DYNAMIC INDICATIONS ACCOMPANY EACH CIRCLE, ON THE OCUMPERENCE OF WHICH THE NOTES ARE PLACED. (SCALE  $\frac{1}{16}$ - $\frac{1}{16}$ )

**H** ANY ONE OF THESE AS IN C, OR ANY NUMBER (BUT INCLUDING ALL) IN SEQUENCE, MAINTAINING, IN THE LATTER CASE, THE CLEF SIGN OF THE ONE FIRST PLAYED.

**I** PIZZ, WHERE INDICATED, A SINGLE TONE. INTERVAL OR A 3 NOTE AGGREGATE, REAPPEARANCES OF TONES TO BE PLAYED AS ORIGINALLY. NUMBERS ARE OF NOTES TO BE PLAYED BETWEEN LIMITS CONNECTED BY LINES. ARROWS INDICATE DIRECTION IN SPACE TIME BACKWARDS AND FORWARDS. A STRAIGHT LINE ABOVE A NUMBER MEANS ASCENDING OR DESCENDING GAIT. NV MEANS ASCENDING AND DESCENDING. DISREGARD TIME, PLAY ONLY 1 OR EVEN NUMBER OF NOTES IN A PERFORMANCE, USING OTHERS OF A GIVEN 3, 4, 5 OR 6 SIDED FIGURE AS GRACES OR PUNCTUATIONS.

**J** PLAY FROM LEFT TO RIGHT WITH HANDS INDICATED. CLEF AMBIGUITY AS IN B. PERIMETERS WERE COMPOSING MEANS AND DO NOT HERE AFFECT TIME AS THEY DO IN A.

**M** BEGIN AT LEFT END STRAIGHT, CHANGES DIRECTION AT INTERSECTIONS IF DESIRED, MAY BE EXPRESSED AS ONE VOICE, A COUNTERPOINT, OR AS 3 OR 4 VOICES. PEDALS ONLY IN AREAS INDICATED, NOT OBLIGATORY. U.PED. L.U.PED. SUSTENUTO.

**N** LIKE I, BUT WITH VARYING DYNAMICS. SUSTENUTO PEDAL GIVEN.

**O** AUDIBLE AS CHORDS, LINES, ARREGGATIONS AS IND BTW FREE ETC) ONLY BETWEEN HORIZONTAL LINES. PEDALS AS IN M.

**P** ANY NOISES (INCLUDING AUXILIARY), DYNAMICS OF WHICH ARE NOTATED.

Q LIKE M, BUT IN TIME (ANY UNITS); GOING BACK IN TIME HEED FOR INCREASED SPEED.

**R** RIGOROUSLY IN TIME, NOTES ABOVE STAFF: V TREBLE; BELOW: BASS. OH AND IGNOUS LINES WERE PART OF COMPOSING MEANS, THE INTERSECTIONS PRODUCING TONES OTHER THAN THE EXTREME PIANO KEYS.

**S** LIKE C, BUT WITH NOISES: ABOVE LINES INSIDE PIANO CONSTRUCTION; BELOW: OUTSIDE PIANO CONSTRUCTION.

**T** INFLUENCES IN PITCH AND TIME INDICATED AS SHAPES WITH CENTER POINTS TO BE AUDIBLE AS CLOUTERS, A SINGLE ONE CHANGING IN ITS COURSE. NUMBERS REFER TO LOUDNESS (1-64) (SOFT TO LOUD OR LOUD TO SOFT)

**U** CHOOSE ONE OF 3 MUTUALLY EXCLUSIVE AREAS, BOUNDED BY STRAIGHT LINES. PROCEED L. TO R. USING NUMBER OF NOTES GIVEN WITHIN DOTTED PARTS.

**V** PERFORMANCE INDICATIONS ABOVE (READING DOWN) ARE DEGREE OF FORCE (MOST-LEAST), VERTICAL DISTANCE OF ATTACK FAR CLOSE; SPEED OF ATTACK, SLOW-FAST, ANY NOISES (BELOW LINE BETWEEN STAVES).

**W** LEGATO (TRIANGLES) AND SPACATO (ISOLATED NOTES).

**X** PS ARE PUNCTUATIONS (BEFORE AT, DURING, END OF INTERVAL THEY ACCOMPANY. N MEANS REPEAT SOMETHING (OR ALL, OR ANY AMT.) PLAYED BEFORE, BUT CHANGING AMPLITUDE. PEDALS ARE OPTIONAL.

**Y** 8 PITCH AREAS, CHROMATICALLY ADJACENT, AND HAVING NUMBER OF CHROMATIC TONES GIVEN (LARGE NUMBERS BE LOW STAFF), WHEN NOTES ARE OFF A LINE, THEY BELONG TO EITHER THE UPPER, OR THE LOWER AREA. TIME IN SPACE SECONDS AS INDICATED. LOUDNESS GIVEN BY POSITION OF NOTE WITH RESPECT TO AREA VERTICALLY. HIGH IS ff, LOW IS pp.

