A COMPARATIVE STUDY OF SELECTED TWENTIETH-CENTURY PIANO WORKS INVOLVING THE ELEMENTS OF CHANCE AND INDETERMINACY

by

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A study of selected chance and indeterminate piano pieces was made with a two-fold purpose: (1) to provide an intermediate stage between the composition and performance of the selected works and (2) to illustrate the diverse ways spontaneity may be invoked. The investigation centered on three points: (1) the problems the performer might encounter in examining the pieces, (2) implications of the instructions and (3) possible realizations of the score.

While each score examined showed a slightly different approach to chance or indeterminacy, the pieces within the two categories were seen to exhibit common features. Generalizations were made in three broad areas: (1) the instructions in the scores, (2) the notation and (3) possible solutions.

The instructions in the indeterminate scores were found to be relatively straightforward; the performer is made aware of his choices or alternatives and manner of performance is discussed. Instructions in chance works are less explicit; the performer is not directed to any one solution. Some explanation of the notation is given and the performer is led to discover how extensive his freedoms are.

Indeterminate works on the whole are found to use traditional notation. The notation may be altered in some way, but retains a resemblance to its traditional source. Chance notation is very diverse, but three general categories exist: (1) works using
traditional notation, (2) works using traditional and non-
traditional (graphic) notation and (3) works using only graphic
notation.

The possible solutions of indeterminate works are concerned
with either the juxtaposition or the metric relationship of
material. The degree to which the choices are guided varies in
the works discussed. Possible solutions of the chance works
involve interpretation of notation and various ideas presented
in the instructions. The performer must respond in an individual
way, drawing on his own ideas.

In general, analyses of the works illustrated some features
that might be expected in other chance and indeterminate works.
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INTRODUCTION

The main purpose of this study is a didactic one, providing an intermediate stage between the composition and the performance of selected chance and indeterminate piano pieces. Investigation of the works centers on three points: (1) problems the performer might encounter in examining the pieces, (2) implications of the instructions and (3) possible realizations of the score. While certain ambiguities in the works may be clarified and this may be useful to the performer, the attempt has been not so much to make the scores and their instructions entirely explicit as to help the performer orient his thinking in terms of the musical philosophy underlying the works and to stimulate his interest and imagination along the lines of possible solutions.

A secondary purpose is the illustration of the diverse means used to invoke spontaneous choice. Each score examined exhibits a different approach to chance and indeterminacy, and for this reason two chapters have been devoted to a discussion of the scores individually. Within the chapter on indeterminate works, pieces are grouped according to the type of indeterminacy present. In the following chapter the chance works are categorized according to notational similarities. In a further chapter the results of the analyses will be discussed and generalizations concerning the pieces made. Preceding the analyses, a background to the study is provided by a discussion of the terminology and the musical philosophy associated with the works.
CHAPTER I

DEFINITION OF THE TERMS

In this chapter existing definitions and applications of the terms chance, indeterminacy and aleatoricism will be presented, noting the present confusion in their usage. Following this, the terms will be defined as they are to be used in this study.

The term chance by general definition implies that an event "happens unpredictably, without any discernible human intention or direction and in dissociation from any observable pattern, causal relation, natural necessity, . . . ."\(^1\) A chance event happens "unaccountably, without premeditation, pre-arrangement or any sign of motivation and without observable causal relation to attendant circumstances."\(^2\) Indeterminacy suggests a vagueness or lack of preconceived end result. Aleatory means "depending on an uncertain event or contingency."\(^3\) By definition, chance and indeterminacy are close in meaning; unlike chance, indeterminacy does not necessarily connote contingency, the undefined aspect may not be solved in an unexpected manner.

Confusion has arisen in the application of these terms to

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\(^2\) Ibid., p. 373.

\(^3\) Ibid., p. 51.
music. Heinz-Klaus Metzger, noting this confusion, claims that the musical application of the term aleatoric evolves from two individuals, Werner Meyer-Eppler and Pierre Boulez. The first volume of *Die Reihe* contains an article by Meyer-Eppler in which he gives the following definition: "A process is said to be aleatoric (from the Latin *Alea* = dice) if its course is determined in general but depends on chance in detail." In the first issue of the *Darmstädter Beiträge* a translation of the article "Alea" by Boulez appears. In the article Boulez deals with chance as a compositional technique, referring at one point to "aleatoric happenings." No reference is made to aleatoric form. Elsewhere, Boulez writes that the "notion of shunting does not belong to that of pure chance, but that of non-determinate choice, and this difference is fundamental . . . ." Metzger infers from these sources that chance and aleatoricism are synonymous, both referring to works in which the detail is unspecified, being finalized in the performance. If the detail is determined but there is choice in its ordering, the work may be considered indeterminate.

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7 Boulez, "Sonate, Que Me Veux-tu?" *Perspectives of New Music*, 1 (Spring 1963), p. 35.
Aleatoric music is defined in the *Harvard Dictionary* as "music in which the composer introduces elements of chance or unpredictability with regard to either the composition or its performance." This general statement aligns the terms chance and aleatoricism. The contributors noted the terms chance, indeterminate and aleatoric "have been applied to many works created since 1945 by composers who differ widely as to concepts, methods and rigor with which they employ procedures of random selection." The article gives the reader no basis for distinguishing indeterminacy from chance and aleatoric; the three terms are not clearly defined.

