

HOW THE DARMSTADT *INTERNATIONALE FERIENKURSE FÜR NEUE MUSIK*  
CULTIVATED SOLO MULTIPLE PERCUSSION REPERTOIRE THROUGH GRAPHIC  
NOTATION AND INDETERMINACY

by

Kevin Cross

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## ABSTRACT

Title: How the Darmstadt *Internationale Ferienkurse für Neue Musik* Cultivated Solo Multiple Percussion Repertoire through Graphic Notation and Indeterminacy

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Committee Chair: Dr. Norman Weinberg

The Darmstadt *Internationale Ferienkurse für Neue Musik* (IFNM) contributed to the rise of solo multiple percussion music and compositional techniques found in early repertoire, including graphic notation and indeterminacy. John Cage wrote the first solo multiple percussion work (*27' 10.554" for a Percussionist*) in 1956, two years before he became involved at the Darmstadt IFNM. Cage then delivered a lecture at the courses in 1958 about indeterminacy, and the next year (1959) Stockhausen composed the second work for solo multiple percussion—*Nr. 9 Zyklus*—for the IFNM. In the same year, Stockhausen also delivered a lecture about graphic notation. Seven years later in 1966, Helmut Lachenmann—who was active at the IFNM since 1957—composed *Intérieur I für einen Schlagzeugsolisten* which utilizes graphic notation and indeterminacy. The three pieces by Cage, Stockhausen and Lachenmann will be examined in regards to how they employ graphic notation and indeterminacy and similarities and differences in how these techniques are used will be cited.

## I. Introduction

The Darmstadt *Internationale Ferienkurse für Neue Musik* (IFNM) is a series of summer courses that are dedicated exclusively to contemporary music. Today, a larger institution exists that includes not only the summer courses, but also a library and an archive. The current website of the institution describes the courses as “a meeting place for composers, performers, sound artists and scientists. To discover, (learn), network, exchange and debate, work together and not least to invent—these are the international holiday [summer] courses for new music Darmstadt.”<sup>1</sup> The courses started in 1946 in the town of Darmstadt, Germany. The genesis of the courses emanated from a bombing run by the Allied Forces on the night between September 11 and 12, 1944 that destroyed 78 percent of the city center. Over 11,000 people were killed that night and 70,000 were rendered homeless.<sup>2</sup> The following quote by Martin Iddon portrays the horrific aftermath:

It was estimated that the number of inhabitants of the city plummeted to roughly 51,000 after the bombing, from a total of 115,000 before the start of the war... The Prince of Hesse saw the devastation from his estate some fifteen kilometres away: ‘The flare grew and grew until the whole southern sky burned red and yellow.’ Unsurprisingly, Darmstadt’s cultural institutions were similarly obliterated: in principle no official venue for the presentation of artistic work remained...<sup>3</sup>

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1. “Ferienkurse,” Internationales Musikinstitut Darmstadt, accessed April 17, 2017, <http://www.internationales-musikinstitut.de/ferienkurse.html>.

2. Martin Iddon, *New Music at Darmstadt: Nono, Stockhausen, Cage, and Boulez* (Cambridge: Cambridge University Press, 2013), 2.

3. Ibid.

The final line of Iddon's quote is especially poignant in regards to this document. The implications of having no venue for the "presentation of artistic work" are profound. This sentiment could explain the urgency with which the reinstatement of the arts was undertaken. One avenue through which the artistic landscape was revitalized was the Darmstadt IFNM. The courses stemmed from a desire to overcome the loss of culture that World War II inflicted on Germany. According to Iddon, "the rebuilding of cultural life was seen as central" to post World War II Germany.<sup>4</sup>

Ludwig Metzger became the first post-war mayor of Darmstadt in 1945. He appointed Wolfgang Steinecke—a well-known music critic—to fill the Head of Culture position. Steinecke would eventually serve as the first director of the Darmstadt IFNM. The original courses received funding from sources such as Radio Frankfurt and the city of Darmstadt. They started to receive funds from the American High Commission in 1948.

Three early works written for solo multiple percussion, John Cage's *27' 10.554" for a Percussionist*, Karlheinz Stockhausen's *Nr. 9 Zyklus* and Helmut Lachenmann's *Intérieur I für einen Schlagzeugsolisten*, all use graphic notation and indeterminacy and are all connected to the Darmstadt IFNM. The first work for solo multiple percussion—*27' 10.554" for a Percussionist*—was composed in 1956 by John Cage. Although *27' 10.554"* was composed before Cage visited Darmstadt, he lectured there in 1958 about indeterminacy, which he employed in *27' 10.554"*. This lecture—titled "Composition as Process"—was delivered over three sessions. The sessions were titled, in order, "Changes," "Indeterminacy" and "Communication." The next year (1959), Stockhausen composed—and Christoph Caskel premiered—the second work for solo multiple percussion, *Nr. 9 Zyklus*. According to Iddon, "*Zyklus*, for solo percussionist, was not only

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4. Iddon, *New Music at Darmstadt*, 7.

commissioned for Darmstadt... as a part of the opening concert on 25 August, but was also the selected obligatory piece for performance for competitors for the Kranichsteiner Musikpreis in that year..."<sup>5</sup> Although *27' 10.554"* was written in 1956, it was not premiered until 1962 in Munich.<sup>6</sup> This sequence of events means that Caskel's performance of *Zyklus* in Darmstadt was the first time that a solo multiple percussion performance occurred. Also in 1959, Stockhausen delivered a lecture at the IFNM titled "Musik und Graphik," where he discussed graphic notation. A few years later in 1966, Helmut Lachenmann wrote *Intérieur I für einen Schlagzeugsolisten*, in which he used both graphic notation and indeterminacy. He attended Darmstadt for the first time in 1957<sup>7</sup> and was in attendance at Cage's 1958 lecture.<sup>8</sup> Lachenmann's thinking was influenced by his experiences at the Darmstadt IFNM. In 1966—the same year he composed *Intérieur I*—he drafted a "typology of sounds, in which sound and form are dialectically merged, and in doing so [he] referred to structural models from Darmstadt."<sup>9</sup> Lachenmann's reference means that at the time he was writing *Intérieur I*, he consciously recognized the Darmstadt IFNM as an influence on his composing.

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5. Iddon, *New Music at Darmstadt*, 235.

6. John Cage, "Database of works: *27' 10.554"*," accessed January 08, 2017, [johncage.org/pp/John-Cage-Work-Detail.cfm?work\\_ID=14](http://johncage.org/pp/John-Cage-Work-Detail.cfm?work_ID=14).

7. Helmut Lachenmann, "Composing in the Shadow of Darmstadt," *Contemporary Music Review* 23, nos. 3-4 (September/December 2004): 44.

8. Amy Beal, "David Tudor in Darmstadt," *Contemporary Music Review* 26, no. 1 (February 2007): 81.

9. Lachenmann, "Composing in the Shadow of Darmstadt," 45.

## II. Definition of Terms

The terms that require definition are *solo multiple percussion*, *graphic notation* and *indeterminacy*.

- Solo multiple percussion is more than one percussion instrument acting as a cohesive unit that is played by one person. This variety of instrumentation allows composers to use a variety of timbres while still maintaining a cohesive compositional approach. Composers of early solo multiple percussion music wrote works in a notation system created for each piece; they were striving to create new systems of notation that allowed their ideas to be read and performed by one player.
- Graphic notation uses symbols, lines, shapes, dots, pictures and/or blank space to represent musical ideas or directions to the performer. These graphics can be used alone or in conjunction with traditional, non-graphic notation.
- Indeterminacy arises when the composer makes a choice to relinquish control of one or more elements of the composition. These elements could include pitch, rhythm, form, instrumentation, volume, articulation and timbre. Indeterminacy can happen as part of the compositional process or during the performance. Indeterminacy during the compositional process often takes the form of chance operations, such as flipping coins or tossing dice.

## III. Review of Scholarly Literature

Review of the scholarly literature began in two distinct areas, literature concerning the Darmstadt IFNM and the composers who were active there, and literature involving solo multiple percussion music. The main source consulted regarding the Darmstadt IFNM was a book by Martin Iddon titled *New Music at Darmstadt: Nono, Stockhausen, Cage, and Boulez*

(2013). This book presents a wealth of facts concerning the circumstances that led to the beginning of the IFNM and each of the first fifteen years. The book ends at the death of the first director of the courses, Wolfgang Steinecke. Iddon makes extensive use of primary sources in the form of written correspondence among many of the major figures at the IFNM. The following passage is from a letter by composer Luigi Nono to Steinecke after the 1953 IFNM. In the letter, Nono explicitly states that Stockhausen had an influence on his thinking.

I want to thank you again for this year, in particular for the ever stronger and better friendship we share. Now I am truly, after Kranichsteinecke [sic], quiet and more sure with wholly new ideas and plans for work: I believe a new period begins for me now; in every sense. The Webern evening with the violent discussion, in the night with Stockhausen, was very important for me, and I believe that just as Stockhausen gave me something, so did I to him, just as it should be between two friends. I am certain that Stockhausen will become an increasingly important and vital musician.<sup>10</sup>

This type of situation highlights the probability that the IFNM played a role in the cultivation and dissemination of ideas between composers. Nono's letter exemplifies how the IFNM gave composers the opportunity to share ideas.

Iddon's book is divided into two parts. The first part—titled “The accidental serialists”—discusses the formation of the courses, establishment as an institution and the formation of the idea of “the Darmstadt School” of composers. They primarily include Luigi Nono, Karlheinz Stockhausen, Bruno Maderna and Pierre Boulez. The second part of the book discusses the dissolution of “the Darmstadt School.” Iddon makes the argument that its demise was catalyzed by the arrival of John Cage at the 1958 courses. Cage presented three lectures that year, titled “Changes,” “Indeterminacy,” and “Communication.” During these lectures, he and pianist David Tudor performed works by Cage, Stockhausen, Bo Nilsson, and Christian Wolff. Cage's lectures

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10. Iddon, *New Music at Darmstadt*, 101.

caused a stir among the participants, critics and faculty at the IFNM. Cage's arrival in Darmstadt caused a rift among the composers there, with indeterminacy as the main point of contention.<sup>11</sup> Carl Dahlhaus said that Cage "swept across the European avant-garde like a natural disaster"<sup>12</sup> since the effect he had on the European avant-garde community was incredibly polarizing.

Another way the Darmstadt IFNM disseminated ideas was through the use of media. Every year, Steinecke compiled the lecture highlights into a journal called the *Darmstädter Beiträge zur Neuen Musik*. The courses were also attended by music critics—such as Theodor Adorno<sup>13</sup>—with the intent of covering the courses in music journals and local newspapers. Perhaps the media outlet with the highest potential for broad coverage that the IFNM employed was the radio. The following quote from Iddon highlights exactly how influential these broadcasts were for composers, specifically György Ligeti:

The impact of Metzger's introduction to Cage's *Concert for Piano and Orchestra* should not be underestimated. To have heard Cage at Darmstadt, naturally one had to have been there, even if the translations of his lectures were slowly circulating around the West German (or, perhaps better, the European German-speaking) avant-garde. Metzger's description of Cage was broadcast as a part of the Westdeutscher Rundfunk's 'Nachtprogramm' to which, anecdotally at least, everyone involved—or wishing to be involved—with the European avant-garde listened almost religiously. One might recall that, as far away as Hungary, György Ligeti listened to the Westdeutscher Rundfunk's

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11. Iddon, *New Music at Darmstadt*, 196-229.