**Z** CLUSTERS ENDING AS SINGLE TONES. DYNAMICS AS IN T.

**AA** CLEF AT ALL TIMES AMBIGUOUS. STICKS TO BE PLAYED FREELY (SINGLE TONED INTERVALS, AGGREGATES, EVENTS, ETC. WITHIN PITCH LIMITS AND RELATIVE TIME LIMITS INDICATED BY THEIR EXTREMITIES (NOTES)) USING GRACES AS ASSISTANCE. GIVE EMPHASIS BY DYNAMICS, HARMONICS, REPETITION OR OTHER MEANS TO THOSE CLOUTERS AND MORE EXTREMELY TO THOSE CLOUTED TWICE OR 3 TIMES.

**AB** CLOUTERS AS IN Z, SOMETIMES BEGINNING AS SINGLE TONES (NUMBERS ARE DYNAMICS).

**AC** NOTES, OF THOSE NOTATED, PLAY ONLY THAT NUMBER GIVEN. I: INSIDE PIANO CONSTRUCTION, A: AUXILIARY NOISES. O: OUTER PIANO CONSTRUCTION. THE POSITION OF THE NOTE VERTICALLY GIVES ITS LOUDNESS (HIGH ff LOW pp).

**AD** SINGLE TONES, INTERVALS AND THREE NOTE AGGREGATES WITH AMBIGUOUS STAFF, LEGER LINES ABOVE TREBLE, BELOW BAS.

**AE** PITCH-TIME AREAS SILENT UNLESS ACCOMPANIED BY NUMBERS MEANING NUMBER OF TONES(WHAT) TO BE PLAYED.

**AF** EACH EVENT (LINE CONNECTED TO) IS TO BE PLAYED BY ONE HAND ONLY. THE CLEF SIGNS ABOVE ARE FOR THE RIGHT HAND, BELOW FOR THE LEFT.

**AG** OMIT ANY 2 NOTES OF EACH AGGREGATE.

**AH** CLEFS FREE (TREBLE OR BASS) HANDS GIVEN, FOLLOW LINES IN DIRECTIONS GIVEN BY ARROWS.

**AI** PLAYWHEEL OR AXLE USING ONE(S) NOT PLAYED AS HARMONIC(S). PLAY FROM LEFT TO RIGHT.

**AJ** NUMBERS ARE PROPORTIONAL OF NOTES TO BE PLAYED IN DIRECTIONS GIVEN BY ARROWS, CHANGING CLEF AT POINTS WHERE SIGNS APPEAR.

**AK** PLAY ANY 1 NOTE IN EACH UNIVERSE GIVEN.

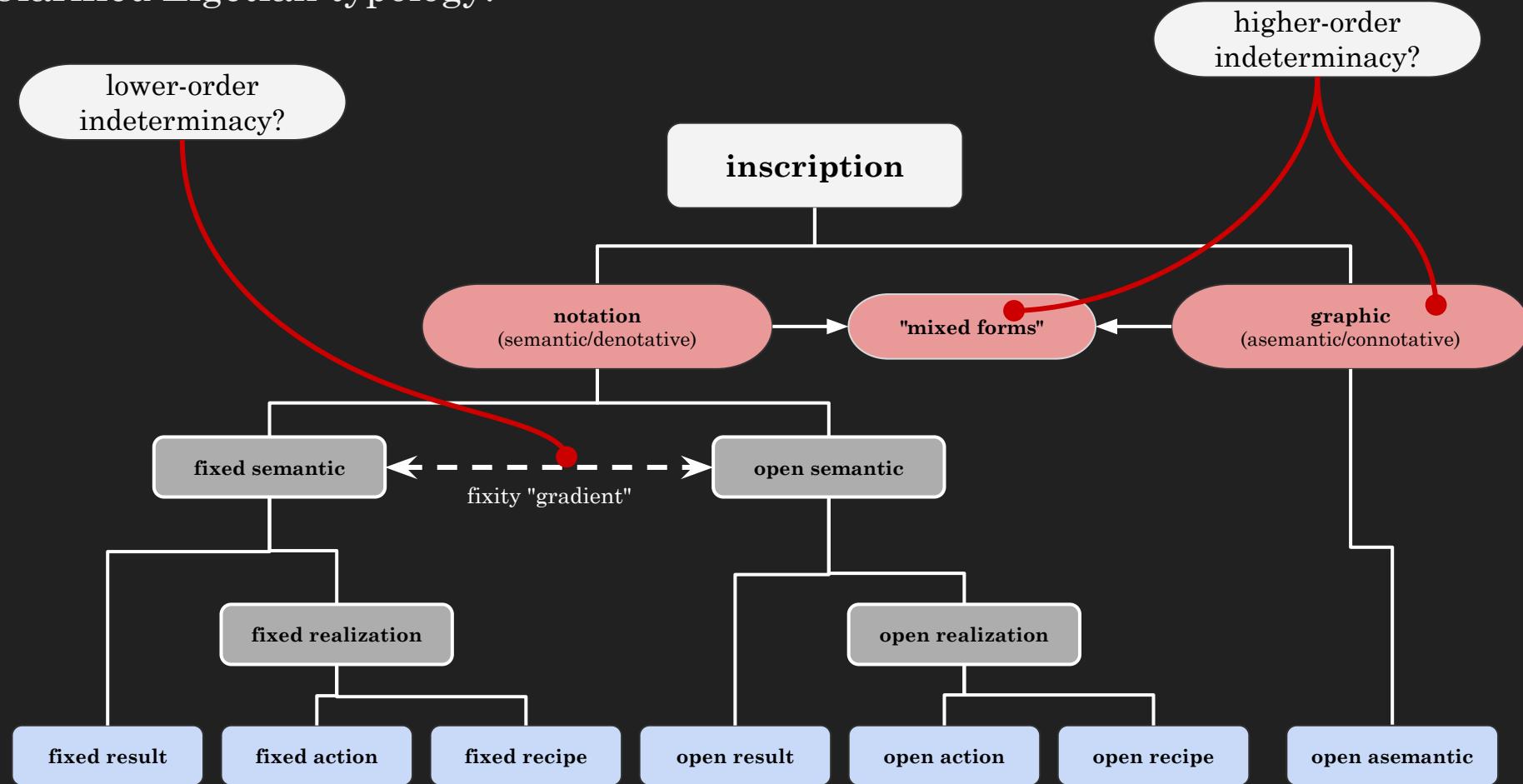
**AL** ANY 8 TONE GAMMA; LARGE NUMBERS ARE PROPORTIONAL TIME BETWEEN SOUND EVENTS. ~ = LEGATO. - = SPACATO.