12. *Ibid.*, 300.

13. Theodor Adorno was a German philosopher and social critic; he was known for his work as a music critic as well. Please refer to Martin Iddon's book for more information about Adorno's time at the Darmstadt IFNM.

broadcasts whenever they were not being jammed by the Hungarian or Soviet authorities and that it was the station's broadcast of Stockhausen's *Kontra-Punkte* and *Gesang der Jünglinge* in November 1956 that led Ligeti to aim for Cologne in the wake of the Soviet invasion and takeover of Hungary. In short, anyone who was anyone was listening.<sup>14</sup>

Another indispensable source concerned with the history of the Darmstadt IFNM was found on the website of the current institution. Users may download a document that contains all the programs for the concerts and lectures from 1946-1966.<sup>15</sup> This document also identifies the faculty, performers and which pieces were performed in concerts, workshops and masterclasses.

Several different sources proved valuable in the examination of solo multiple percussion repertoire. One such source is a reference book titled *Percussion Solo Literature* (1995), edited by Thomas Siwe. The Siwe book contains a broad list of solos in the areas of drum, mallet (multiple keyboard), marimba, snare drum, timpani, vibraphone, xylophone and multiple percussion. The book also includes information on each composer and publisher/source information. One useful tool that the volume includes—especially in the area of multiple percussion—is a listing of the instruments required to perform each composition.<sup>16</sup> This volume was particularly useful in finding little-known works and creating a more comprehensive view of all extant solo multiple percussion literature.

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14. Iddon, *New Music at Darmstadt*, 228.

15. Darmstädter Ferienkurse 1946-1966, "Veranstaltungstitel und Programm," accessed January 9, 2017, [http://www.internationales-musikinstitut.de/images/stories/PDF/Darmstaedter\\_Ferienkurse\\_1946-1966.pdf](http://www.internationales-musikinstitut.de/images/stories/PDF/Darmstaedter_Ferienkurse_1946-1966.pdf).

16. Thomas Siwe, *Percussion Solo Literature* (Champaign, IL Media Press, Inc., 1995).

Robin Maconie authored a book titled *Stockhausen on Music* (1991), which is divided into two parts.<sup>17</sup> Part One reviews Stockhausen's childhood, as well as some of the different approaches he takes to writing music. These approaches include "Points and Groups," "Composing statistically," "Lyric and dramatic form," "Moment-forming and MOMENTE," "Microphony," "Four criteria of electronic music" and "Intuitive music." The second part of the book is an interview of Stockhausen by Maconie.

In the chapter about composing statistically, Maconie mentions *Zyklus*. This particular work uses statistical composition, which means "that you can permute or change the order of events without it really making any difference."<sup>18</sup> This thought means that even though individual events may be interchangeable, there are certain structural pillars that are constant; individual choices don't change the macrostructure. In this way, statistical composition leaves room for indeterminacy. Details about the composition of *Zyklus* will be discussed in section V:B.

Select doctoral dissertations have been helpful in the examination of solo multiple percussion literature. One example is Stuart Gerber's document titled "Karlheinz Stockhausen's Solo Percussion Music: A Comprehensive Study." Gerber's dissertation is especially relevant since Stockhausen was a major figure at the Darmstadt IFNM and Gerber examined all of his solo multiple percussion output. The works Gerber discusses are *Zyklus*, *Nasenflügelanz*, and *Komet*. He gives a small amount of biographical and background information, but he primarily discusses the "musical, aesthetic, and technical concerns" of each piece, essentially providing a

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17. Robin Maconie, *Stockhausen on Music* (London: Marion Boyars Publishers, 1991).

18. *Ibid.*, 50.

method for interpretation.<sup>19</sup> Gerber gives examples of notation from each score. These examples helped trace some of the notational and compositional trends of solo multiple percussion music that Stockhausen used throughout his career; *Zyklus* was written in 1959, *Nasenflügeltanz* in 1983 and *Komet* in 1999.

Tracy Wiggins's dissertation, titled "27' 10.554" by John Cage and *The King of Denmark* by Morton Feldman and Their Influence Upon Thomas DeLio's *as though*," also offers insight into the area of solo multiple percussion music. Wiggins makes the point that "27' 10.554" and *Zyklus* both have different set-ups and notational systems.<sup>20</sup> This point shows that notation for percussion music, especially solo multiple percussion, changes depending on the composer's intent and the instrumentation used. With so many options for composers to choose from or create, it is remarkable that certain trends came forth, such as graphic notation and indeterminacy. This notion lends credibility to the claim that the Darmstadt IFNM may have played a role in shaping this repertoire.

James Pritchett's dissertation is titled "The Development of Chance Techniques in the Music of John Cage, 1950-1956." In this document, he briefly discusses Cage's pre-chance music from 1939-1950, chart works, point drawing techniques, *Music of Changes* from 1951 and *The Ten Thousand Things* from 1953-1956. "27' 10.554" was written as the last piece in *The Ten Thousand Things* project. Pritchett's document discusses the compositional method Cage used

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19. Stuart Gerber, "Karlheinz Stockhausen's Solo Percussion Music: A Comprehensive Study" (DMA document, University of Cincinnati, 2003), 121.

20. Tracy Wiggins, "27' 10.554" by John Cage and *The King of Denmark* by Morton Feldman and Their Influence Upon Thomas DeLio's *as though*" (DMA document, University of Hartford, 2009), 4.

while writing *27' 10.554"*. The specifics of how Cage used graphic notation and indeterminacy will be discussed in section V:A.

#### IV. The Lectures

##### A. John Cage - *Composition as Process*, II. "Indeterminacy"

John Cage delivered a lecture in three parts at the 1958 Darmstadt IFNM titled "Composition as Process." The lecture contains the sections "Changes," "Indeterminacy," and "Communication." This document will discuss the second part of the lecture, "Indeterminacy," delivered on September 8th at 5:00 p.m.<sup>21</sup> During the lecture, David Tudor performed Stockhausen's *Klavierstück XI* (1956) and Cage and Tudor performed Cage's *Variations I* (1958). A transcription of the lecture is available in *Silence* (1973), a book that contains the lectures and writings of John Cage.

Cage starts his lecture with this sentence: "This is a lecture on composition which is indeterminate with respect to its performance."<sup>22</sup> He follows by drawing a comparison between Stockhausen's *Klavierstück XI* and J.S. Bach's *The Art of Fugue*; he states that both works are indeterminate with respect to performance. Regarding Bach's fugues, Cage explains that "...structure, which is the division of the whole into parts; method, which is the note-to-note procedure; and form, which is the expressive content, the morphology of the continuity, are all

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21. Darmstädter Ferienkurse 1946-1966, "Veranstaltungstitel und Programm," 1958, accessed January 09, 2017, [http://www.internationales-musikinstitut.de/images/stories/PDF/Darmstaedter\\_Ferienkurse\\_1946-1966.pdf](http://www.internationales-musikinstitut.de/images/stories/PDF/Darmstaedter_Ferienkurse_1946-1966.pdf)

22. John Cage, *Silence: Lectures and Writings* (Hanover, NH: Wesleyan University Press, 1973), 35.

determined. Frequency and duration characteristics of the material are also determined.”<sup>23</sup>

Timbre and amplitude are the elements Cage denotes as undetermined. Timbre can be thought of as what tone color a note possesses and amplitude as the vertical dimension of a sound wave, or the volume of a sound. In this instance, timbre means which instrument is used or which playing techniques are used on that instrument. In the case of Bach’s fugues, the instrument they are played on is not specified. According to Kerman, they could be played on clavichord, harpsichord or organ.<sup>24</sup> Therefore, timbre—thought of as instrumentation—is indeterminate. Amplitude is considered indeterminate because no dynamic markings are given in the scores to the fugues; the decision is left up to the performer. These two elements are true to Cage’s statement at the beginning of the lecture about indeterminacy with respect to performance.

Stockhausen’s *Klavierstück XI* also has a mix of determined and undetermined elements. According to Cage, the characteristics of the material, the note-to-note procedure and the structure (division of the whole into parts) are all determined. What is not determined is the sequence of parts in the structure. Cage draws contrasts between the role of the performer in both works by making the analogy of somebody coloring in the lines of a children’s coloring book: Bach’s fugues are similar to somebody filling in color in a predetermined set of lines, while in Stockhausen’s *Klavierstück* the performer’s role is not to add color, but to spontaneously organize the lines.<sup>25</sup> This observation of how indeterminacy can be employed will serve as the

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23. Cage, *Silence*, 35.

24. Joseph Kerman, *The Art of Fugue: Bach Fugues for Keyboard, 1715-1750* (Berkeley and Los Angeles, CA: University of California Press, 2005).

25. Cage, *Silence*, 35-36.

groundwork for the discussion of solo multiple percussion music by Cage, Stockhausen and Lachenmann.

Cage's lecture continues when he discusses *Intersection 3* by Morton Feldman, *Music of Changes* by Cage, *Indices* and *Four Systems* by Earle Brown and *Duo II for Pianists* by Christian Wolff. He states that some of the works—such as *Music of Changes* and *Indices*—are not indeterminate compositions because even though chance operations were used in the compositional process, there are no indeterminate elements in performance practice. He makes a distinction between pieces that use chance strictly in the compositional process, such as *Music of Changes and Indices*, and pieces that are indeterminate in their performance practice, such as *Intersection 3, Four Systems* and *Duo II for Pianists*. The following quote from Cage's lecture expresses his thoughts about what qualifies as indeterminacy:

That the *Music of Changes* was composed by means of chance operations identifies the composer with no matter what eventuality. But that its notation is in all respects determinate does not permit the performer any such identification: his work is specifically laid out before him. He is therefore not able to perform from his own center... The *Music of Changes* is an object more inhuman than human, since chance operations brought it into being. The fact that these things that constitute it, though only sounds, have come together to control a human being, the performer, gives the work the alarming aspect of a Frankenstein monster. This situation is of course characteristic of Western music, the masterpieces of which are its most frightening examples, which when concerned with humane communication only move over from Frankenstein monster to Dictator.<sup>26</sup>

There is one quote from Cage's lecture that deserves special attention in the context of this document. While discussing Earle Brown's *Four Systems*, Cage says the following: "In order to multiply the possible interpretations the composer gives the following permission—to read the cardboard in any of four positions: right side up, upside down, sideways, up and

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26. Cage, *Silence*, 36.

down.”<sup>27</sup> This freedom of alignment is similar to how Stockhausen’s *Zyklus* is able to be read, left-to-right, right-to-left, top-on-top or bottom-on-top.<sup>28</sup>

### B. Karlheinz Stockhausen - “Musik und Graphik”

There is no full translation available of Stockhausen’s 1959 lecture, “Musik und Graphik.” The closest substitute is an article by David Gutkin: “Drastic or Plastic?: Threads from Karlheinz Stockhausen’s ‘Musik und Graphik,’ 1959.” When Gutkin wrote his article, he worked from a copy of the lecture published in German in one of Stockhausen’s volumes of writings. One interesting aspect of the article is that it lists the dates, pieces performed and performers for each segment of Stockhausen’s five-part lecture:

WEDNESDAY, AUGUST 26—MUSIK UND GRAPHIK I—PREMISES OF COMPOSITION

THURSDAY, AUGUST 27—MUSIK UND GRAPHIK II—COMMENTARY ON NEW SCORES

Scores: *Zyklus*—Stockhausen, *Two Books of Study for Pianists*—Cardew  
Performer: Christoph Caskel—percussion

FRIDAY, AUGUST 28—MUSIK UND GRAPHIK III—COMMENTARY ON NEW SCORES

Scores: *Piano Piece 1959*—Cardew, *Concert for Piano and Orchestra*—Cage  
Performer: Cardew—piano

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27. Cage, *Silence*, 37.

28. Earle Brown’s *Twenty-Five Pages* also uses the same idea and was composed the year prior to *Four Systems*. The author is unaware of any Stockhausen compositions prior to *Zyklus* that employ this technique.

SATURDAY, AUGUST 29—MUSIK UND GRAPHIK IV—COMMENTARY ON NEW SCORES

Scores: *Five Piano Pieces for David Tudor* from *Pièces de Chair II*, numbers 3 and 4—Bussotti; *Transición II* (introductory statement on score)—Kagel.

Performers: David Tudor—piano, Caskel—percussion, and Kagel —tape machine.

MONDAY, AUGUST 31—MUSIK UND GRAPHIK V—COMMENTARY ON NEW SCORES

Score: *Transición II*—Kagel Performers: same as August 29.<sup>29</sup>

Some of the ideas Stockhausen discusses in his lecture are “the significance of a notation that codes action rather than sound... the difference between transparent codes and pictorial autonomy, the relationship between graphic scores and electronics, the usefulness of non-traditional notation for the musically illiterate, and the connection between hearing and seeing.”<sup>30</sup> Of these topics, the most relevant in relation to solo multiple percussion music is the idea of a notation that “codes action rather than sound.” Percussion performance is, by its nature, an extremely physical activity. Some of the gestures required for percussionists to execute passages of music are part of the art of a performance. The three pieces discussed in this document all have large set-ups and sometimes require sizable gestures to navigate around the instruments. Many composers are conscious of the relationship between music and the physical gesture it creates. One such example is Stuart Saunders Smith. The following quote by Smith is from the performance notes for *The LINKS Series of Vibraphone Essays*: “I was conscious of the body movements necessary to play each of the Links. The corporeal vibe-dance is an important

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29. David Gutkin, “Drastic or Plastic?: Threads from Karlheinz Stockhausen’s ‘Musik und Graphik,’ 1959,” *Perspectives of New Music* 50, no. 1-2 (Winter/Summer 2012): 261-262.

30. *Ibid.*, 263.

by-product of any performance. Be conscious of it, without exaggeration.”<sup>31</sup> It is clear from Smith’s note that he is explicitly aware that music, and therefore notation, is able to “code action” as well as sound.

One of the works that Stockhausen discussed in his lecture was *Nr. 9 Zyklus*. Gutkin posits that the score is more of a “choreographic plan,” and the notation Stockhausen chooses highlights this idea. Each page of *Zyklus* is divided into thirty equal time segments. While segments are not set to a specific metronome mark or duration, they must remain consistent throughout the work. This strict temporal flow does support Gutkin’s idea of “choreography.” That term also brings dancing to mind, which is an art form based on physical gesture. This thought returns to the idea that the notation for *Zyklus* “codes action.” While it is plausible that composers do “code action” in notation, a more accurate description is possible. Instead of “cod[ing] action rather than sound,” composers are choosing to code action and sound.

Another interesting aspect of Gutkin’s article is when he describes what could be the origin of modern graphic notation, which is *Projection I* for solo cello, composed in 1950 by Morton Feldman. The common story is that Feldman was having dinner with John Cage and they were cooking wild rice. While waiting, he “doodled a freely drawn piece of graph paper—and what emerged were high, middle, and low categories. It was just automatic. [He] never had any conversation about it before, you know never discussed it.”<sup>32</sup> Other composers started to experiment with graphic notation, such as Earle Brown with *Folio* (1952/53), followed by

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31. Stuart S. Smith, *Links for Solo Vibraphone* (Sharon, VT: Smith Publications, 1974), n.p.

32. Jan Williams, “An Interview with Morton Feldman,” *Percussive Notes Research Edition* (September 1983), quoted in Gutkin, “Drastic or Plastic?”: 259.

Christian Wolff and John Cage. Gutkin also states that Pierre Boulez had seen Feldman's early graph notation by 1951; Boulez most likely shared and/or discussed this concept with other European composers. However, Gutkin states that there is no proof of this discussion. Gutkin also thinks that prior to 1954—when Cage and Tudor traveled to Donaueschingen—there was not an open sharing of ideas between the avant-garde circles in America and Europe.<sup>33</sup> This Donaueschingen trip is pre-dated by letters that Cage and Boulez wrote to each other throughout the early 1950s, readable in Nattiez's volume, *The Boulez-Cage Correspondence* (1995).

Gutkin espouses the idea of “notation's profound entwinement with the idea of potential, or possibility.”<sup>34</sup> This seems to be an extension of a centuries old thought when music was transitioning from a medium that was strictly aural to one that was both aural and visual. It is likely that composers actively use notation as a means to record the extra-musical aspects of music. Graphic notation could be viewed as a method to expand the dialogue between musical notation and what listeners pay attention to in music: The effectiveness of a passage of music is not only dependent on proper execution of notes, rhythms and dynamics, but often on the physical gesture as well, especially on a multiple percussion set-up. The word “zyklus” in German translates to “cycle.” This refers to the circle that a performer makes as they play *Zyklus*. As *Zyklus* progresses, the performer physically turns 360 degrees from where they start, whereby they complete one cycle around the instruments. Again, Stockhausen was “cod[ing] action.”

Helmut Lachenmann was conscious of graphic notation's ability to depict physical gesture when he wrote *Intérieur I*, the piece is highly organized with regards to this aspect of

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33. Amy C. Beal, “New Music, New Allies: American Experimental Music in West Germany from the Zero Hour to Reunification (Berkeley: University of California Press, 2006), quoted in Gutkin, “Drastic or Plastic?”: 260.

34. Gutkin, “Drastic or Plastic?”: 257.

performance. Lachenmann specifies three music stands in the set-up at left, right and middle positions. Each page of the score is assigned to go on a specific stand because the primary instruments used on that page occupy the physical space closest to that stand. He also specifies every mallet change the performer must make. There must be hard sticks, soft sticks, a thick knitting needle, drumsticks and a wire brush available. Each time a mallet change is required, he draws a diagram of a pair of hands. This diagram has four slots for mallets, includes which mallet goes in each slot and if the mallet is turned backwards or forwards.

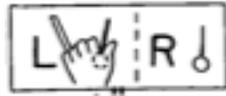


Figure 1. Diagram that shows a needle and two backwards mallets.<sup>35</sup>

There is also a note in the directions: “All drumsticks [sic] changes as unnoticeable as possible! The practice of drumstick changes is a part of learning the piece.” This organization of movement shows that Lachenmann was conscious of the time and space needed to execute these mallet changes and the effect they have on the temporal flow of the music. Therefore, he is also “cod[ing] action.”

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35. Helmut Lachenmann, *Intérieur I für einen Schlagzeugsolisten* (München: Edition Modern, 1967). An effort was made to preserve the composer’s original hand in the figures. Some figures may be slightly blurred, but exact replication was prioritized. This will be especially true of figures from John Cage and figures that have been magnified.

## V. The Early Works

*27' 10.554"* (1956) by John Cage, *Nr. 9 Zyklus* (1959) by Karlheinz Stockhausen and *Intérieur I für einen Schlagzeugsolisten* (1966) by Helmut Lachenmann comprise three of the first four works ever written for solo multiple percussion. There is one other work—*The King of Denmark* (1964) by Morton Feldman—that was composed slightly before Lachenmann's piece. *The King of Denmark* will not be considered in this document since Feldman, an American composer, was not in the European scene or involved with the Darmstadt IFNM in the 1950s and 1960s. However, he was in close contact with John Cage around this time, as seen earlier in this document in the discussion of David Gutkin's article.

### A. John Cage - *27' 10.554" for a Percussionist* (1956)

*27' 10.554"* was the first composition for solo multiple percussion; John Cage composed it in 1956 as the last part of his *Ten Thousand Things* project. Cage's idea behind the project was as follows:

From time to time ideas come for my next work which as I see it will be a large work which will always be in progress and will never be finished; at the same time any part of it will be able to be performed once I have begun. It will include tape and any other time actions, not excluding violins and whatever else I put my attention to. I will of course write other music than this, but only if required by some outside situation.<sup>36</sup>

Other works in the *Ten Thousand Things* project, besides *27' 10.554"*, include six short pieces for a string player (1953), an unfinished work for magnetic tape (most likely 1953), an

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36. John Cage, Letter to Pierre Boulez, May 1, 1953 JCA-16, quoted in James Pritchett, "The Development of Chance Techniques in the Music of John Cage, 1950-1956" (PhD diss., New York University, 1988), 237.

unfinished work for voice (most likely 1953), *34' 46.776" for a Pianist* (1954) and *26' 1.11499" for a String Player* (1955).

The name *Ten Thousand Things* is derived from the structure of the project as a whole. Cage divided the structure into thirteen phrase groups with the following lengths: 3, 7, 2, 5, 11, 14, 7, 6, 1, 15, 11, 3 and 15. The sum of the groups is one hundred, so the overall structure would consist of one hundred phrase groups of one hundred measures each, for a total of 10,000 measures. Cage later realized this was too long to be manageable and cut the proportions by four, making each phrase group one hundred beats instead of one hundred measures.<sup>37</sup> According to Cage, the way the structure comes out to 10,000 just happened by accident. Either way, the number 10,000 has significance for him: it stands for infinite in oriental philosophy, in which Cage was known to believe. Buddhist and Taoist texts commonly use 10,000 to explain the eclecticism of the universe. The following poem—taken from Lao Tzu in the *Tao Te Ching*—contains an iteration of 10,000:

*Tao produced the One.  
One produced the two.  
Two produced the three.  
And the three produced the ten thousand things*<sup>38</sup>

*27' 10.554"* was composed using a twenty-eight unit, five section structure that was also followed in the piano and string pieces. This common structure makes the pieces performable simultaneously, as indicated in the performance notes to *27' 10.554"*:

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37. Pritchett, "The Development of Chance Techniques," 239-240.