**AM** SINGLE TONES AND INTERVALS EQUAL LENGTHS OF TIME BETWEEN MARKS ABOVE AND BELOW STAFF.

**AN** CLEFS REFER TO HANOS, FOLLOWING THE LINE FROM LEFT TO RIGHT. PLAY ANY NUMBER OF NOTES WITH ONE HAND FOLLOWED BY A DIFFERENT NUMBER WITH LEFT (ETC, IF NUMBERS CLOSEST DO NOT USE ALL THE NOTES).

(please do not attempt to read)

# Clarified Ligetian typology:



## Strengths of the Ligetian framework:

Clarifies muddy terminology.

Moves toward an account of notational representation.

Develops a function-centric notation typology.

Differentiates *semantic* and *asemantic* inscriptions.

Differentiates *degree of fixity* and *degree of semanticity*.

# Works referenced:

## Essays

Gutkin, David. 2012. "Drastic or Plastic?: Threads from Karlheinz Stockhausen's "Musik und Graphik", 1959." *Perspectives of New Music, Volume 50, Winter/Summer 2012*, <https://muse.jhu.edu/article/778105/>.

Stockhausen, Karlheinz. 1963. "Musik und Graphik" In *Texte zur Musik 1*, edited by Dieter Schnebel, 176–88. Köln: DuMont Buchverlag.

Ligeti, György. 1965. "Neue Notation — Kommunikationsmittel oder Selbstzweck?" In *Notation Neuer Musik (Darmstädter Beiträge zur Neuen Musik 9)*, edited by Ernst Thomas, 175–84. Mainz: Schott.

## Scores

Brown, Earle. *Folio and 4 systems*. New York: Associated Music Publishers, 1961.

Bussotti, Sylvano. *Pièces de chair II: pour piano, baryton, une voix de femme, instruments (1958 '59 '60)*. Instrumental ensemble. Milano: Ricordi, 1970.

Cage, John. *Concert: For Piano and Orchestra*. Stony Point, N. Y.: Henmar Press, 1960.

Cardew, Cornelius. *Treatise*. Buffalo, N. Y.: The Gallery Upstairs Press, 1967.

Crumb, George, and David Burge. *Makrokosmos, Vol. I*. Nonesuch, 1974.

Feldman, Morton. *Projection 1 for Solo Cello*. New York, NY: Peters, 2010.

Kagel, Mauricio. *Improvisation ajoutée: Musik für Orgel für einen Spieler und zwei Assistenten; (Dreistimmiger Chor ad libitum); 1961-62*. Version 1968. London: Universal Ed., 1972.

Lachenmann, Helmut. *Gran torso: Musik : für Streichquartett, for string quartet*. Partitur. Breitkopf und Härtels Kammermusik-Bibliothek. Wiesbaden: Breitkopf und Härtel, 1980.

Smith, Ryan Ross. *Study No. 31: Animated Notation*, 2018.  
<https://www.youtube.com/watch?v=SSTOgv0Vbcg>.