38. Lao Tzu, *The Way of Lao Tzu*, trans. Wing-Tsit Chan, (New York: Bobbs-Merrill Co., 1963), 176, quoted in Pritchett, "The Development of Chance Techniques," 240.

Percussion instruments are here divided into 4 groups: M = metal; W = wood; S = skin; and A = all others... e.g. electronic devices, mechanical arrangements, radios, whistles, etc...

A correspondence between time and space is made so that each page = one minute; the numbers above the systems are the seconds of the minute. A performance with string players and/or pianists may be made previous [sic] the latter use an equal number of structural units of their parts.

A virtuoso performance will include a wide variety of instruments, beaters, sliding tones, and an exhaustive rather than conventional use of the instruments employed. For example: a gong may be suspended or placed on a mat, struck with metal, felt, yarn, wood, rubber, etc. beaters at points on the edge or center or anywhere between. It may be lowered into and/or raised out of a tub of water. A tremolo between suspended gongs facing one another is another use. And directional changes following the attack are also effective.

Dots above a line and lines are louder than those below (the staff line is to be taken in all cases as *mf*). Thus, —/— will be a crescendo. Stems are attached where it is not otherwise clear which instrument is to be used. A hook for metal instruments = *laissez vibrer*. This piece may be performed as a recording or with the aid of a recording.<sup>39</sup>

Cage's work makes extensive use of graphic notation. As observed in the performance directions, each page is equal to one minute: there are four staves of fifteen seconds per page. The numbers notated above each system indicate seconds and one inch of horizontal space is equal to one second. For example, the first line of page 3 of the score (seen ahead in figure 2) would consist of a sustained event—such as a roll—on a metal instrument that lasted from approximately six seconds until eighteen seconds. The volume of the event is indicated by the event's vertical relationship to the staff, which represents *mezzo forte*. Therefore, the sustained event would start below *mezzo forte*, jump to a dynamic slightly above *mezzo forte* just after twelve seconds, descend to a quieter dynamic by fifteen seconds, rise again around sixteen or seventeen seconds and quickly taper off to a softer dynamic at eighteen seconds. This system of

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39. John Cage, *27' 10.554" for a Percussionist* (New York: C.F. Peters Corporation, 1960).

notating dynamics liberates Cage from having to notate pitch by an event's vertical placement on the staff. He is able to take this liberty since the percussion instruments Cage asks for are not required to be specifically pitched.

The image shows a page of musical notation for a percussion ensemble. It consists of five staves. The first staff (top) is a single line with a wavy line representing a dynamic contour, with measures 6 and 7 marked. The second staff (measures 15-30) has four parts: M (Maracas), W (Woodblock), S (Shaver), and A (Axe). The third staff (measures 31-41) has four parts: M, W, S, and A. The fourth staff (measures 42-60) has four parts: M, W, S, and A. The notation includes various rhythmic symbols, including vertical lines, dots, and horizontal lines, indicating the timing and dynamics of the instruments. A dashed line connects measure 15 on the second staff to measure 15 on the fourth staff.

Figure 2. Page 3 of the score to 27' 10.554".<sup>40</sup>

40. Cage, 27' 10.554".

According to Pritchett, “all that is notated for a given sound... is the general type of instrument to be used, the point of attack, and the relative dynamic.”<sup>41</sup> As seen earlier, the type of instrument used is indicated by the letter to the left of each staff, an “M” for metal, “W” for wood, “S” for skin and “A” for all others. This is different than *Zyklus* and *Intérieur I* which both use symbols (pictograms) to depict instruments. Another manifestation of graphic notation is Cage’s use of dots and lines to indicate “points of attack.” In a section of score where there is more than one staff line and a dot falls approximately half-way in between, a line is drawn from the dot to the correct staff line.

Indeterminate composition was a process central to Cage’s output when he wrote *27’ 10.554”*. There are many elements of the piece—both from compositional and performance standpoints—that employ indeterminacy. The following passage from Pritchett concisely explains Cage’s compositional process for *27’ 10.554”*:

The first step [was the]... determination of tempi and densities for each phrase of the rhythmic structure. The tempi were then used to calculate the duration in seconds of each phrase... Individual events [were determined by hexagrams]. First, Cage obtained numbers which determined both sound and silence, and the duration of that sound or silence. Even numbers signified silences, odd numbers signified sounds... Once all the sounds and silences were determined, Cage obtained hexagram numbers for each sound event in the phrase to determine the number of “active” or sounding points within the number allotted it... Once the number of active points within each sound duration were obtained, Cage determined event types. There were only three types of events: points, lines, and mixtures of points and lines. An *I Ching* table for these three types was created by tossing two hexagrams to be used as the dividing points. Then hexagrams were obtained for each sound to determine the event type of that sound, based on the table... Once the event lists were made, Cage inscribed the points on the score and then used the event lists to draw the notes.<sup>42</sup>

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41. Pritchett, “The Development of Chance Techniques,” 294.

42. *Ibid.*, 295-300.

Cage used the *I Ching* as part of his compositional process for *27' 10.554"*.<sup>43</sup> The *I Ching* is a Chinese philosophical text, one of its methods to obtain random numbers involves flipping coins. Cage has the performer execute a similar process in *Child of Tree*, a multiple percussion solo from 1975.

Cage leaves aspects of the performance of *27' 10.554"* up to individual performers, such as the selection of instruments. Regarding distribution of instruments in the instrument groups, no minimum or maximum amount is given, although Cage does specify that a “virtuoso performance will include a wide variety of instruments, beaters, sliding tones, and an exhaustive rather than conventional use of the instruments employed.”<sup>44</sup> He provides examples of possible playing techniques, including dipping gongs in water, executing a tremolo between two instruments set up side-by-side and employing many different types of beaters. The only stipulation built into Cage’s directions and notation is that some events are required to resonate. Therefore, an event marked “laissez vibrer” would work best as a resonant instrument. For example, it would be best to use a triangle instead of a muffled brake drum for an event marked with a “hook,” Cage’s symbol for “laissez vibrer.”

There is also an element of indeterminacy when the performer chooses which instrument to play. The notation in *27' 10.554"* does not specify which individual instruments in a group to strike, only in which group an event occurs. This leaves the performer free to interpret the score in a myriad of ways, increasing the likelihood that no two performances—even by the same performer—will be identical.

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43. Pritchett, “The Development of Chance Techniques,” 295-296.

44. Cage, *27' 10.554*.

Another indeterminate element of performance in *27' 10.554"* is whether or not to utilize a recording. The premiere, which did not take place until 1962 in Munich, used a recording. This initial performance was presented by Siegfried Rockstroh on percussion with Mauricio Kagel controlling the electronic tape.<sup>45</sup> One way the recording could be utilized is to prerecord some of the events to make a play-along track. Some sections of the piece have too many events for one performer to physically execute. On page 10—from fifteen seconds to sixteen seconds—there are forty-five points of attack that need to occur in the space of one second.

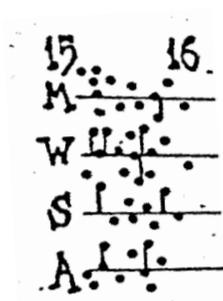


Figure 3. One second of music that contains forty-five points of attack.<sup>46</sup>

This passage is unplayable if taken literally; the addition of the tape part would allow some of these events to be pre-recorded and either triggered at the appropriate time or placed in a continuously running track that was twenty-seven minutes and ten and one-half seconds long. One other interpretation could be to not take the number of events literally and focus on the density of events instead. There would be approximately one second of extremely high activity across all instrument groups.

The execution of the tape part is also indeterminate. In the 1962 premiere, Mauricio Kagel controlled the tape. However, it could also be controlled by the percussion performer with

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45. Pritchett, "The Development of Chance Techniques," 291.

46. Cage, *27' 10.554*.

a foot pedal or, as mentioned earlier, as a play-along track in which events are pasted into the corresponding seconds from the score. The work is also performable as just a recording with no live percussionist.

One other indeterminate aspect of *27' 10.554"* is that it can be combined with string players and/or pianists, as long as they “use an equal number of structural units of their parts.”<sup>47</sup> This means that a performance of *27' 10.554" for a Percussionist* could include any combination of a percussionist, tape, tape performer, pianist(s) or string player(s). Cage does not specify any limit to the number of string players or pianists that can be utilized. If a pianist or string player is added it is unclear if the work would still be referred to as *27' 10.554" for a Percussionist* or simultaneous performances of *27' 10.554" for a Percussionist* and *26' 1.11499" for a String Player*, for example.

#### B. Karlheinz Stockhausen - *Nr. 9 Zyklus* (1959)

The following quote from Stockhausen’s 1971 London lecture explains his compositional process for *Zyklus*:

My composition ZYKLUS ‘Cycle’ is worked out according to different degrees of indeterminacy, with different degrees of statistical behavior affecting certain groups of elements, groups or masses. That means the resulting music is constantly fluctuating between determinate and statistical behaviour... In ZYKLUS I have worked with nine degrees of statistical distribution... Statistical methods are introduced into musical composition in terms of bands and band-widths. By band I mean that every aspect is considered as occupying a position between a minimum and a maximum value: in pitch, a highest and a lowest pitch; in rhythm, a shortest and a longest duration; in timbre it may be between dark and bright. What is in between such limits is called a band and the band has a certain width. When the width of the band is zero, then we have a highly determinate situation: there is no choice. At the other extreme, when the band extends

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47. Cage, *27' 10.554*.

over the whole range of possibilities and I can choose, for example, any pitch, then the band-width is maximum.<sup>48</sup>

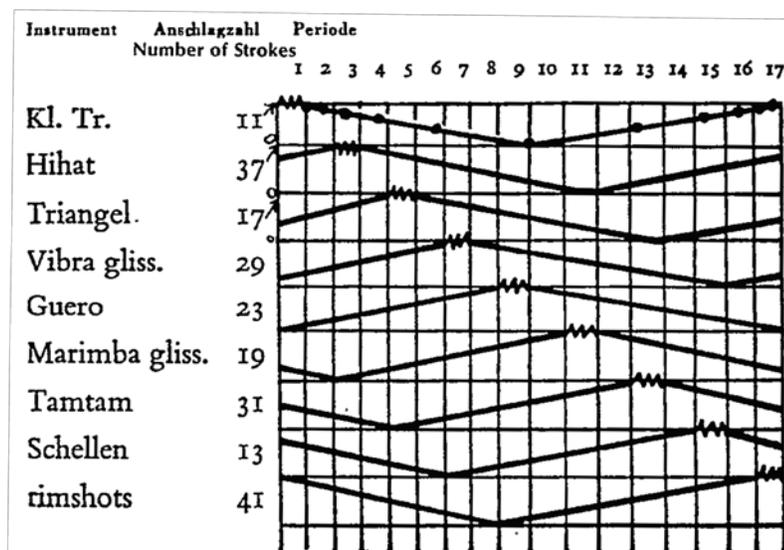


Figure 4. Graphic that shows one manifestation of the band-widths Stockhausen discusses: the distribution of instrument activity densities through each page (periode) of *Nr. 9 Zyklus*.<sup>49</sup>

*Zyklus* is organized into bands by instruments that create a circle around the performer. Activity levels for instruments opposite each other are inversely related. For example, when the triangle is at its busiest, the instrument across the circle (tam-tam) is in its period of least activity.

The first step in understanding Stockhausen's system of notation is for a player to figure out which instruments to strike and when to strike them. Figure 5 contains the symbols

Stockhausen uses to indicate instruments:

48. Maconie, *Stockhausen on Music*, 50-51.

49. Neil DePonte, "No. 9 Zyklus: How and Why?," *Percussionist* 12, no. 4 (1975): 142.

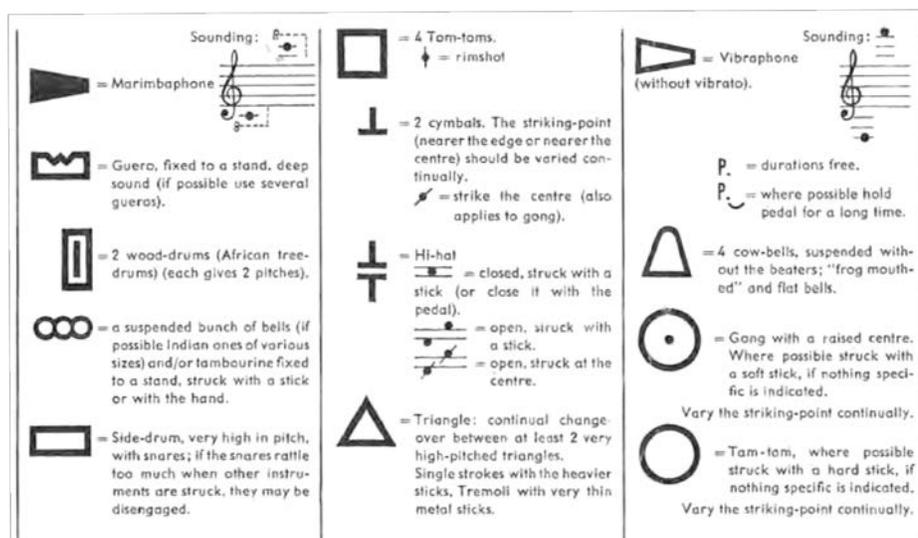


Figure 5. Diagram that explains instrument symbols.<sup>50</sup>

All the symbols are a symmetrical drawing of each instrument. This symmetry facilitates reading the score no matter which way the pages are turned and if the player is reading right-to-left or left-to-right.

The following text is an excerpt from Stockhausen's notes included with the score, with the author's clarifications in square brackets. It explains how to interpret Stockhausen's notation.

### Structure Types:

1. Composed straight through as usual; all dots and/or groups are fixed by the time scale. [The time scale is represented by the vertical lines that create equal segments on the staff; each box is of equal duration.]
2. Where several bracketed staves occur, one is to be chosen for performance.
3. Groups and/or dots in triangles are interchangeable (as regards their succession), but they must begin in the indicated points in the measured time-lapse.
4. Groups and/or dots in rectangles are interchangeable (as regards their succession) and can be folded into the measured time-lapse at any point within the length of the rectangle: both successively and simultaneously (wherever possible).
5. Groups and/or dots in 2 rectangles drawn one above the other [with a double-headed arrow in between] are just as in single rectangles. But a group or dot from one rectangle should be followed by a group or dot from the other (alternate). In some

50. Karlheinz Stockhausen, *Nr. 9 Zyklus* (London: Universal Edition Ltd., 1960).

rectangles and pairs of rectangles, only connections and changes indicated by arrows may be played.

6. Groups and/or dots in bracketed rectangles drawn simultaneously above and below the continuous measured stave: the procedure is the same for single rectangles, but in one performance only the contents of one of the rectangles are to be played.
7. Groups and/or dots in rectangles which are occasionally widened: the procedure is the same as for simple rectangles, but the reservoir of elements is increased during the time of the widening.
8. Dots without stave-lines for the 4 Tom-toms: the distribution of the points is determined statistically by their density (speed) and thickness (intensity); the pitches are free; intervals of entry are—taking account of density—relatively free.<sup>51</sup>

We can now examine how Stockhausen employs graphic notation. Figure 6 (ahead) shows an example page of *Zyklus* and includes structure types 4, 5, 6, 7 and 8; this figure will also show how Stockhausen notates marimba glissandi.

The thick oblique lines seen in the marimba music on the main time scale are interpreted as glissandi. Starting with the beginning of the time scale at the top of the document page and using the left side of the document page as the bottom of the score page, the following marimba glissando starts on the notated Bb3 and moves with consistent intensity up to E6.<sup>52</sup> When the line reaches the peak, the player should immediately glissando down to G3 with a consistent intensity, but with more intensity than on the way up. The player is left with a decision to make at this point, which is how to make the required change in intensity. The thicker line is steeper than the thinner line that came before it. The steeper line will indicate a faster glissando since the distance the mallet travels is covered in a shorter period of time.

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51. Stockhausen, *Nr. 9 Zyklus*.

52. C4 will be considered middle C in this document.

The image displays a musical score for marimba glissandi, organized into several systems. The top system includes a large staff with a series of dots, likely representing a glissandi pattern, and a smaller staff with notes. Below this, there are several systems of staves, each containing different musical notations such as notes, rests, and dynamic markings. The score is written in a complex, multi-staff format, typical of contemporary music notation. The notation includes various symbols like triangles, squares, and lines, which are used to indicate specific performance techniques or dynamics. The overall layout is dense and intricate, reflecting the complexity of the piece.

Figure 6. Structure types 4-8 and marimba glissandi.<sup>53</sup>

53. Stockhausen, *Nr. 9 Zyklus*.

Another example page of *Zyklus* is figure 7. This figure shows structure types that figure 6 did not (1-3).

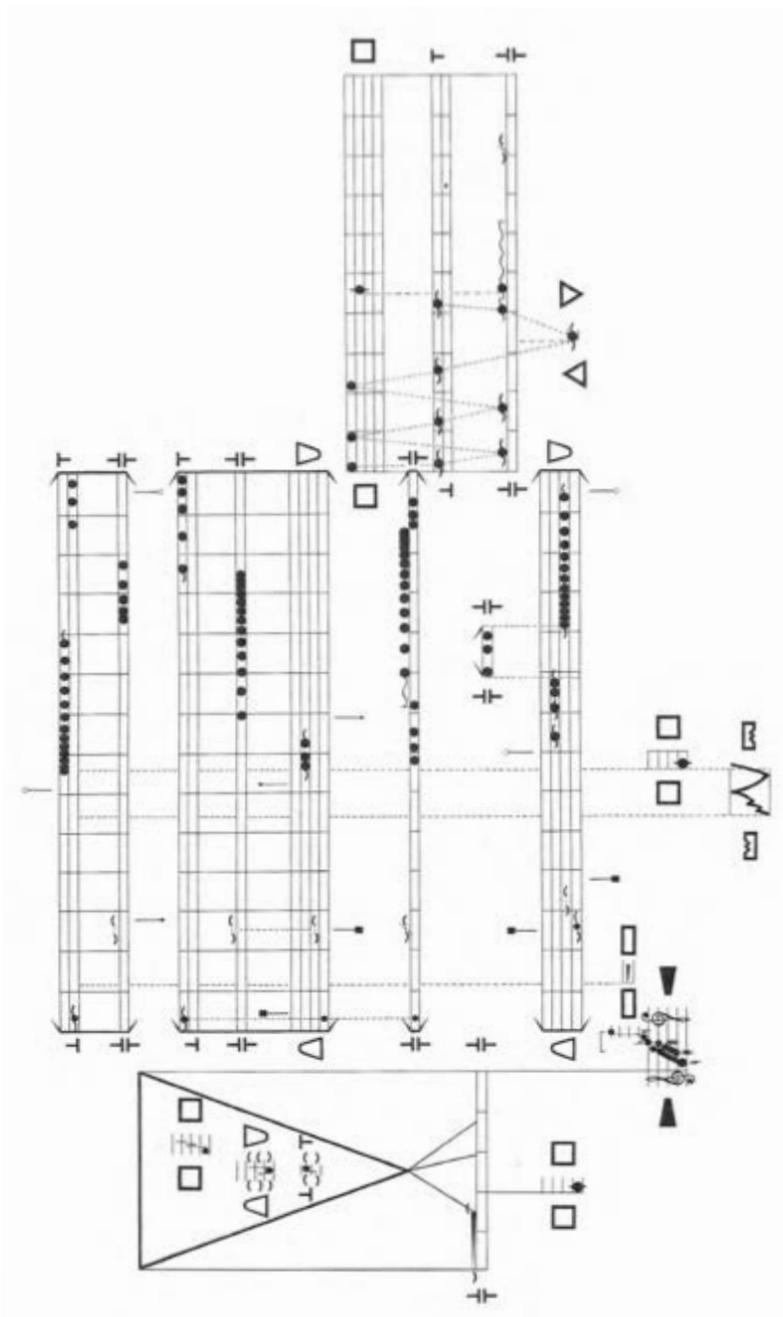


Figure 7. Structure types 1-3.<sup>54</sup>

<sup>54</sup> Stockhausen, *Nr. 9 Zyklus*.

In Figure 7, the beginning of the score page will be at the bottom of the document page and the bottom of the score page will be at the right of the document page. At the beginning of the time scale, Stockhausen uses a black line that thickens as time moves forward. This line gives us instructions regarding two parameters, which are duration and volume. Duration is transmitted when the performer observes where the line begins and ends. The sound must be continuous since the line is continuous. Volume is transmitted by the thickness of the line, a thicker line equals greater volume (intensity). Using this information, it is known that the performer should execute a roll on a hi-hat (indicated by the symbol next to the staff) that grows in volume and finishes after one and one-half segments on the time scale. If this were notated in a non-graphic manner, it could involve—as one example—a dotted quarter note with three slashes through the stem and a crescendo hairpin underneath with the desired dynamics marked at the beginning and the end. There would possibly be “hi-hat” written above or beside the staff. It is clear that Stockhausen’s system of graphic notation is more efficient in conveying this information.

Another example of graphic notation in figure 7 is the guero scrape, indicated by the jagged line that occupies the bottom of the score page. From Stockhausen’s notation we receive information regarding four parameters, including instrumentation, duration, articulation and (relative) pitch. The instrumentation is, once again, indicated by the symbol to the left of the staff. Duration is indicated by when the line begins and ends; articulation and pitch are indicated by the shape and angle of the line. The line is not straight, but contains two smaller peaks on the way up to a large peak and swoops down into a valley only to rise again immediately to the level of the large peak, where it terminates. Each of the smaller peaks can be interpreted as a re-articulation of the scrape, without allowing the scrape/sound to stop. It can be assumed that the lower part of the line indicates a lower relative pitch (large/closed end of the guero), and the

higher part will indicate a higher relative pitch (smaller/open end). Pitch is also determined by the speed of the scrape, so a steeper line will indicate a higher pitched scrape. We can interpret the scrape as follows: The performer starts with three small, quick scrapes that move from low to high followed by a larger, slower scrape back down and terminates with a faster scrape back up (speed of the scrape can be inferred from the angle of the line: the more vertical the line, the faster the stick moves across the instrument). Conveyance of a gesture such as the guero scrape would be less clear with non-graphic notation. The previous examples show how much information Stockhausen is able to convey using graphic notation. He would not be able to transmit this information using non-graphic notation without a detraction from clarity in the score.

Stockhausen uses indeterminacy in *Zyklus*, which has three distinct manifestations in figure 8 (ahead). He employs a large-scale form of indeterminacy that can be observed in the performance notes: “One interpretation can begin with any page, and must then run through all pages in the given order, without interruption and finish with the first stroke of the page you started with.”<sup>55</sup> Stockhausen also allows the piece to be played with the pages inverted, indicated by the instrument symbols and clefs that are drawn on both sides of events, facing upside down and right side up. These symbols and clefs allow the performer to read the notation regardless of how the music is facing. This indeterminacy is large-scale and can greatly alter the sequence of events, even if those events are all fixed and pre-determined.

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55. Stockhausen, *Nr. 9 Zyklus*.

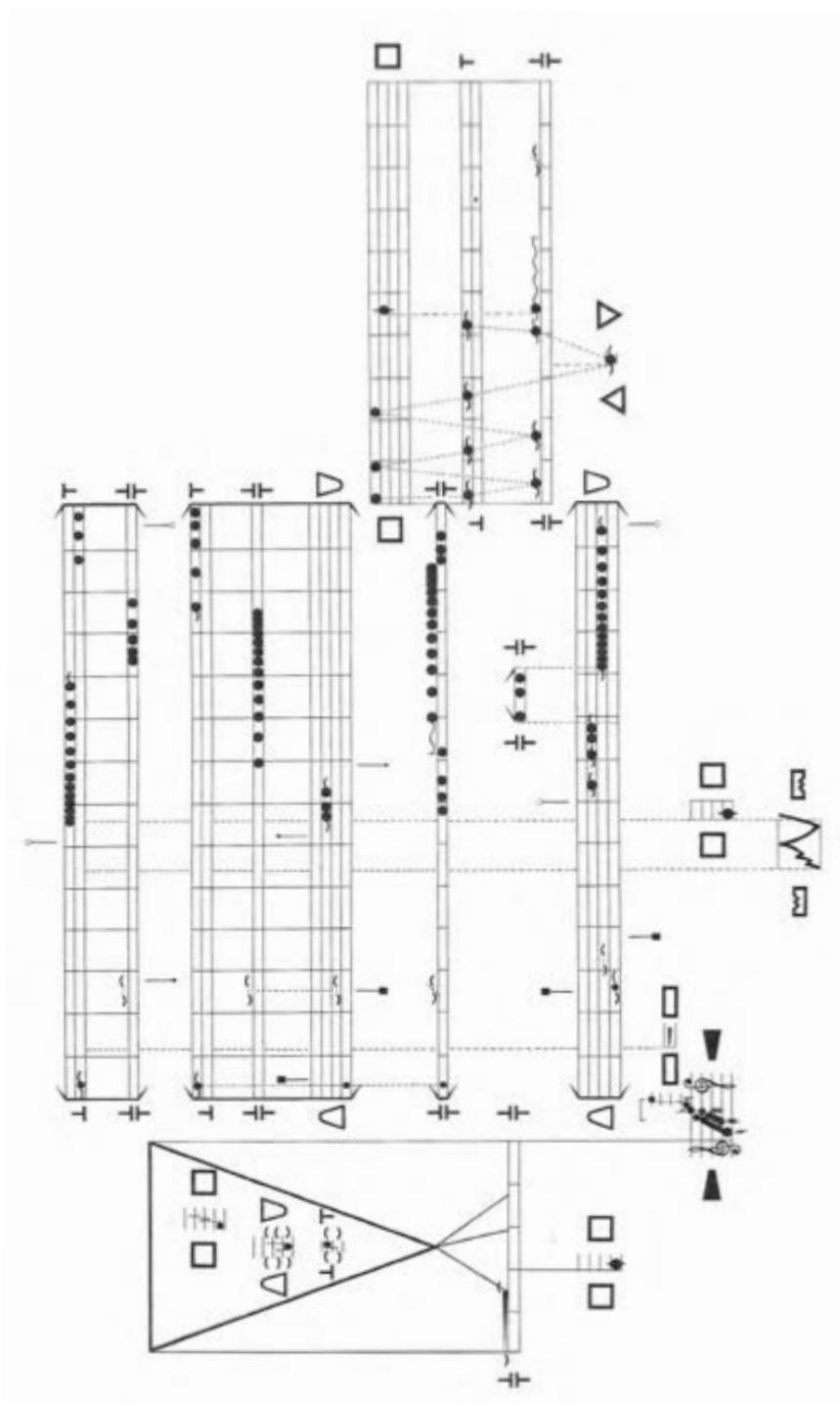


Figure 8. Three different levels of indeterminacy.<sup>56</sup>

<sup>56</sup> Stockhausen, *Nr. 9 Zyklus*. The same page of music was copied again to prevent excessive page turning while referencing the figures.

Stockhausen allows the player to choose bracketed staves, as seen in the middle of the page in figure 8. During a performance, only one staff is selected, picked in the moment by the performer—although most interpretations pre-select the staff. This form of indeterminacy is on a smaller scale than the previous one, but still has the potential to alter the musical effect.

Another way that Stockhausen employs indeterminacy—seen in figure 8—is through the use of structure type 3, which is the triangle seen at the bottom of the document page. In this particular triangle, there are three events that can take place in any order. His only stipulation is that the events have to correspond to the points indicated on the time scale by the lines that emerge from the point of the triangle. This is the smallest scale example of indeterminacy seen on this page. From the previous three forms of indeterminacy discussed, we see exactly how Stockhausen leaves the performer free to choose the local structure of the fixed musical materials. This is opposite of a simplified “Cage-ian” philosophy of indeterminacy, where one is often required to come up with the musical materials inside of a fixed structure, as seen in Cage’s 1975 composition *Child of Tree*. However, there are instances where the musical materials in *Zyklus* are not determined. This indeterminacy is found when Stockhausen uses dots to show the density of materials, similar to the method Cage used in *27' 10.554"*. The more dots that occupy a certain space, the denser the musical activity.

Referring back to figure 8, one can count the number of ways this page can be played. Taking into account the three levels of indeterminacy on this page (left/right, upside down and the order of events in the triangle), there are 96 acceptable interpretations.

C. Helmut Lachenmann - *Intérieur I für einen Schlagzeugsolisten* (1966)

In the latter half of the 1960's, Helmut Lachenmann was interested in finding his own concept of music. He desired this concept to fall outside the serial, aleatoric and tonal systems already in place. The result of his searching was an idea he calls *Musique Concrète Instrumentale*; the following quote from an interview conducted by Paul Steenhuisen in 2003 explains Lachenmann's thoughts:

I felt that I needed to find my own concept of music. When I searched for it in the late sixties, I called it *musique concrète instrumentale*. The original *musique concrète*, as developed by Pierre Schaeffer and Pierre Henry, uses life's everyday noises or sounds, recorded and put together by collage. I tried to apply this way of thinking, not with the sounds of daily life, but with our instrumental potentialities... It is true that I am trying to search for new sounds, but this is not my aesthetic aim or credo as an artist. With conventional or unconventional sounds, the question is how to create a new, authentic musical situation. The problem is not to search for new sounds, but for a new way of listening, of perception. I do not know if there are still new sounds, but what we need is new contexts.<sup>57</sup>

This quote sheds light on how Lachenmann's thinking progressed around the time he composed *Intérieur I*. Later in the interview, Lachenmann provides an example of how he defines *Musique Concrète Instrumentale*: "If I hear two cars crashing—each against the other—I hear maybe some rhythms or some frequencies, but I do not say 'Oh, what interesting sounds!' I say, 'What happened?' The aspect of observing an acoustic event from the perspective of 'What happened?', this is what I call *Musique Concrète Instrumentale*."<sup>58</sup>

*Intérieur I* fits into Lachenmann's idea of trying to re-contextualize sounds. Many of the sounds he composed occupy space outside their traditional context. Two methods are relevant,

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57. Paul Steenhuisen, "Interview with Helmut Lachenmann—Toronto 2003," *Contemporary Music Review* 23, no. 3-4 (2003): 9.

58. *Ibid.*, 10.

extended techniques and combinations of timbres. One extended technique Lachenmann uses is at the end of page 6, where Lachenmann requires that the performer grasp a suspended cymbal as you would to muffle the instrument, but before you strike it. This produces a sound that clearly still comes from a cymbal, but is drastically changed. How hard the cymbal is grasped will determine the initial articulation (also dependent on the beater), which overtones are emphasized and how long the resonance will last.

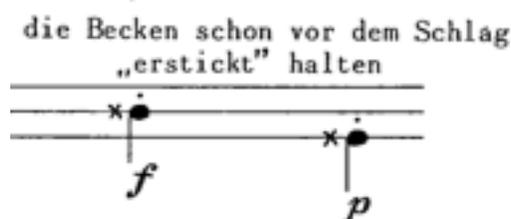


Figure 9. Lachenmann's notation for choking the cymbal before striking.<sup>59</sup>

Combinations of timbres are plentiful in *Intérieur I*. Lachenmann employs a large palette of instruments: three triangles, three suspended cymbals, hi-hat, sizzle cymbal, small and large tam-tams, four almglocken, four temple blocks, a pair of bongos, two tom-toms, timpano, vibraphone, a marimba and six crotales. He is able to construct many combinations of sounds/timbres using these instruments. One example is on page 5 where he requires the performer to strike the small tam-tam and the medium triangle at the same time. Both are metal instruments with a relatively long decay, and this particular combination allows for a sound where mostly low and medium frequencies are observed in the tam-tam, while high frequencies from the triangle add a sparkling, brittle quality to the composite. Another combination is at the beginning of page 5: Lachenmann uses the large tam-tam in combination with the large tom-tom.

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59. Helmut Lachenmann, *Intérieur I für einen Schlagzeugsolisten* (München: Edition Modern, 1967), 6.

There is a *piano* stroke on the tam-tam with a soft beater, quickly followed by a roll on the tom-tom that starts *piano* and decrescendos. If executed so there is not a clearly defined attack on the beginning of the tom-tom roll, the effect is striking. The resonance of the tam-tam will seem to take on the quality of the tom-tom roll and the sounds will decay together.

Both of the examples cited above work well as the blending of multiple sounds into a complex sound. Other examples—mostly with instruments that are dissimilar in material—are heard as the layering of multiple, distinct sounds. One such example is also on page 5: there is a roll on the hi-hat that starts at *piano*—which crescendos then decrescendos—with a simultaneous *fortissimo* staccato stroke on a temple block. The hi-hat is a metal instrument that, in this instance, is heard as legato and the temple block is a wooden instrument that is heard as staccato. Given the opposing construction material and articulations of these instruments, this event is one example of a juxtaposition of sounds rather than a blending of sounds. Figure 10 shows all the events previously discussed:

Musical score for *Intérieur I* by Lachenmann. The score includes staves for various percussion instruments and dynamic markings. The score is annotated with red boxes and labels: "large tam-tam/large tom-tom", "hi-hat/temple block", and "small tam-tam/triangle". The score also includes the instruction "bewegter vorwärts" and "alle Ausdämpfungen (x) deutlich!".

Figure 10. Section of *Intérieur I* that shows how Lachenmann combines sounds.<sup>60</sup>

As we reflect on the previous sounds and Lachenmann's concept of *Musique Concrète Instrumentale*, we might ask "what happened?" when we hear new or re-contextualized sounds in *Intérieur I*. According to Lachenmann, that question is how he defines his musical thought while composing *Intérieur I*.

*Intérieur I* contains elements of graphic notation, one use is the symbols that depict instruments. These symbols reoccur throughout the piece to signify when the performer should switch instruments. It is curious that Lachenmann did not use symbols for the sizzle cymbal, vibraphone, marimba, timpani or crotales. Stockhausen employed symbols to depict marimba

60. Lachenmann, *Intérieur I*, 5.

and vibraphone in *Zyklus*, therefore the precedent was set for Lachenmann. It is unknown why Lachenmann indicated some instruments with symbols but not others. For the instruments that do not have a corresponding symbol, an abbreviation is used. For example, “Mar.” for marimba, “Pk.” (pauken) for timpani, “Sizzle” for sizzle cymbal and “Cymb.” for crotales (sometimes referred to as antique cymbals in the percussion community). Figure 11 is from the page of instructions that accompanies the score to *Intérieur I*, and lists all the symbols:

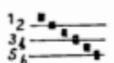
<u>Instrumentarium</u>	
3 verschieden hohe Triangeln	△
3 verschieden hohe Becken (2. und 3. mit langem Nachhall)	⊥
1 (möglichst großes) HiHat	⊥
1 Sizzle-Becken	○
1 kleines Tamtam	○
1 großes Tamtam	○
4 Almglocken z.B. e <sup>4</sup> -a <sup>4</sup> -d <sup>2</sup> -as <sup>2</sup>	◐
4 Temple-Blocks	◑
1 Paar Bongos	▭
2 Tomtom (mittel und tief)	▭
1 Pedal-Pauke (A - g)	▭
Vibraphon	
Marimbaphon	
Cymbales antiques	

Figure 11. Instrument list for *Intérieur I* with the corresponding symbols.<sup>61</sup>

The first event in *Intérieur I* consists of a simultaneous stroke on the timpano and marimba; there are two aspects of this event that warrant consideration in Lachenmann’s use of graphic notation. The first is the solid line that emanates from the note on the timpano. This line is used to indicate a glissando that starts on C3, descends to A2 and ascends to finish at C#3. The change in pitch can be inferred by the direction of the line and where it switches directions.

61. Lachenmann, *Intérieur I*, n.p.

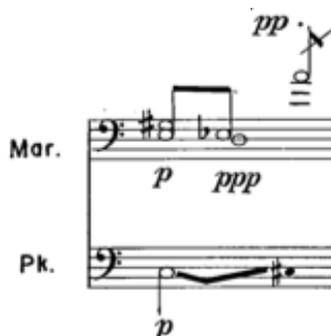


Figure 12. Notation at the beginning of *Intérieur I* that shows the use of soft mallets and the timpano *gliss.*<sup>62</sup>

The second aspect of graphic notation is the note heads, which do not indicate note duration, as seen in standard notation. Instead, Lachenmann chooses to have a note head represent which implement to use. For example, the first event has a note head that is not filled in, similar to a “half note” in conventional rhythmic notation. In *Intérieur I*, a “half note” does not stand for a duration of two beats, but implies that you strike with a soft mallet. A note head that is filled in, similar to a “quarter note,” implies that you strike with a hard mallet. Lachenmann also uses differently shaped note heads to specify implements. The round note heads indicate mallets and the rectangular note heads indicate a drumstick or knitting needle.



Figure 13. Note heads that indicate mallet selection.<sup>63</sup>

One can now observe how Lachenmann indicates which mallets to strike with and the desired range of the glissando on the timpano.

62. Lachenmann, *Intérieur I*, 1.

63. *Ibid.*, n.p.

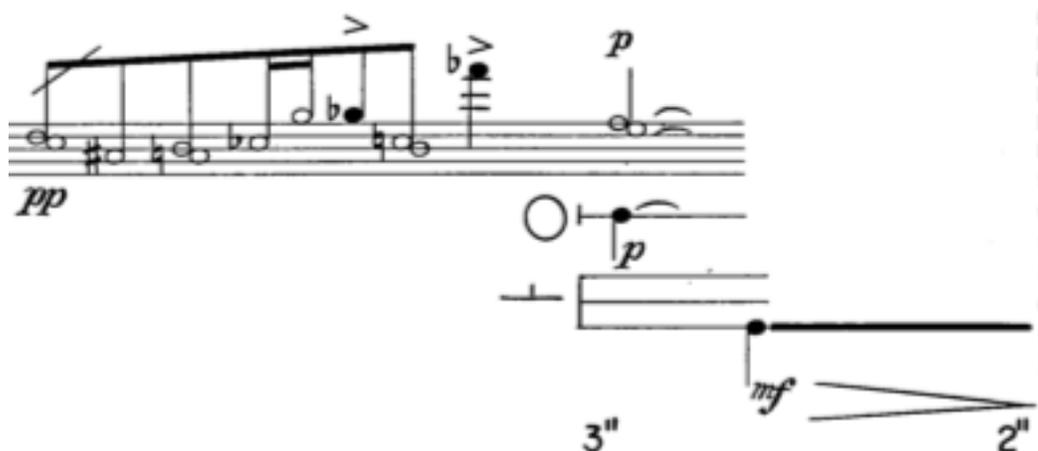


Figure 14. Marimba music that utilizes both hard and soft mallets.<sup>64</sup>

We are now able to discern which notes are struck with hard and soft mallets in figure 14. The event following the release on the Ab (the staff is in bass clef) with the hard mallet can now be interpreted as a double stop on the marimba with soft mallets and a *piano* stroke on the small tam-tam with a hard mallet. The following cymbal note—with the hard mallet at *mezzo forte*—has a line that stems from it horizontally, similar to the timpano glissando. Instead of a glissando, which is indicated by the oblique nature of the line, the horizontal line indicates that the player rub the instrument. Lachenmann states, referring to the symbol used in the key for the score: “stroke, always according to circumstance, circular, or figure eight, or simply vertical. At the same time, the drumstick must not be clasped too firmly, but should slide loosely; the volume is determined by the speed of the sliding (analogous to the “flautato of stringly-instruments” [sic]).<sup>65</sup> Lachenmann indicates a similar technique—which he calls a “tremolo-scraping”—by adding three slashes to the stem of the note. He requests that the percussionist execute a faster

64. Lachenmann, *Intérieur I*, 1.

65. *Ibid.*, n.p.

scraping on the playing surface of the instrument, possibly with a similar motion to a string player producing a tremolo at the tip of their bow.

A different type of symbol is employed to indicate the closing of the hi-hat after it is struck, while allowing the edges to “grate” together. This symbol is also used for the suspended cymbals, which are set up in tiers so the edges overlap. Lachenmann states in his directions: “let both cymbals touch one another very lightly, so that a grating sound is produced.”<sup>66</sup> This symbol appears as a decrescendo that consists of dotted lines.

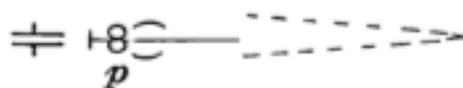


Figure 15. Notation for closing the hi-hat while letting the plates “grate” together.<sup>67</sup>

Lachenmann also uses graphic notation strategies to indicate whether to use the right or left sticks. Right or left-handed sticking is indicated by the stem of a note that faces up or down (up is right, down is left). This strategy is shown in figure 16:

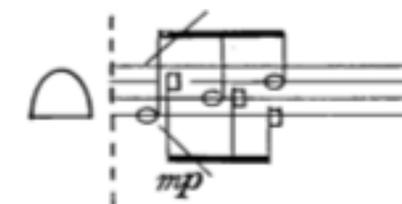


Figure 16. Almglocken with a soft mallet is played by the right hand and by a needle in the left hand.<sup>68</sup>

66. Lachenmann, *Intérieur I*, n.p.

67. *Ibid.*, 2.

68. *Ibid.*, 3.

There are instances that do not follow Lachenmann's sticking rule, these are usually observed in extended passages on mallet instruments or other passages with rapid notes.

There is another notational peculiarity in *Intérieur I* that is worth mentioning: the notated music does not always flow in order from page to page. Instead, Lachenmann uses a series of "Anschluss," or connections, to help facilitate reading the music between the three designated music stands at "Rechts," "Mitte" and "Links" (right, middle and left) positions. This is done so that the percussionist is always reading music that is closest to the instruments he/she is playing. Figure 17 shows one of these "Anschlüssen" that has the player jump to page 4 from the beginning of page 3.

The figure illustrates a musical connection between two pages. On the left, a 9-inch section of music is shown, labeled "Mitte, Anschluss 3 (Blatt 4)". It features a mallet instrument part with dynamics *p* and *ppp*, and a drum part with a *mf* dynamic. A large arrow points from this section to the right page. The right page shows a 5-inch section of music, labeled "Anschluss 3". It includes a mallet part with dynamics *p*, *ppp*, *mf*, and *ff*, and a maracas part with a *gliss.* instruction and a *(s-mf)* dynamic. The notation includes various musical symbols such as stems, beams, and dynamic markings.

Figure 17. An example of "Anschluss."<sup>69</sup>

Lachenmann provides a duplicate of the first events to assist with the transition. He also provides written directions about where to move. This movement is indicated by "Mitte, Anschluss 3 (Blatt 4)." This means that the performer should move his/her eyes to the middle music stand and should look for connection 3 on page 4. Although not explicitly graphic notation, this method is relevant because it is an aspect of the notation for *Intérieur I* that was created specifically for the

69. Lachenmann, *Intérieur I*, 3-4.

piece. Lachenmann's composition was the first of the three to incorporate text that gives real time instruction as the player is reading the score, which is mostly absent from Cage's score, except for letters to represent instrument groups and from the Stockhausen score, except letters for pedaling, trill and 8va markings.

Another technique Lachenmann specifies through graphic notation is the use of fingers on the marimba. He indicates this technique in multiple ways, depending on the context of the music. One method simply states "Hände," which translates to "hands." Another variation of this is "m. Hand." The "m." is an abbreviation for "mit" which makes "mit Hand;" this phrase translates to "with hand." On pages 9, 10 and 14 he also uses the phrase "Fingerspiel," (finger play) accompanied by a series of dense stems with no note heads.

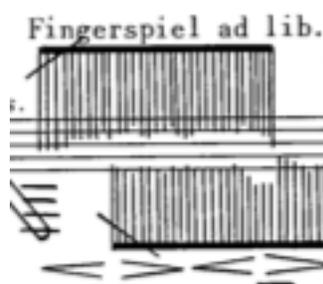


Figure 18. Notation for "Fingerspiel" on marimba.<sup>70</sup>

The "Fingerspiel" technique also has an element of indeterminacy: Lachenmann does not specify which exact notes to play or how to use your fingers.

Lachenmann's treatment of rhythm in *Intérieur I* is mostly indeterminate. There are no measure lines in the score. Instead, sections of music are assigned a temporal value, such as eight seconds. The events within these sections must take place in order, but at no specific time or in any specific rhythm. These sections are sometimes delineated by vertical dotted lines, but similar

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70. Lachenmann, *Intérieur I*, 14.

lines are also used to highlight when events not written on the same staff are to occur simultaneously. It is worth noting that there are sections of *Intérieur I* where Lachenmann does indicate specific rhythms. These are shown at the top of the score page on stems without note heads.

The image shows a musical score snippet with three staves. Above the top staff, there are three groups of rhythmic stems with beams, labeled with '6', '3', and '6' respectively. The middle staff is labeled 'Mar.' and 'm. Hand' and contains a glissando line starting from a *pp* dynamic and ending with a *f* dynamic. The bottom staff is labeled 'Pk.' and 'Fell-Mitte' and contains a single note with a *p* dynamic. To the right, there is a circled minus sign and a staff with a note marked *mp*.

Figure 19. Specific rhythms written above the staff.<sup>71</sup>

Lachenmann's use of beams throughout the majority of the composition indicates relative rhythm, but not exact rhythm. Figure 20, seen previously, shows his use of beams and indications of seconds per section:

71. Lachenmann, *Intérieur I*, 6.

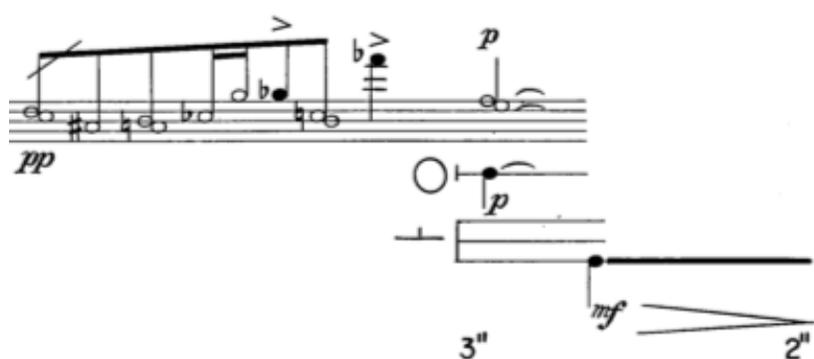


Figure 20. Use of beams and seconds per section.<sup>72</sup>

The “oblique dash” seen at the beginning of figure 20 is explained by a passage that says “Phrases with oblique dash are free, mostly rapidly executed passages, or as rapidly as possible.”<sup>73</sup> This direction leaves the performer some flexibility when he/she decides how to execute these passages.

Some of the indeterminacy in *Intérieur I* stems from ambiguities in Lachenmann’s notation. There are several symbols he uses that are not accounted for in his legend. These symbols include oblique dashes through the stem of an individual note, oblique dashes through the head of an individual note, an *x* through the head of an individual note, different types of fermatas and three different ways to indicate dampening an instrument (an *x*, an *x* with a stem and a comma).

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72. Lachenmann, *Intérieur I*, 1.

73. *Ibid.*, n.p.



Figure 21. Ambiguous notation for muffling the low cymbal: an *x* and an *x* with a stem.<sup>74</sup>

The large cymbal (on the top staff) is struck at *piano* and quickly muffled, indicated by the *x* with no stem. However, Lachenmann asks the performer to muffle the cymbal again (in sync with the small tam-tam), even though it was not struck again. In this event, there is the added ambiguity of the stem on the second *x*. One possible interpretation of this sequence would be to set the soft mallet—used for the initial strike—on the cymbal as the small tam-tam is struck at *triple piano*. This satisfies Lachenmann’s request that an event should happen on the cymbal at that time, but without creating any new sound.

Lachenmann uses two different types of fermatas, neither of which is discussed in his legend of the notational system he uses. One is a “marcato” symbol with a dot in the middle and the other is the symbol typically associated with a fermata. The “marcato” symbol fermata seems to indicate a pause on localized level, or on individual events. The other fermata is used on a broader structural level. As such, the “marcato” symbol fermata is most likely of shorter duration than the other type. The following example, from page 4, shows the two types of fermatas. The

74. Lachenmann, *Intérieur I*, 6.

three seconds indicated above the first fermata does not indicate the length of the fermata, but the length of the section of music, as discussed before.

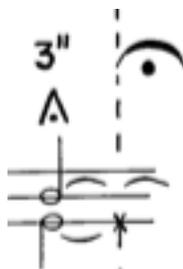


Figure 22. Two different types of fermatas.<sup>75</sup>



Figure 23. Ambiguous use of oblique dashes and glissandi.<sup>76</sup>

Figure 23 could be interpreted as one continuous gesture—as indicated by the spatial proximity of the events—or as four distinct events with a discernible separation between each beam. According to Lachenmann's notation and directions, both would be acceptable interpretations. Therefore, indeterminacy has arisen through ambiguity in Lachenmann's

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75. Lachenmann, *Intérieur I*, 4.

76. *Ibid.*, 13.

notation. The “*gliss.*” marking under the middle two patterns should also be taken into account. One interpretation could be to slide the hard mallet from the cymbal to the almglocken and finish on the temple block. The physical arrangement of instruments seems to support this idea, since middle instruments are lined up with middle instruments and high instruments are lined up with high instruments.

Many elements of Lachenmann’s composition are highly determined, including articulation, pitch, timbre, amplitude, register, specific mallet changes and score pages on specified music stands. Lachenmann’s use of rhythm is the most consciously indeterminate aspect of *Intérieur I*.

## VI. Conclusion

The Darmstadt IFNM was indeed paramount to the development of solo multiple percussion repertoire starting with Karlheinz Stockhausen’s *Nr. 9 Zyklus* in 1959. Cage’s work was composed before his visit to the IFNM, but he lectured there about indeterminacy in 1958, just two years after he wrote *27' 10.554"*. Stockhausen then delivered a lecture about graphic notation in 1959 and these compositional techniques both found their way into Lachenmann’s music seven years later. The following timeline concisely states the order of events that cultivated the existence and development of early solo multiple percussion repertoire.

1956 - Cage composes *27' 10.554" for a Percussionist* using graphic notation and indeterminacy.

1958 - Cage travels to Darmstadt and delivers a series of three lectures called “Composition as Process,” the second one of which is titled “Indeterminacy.”

1959 - Stockhausen composes *Nr. 9 Zyklus* for the Darmstadt IFNM using graphic notation and indeterminacy.

1959 - Stockhausen delivers a lecture on graphic notation titled “Musik und Graphik.”

1966 - Lachenmann—heavily involved at the INFM—composes *Intérieur I für einen Schlagzeugsolisten* using graphic notation and indeterminacy.

Even though Cage, Stockhausen and Lachenmann all employed graphic notation and indeterminacy, the methods they implemented are diverse. Cage graphically notates general timbre (not specific instrumentation), point of attack, volume, density of activity and passage of time. Stockhausen chooses to graphically notate specific instrumentation, passage of relative time, specific and relative pitch, volume, shape of musical gesture and physical motion. His notation of volume is different from Cage's: Stockhausen uses larger dots for louder notes while Cage uses vertical placement of the dots in relation to a horizontal line. Lachenmann graphically notates specific instrumentation, timbre (through implement choice), shape of gesture (such as a timpano glissando) and specific techniques (dampening, grating). His notation of volume is different than both Cage and Stockhausen, he uses conventional dynamic markings.

In regards to indeterminacy, Cage made extensive use of chance operations during the compositional process of *27' 10.554"*, but left many decisions up to the performer as well. These decisions include instrumentation, technique, musical material and implements. Stockhausen's musical materials are more determined than Cage's, especially with the introduction of pitched instruments. A significant conceptual difference that separates *Zyklus* from *27' 10.554"* is the option Stockhausen gives for the performer to choose which staff to play, or the ordering of musical events within a rectangle or triangle. Essentially, Cage's structure is determined while the materials are indeterminate; Stockhausen's materials are mostly determined, but local structures are indeterminate. Lachenmann's composition is the most determined in regards to performance, rhythm is the most substantial indeterminate element he employs.

Other specific similarities and differences between the three pieces—cited earlier in the document—are consolidated here:

1.) In *27' 10.554"* the type of instrument used is indicated by the letter to the left of each staff: an “M” for metal, “W” for wood, “S” for skin and “A” for all others. This is different than *Zyklus* and *Intérieur I* which both use symbols to depict instruments.

2.) It is curious that Lachenmann did not use symbols for the sizzle cymbal, vibraphone, marimba, timpano or crotales. Stockhausen employed symbols to depict marimba and vibraphone in *Zyklus*, therefore the precedent was set for Lachenmann. It is unknown why Lachenmann indicated some instruments with symbols but not others. For the instruments that do not have a corresponding symbol, an abbreviation is used. For example, “Mar.” for marimba, “Pk.” (pauken) for timpani, “Sizzle” for sizzle cymbal and “Cymb.” for crotales.

3.) Note heads indicate soft or hard mallet and type of implement for individual notes in *Intérieur I*. A similar system is used in *Zyklus*, but the symbols do not appear as note heads in the music. Instead, they are seen next to the time scale and apply to the entire passage they precede.

4.) There are instances where the musical materials in *Zyklus* are not determined. This indeterminacy is found when Stockhausen uses dots to show the density of materials, similar to the method Cage used in *27' 10.554"*.

5.) Lachenmann’s composition was the only one of the three to incorporate text that gives real time instruction as the player reads the score. These instructions are mostly absent from Cage’s score, except for letters to represent instrument groups and from the Stockhausen score, except letters for pedal, trill and 8va markings.

In summation, all three composers use graphic notation and indeterminacy, but with three distinct approaches. Their shared relationship to the Darmstadt IFNM allowed for cross-

pollination of ideas which catalyzed the development of early solo multiple percussion music.

Percussionists everywhere owe John Cage, Karlheinz Stockhausen, Helmut Lachenmann and the Darmstadt IFNM a debt of gratitude for helping to give us our own music to perform.

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