Howard Riley states that aleatoric procedures are "those which are dependent on uncertain contingencies." Riley uses aleatoric in a generic sense, to embrace compositions in which details are specified but which lack formal definition, as well as compositions in which the performer must supply the details, being given a general course to follow. In other words, Riley departs from the meaning of aleatoric set up by Metzger and Meyer-Eppler by implying that indeterminate and aleatoric are synonymous.

According to Roger Reynolds, "indeterminacy and chance are

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9 Ibid., pp. 26-27.

progressive degrees of a tendency to leave detailed unspecified . . . . If . . . a composer wants an indetermined situation, there can be no preferred solutions -- and, ultimately, in the case of chance, virtually no 'rules'.\footnote{Roger Reynolds, "Indeterminacy: Some Considerations," Perspectives of New Music, 4 (Fall-Winter 1965), p. 136.} He further submits that in indeterminacy "categories of events" are determined, their ordering being the undetermined aspect. In chance, any event within certain limits may occur.

John Cage writes of works conceived by chance operations and works which are "indeterminate of performance." When the details of parts are established but the form or sequence of the whole is not, Cage would classify the work as "indeterminate of performance," that is, falling in the category of indeterminacy.

The sources above have been used as the basis for deriving the following categories to be used in this study:

a. works in which the details of sections or groups are determined, the ordering of these parts being undetermined; and works in which specified sounds are in a given sequence, but their metric relationship to one another is undetermined.

b. works in which the score exists as a stimulus to the performer, who must supply the details. A form may be given to some degree, or the form may evolve during performance.
The former category will be referred to as indeterminate, the latter as chance or aleatoric. In both categories a degree of spontaneity is assumed. The terms will be further clarified in the discussion of the works.

\[12\] Having defined chance and aleatoric as synonymous musical terms, the term chance rather than aleatoric will be used hereafter.
CHAPTER II

THE MUSICAL PHILOSOPHY: the ideas underlying chance and indeterminacy

The chance and indeterminate works are unified in concept by the denial of prevailing beliefs or assumptions. Historically tonality had assumed an organization structured on a key system. Predictable relationships were a part of tonality; so was periodicity. Not only were there root progressions related throughout a piece, but a piece was divided into related components; that is, the whole was an integration or causal interrelation of parts. With the advent of atonality and non-periodic structure, predictability was no longer a feature, although coherence or continuity was still a concern. Timbre came to be emphasized; pitch and often other parameters were highly organized. Considerable specification and exactness of notation exerted almost impossible demands upon the performer. By creating a situation where the performer could not respond accurately, indeterminacy of a kind arose; the more numerous the demands, the more probable it is that unplanned actions will occur. This sort of indeterminacy, however, is not desired.

The philosophy of chance -- and indeterminacy to a lesser extent -- focused on new assumptions, searching for ways of circumventing the traditional ones. Since the assumptions of chance and indeterminacy do not entirely coincide, the two categories will be discussed separately.
Composers advocating the chance philosophy feel that purposeful structuring or organization prevents the perception of sounds as sensation. Habits of listening, bound by theories about the organization of sound, are a hindrance. Sounds as discrete entities and their situation in time are major concerns of the new assumptions. The possibility of isolating any particular event as the cause of another event is denied. Cage believes that "there are an incalculable infinity of causes and effects . . . . in fact, each and every thing in all of time and space is related to each and every thing in all of time and space." There are no separable causes and effects. Earle Brown refers to "the impenetrable infinite complexities and connections of all things." Thus, events should be allowed to happen without direction, their connection being too intricate to single out a one-to-one relationship. Juxtaposition of sounds no longer indicates a direct relationship. It is sounds as sensation, complete in themselves and independent of structuring, that is important, not their relationship or their placement in a progression. Cage states, "a sound does not view itself as thought, as ought, as needing another sound for its elucidation."

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13John Cage, Silence, Middletown, Conn., Wesleyan University Press, 1939, p. 47.

Each sound should be uniquely perceived, heard for its own sake.

The simplicity of, for example, being given A and from that expecting certain alternatives in B, does not exist. The possibility of the performer envisioning the results of alternative courses of action and of making a rational choice on this basis is no longer acceptable. The composer may no longer predict a general response to what he has written. Prediction depends to a considerable degree upon the use of an established "grammar," a common ground, a "language" which when understood carries with it certain meanings or implications; in chance music this language is absent.

The musical experience becomes a "totality of possibilities" where "no knowing action is commensurate, since the character of the knowledge acted upon prohibits all but some eventualities." If there is selectivity, the singling out of some possibilities, there is no longer a total field of possible results. The meaning of "total field" varies from score to score; the less there is specified in a score, the more manifold the results are likely to be. Within the limitations imposed by a "total field" the experience must be an experimental one, with no preconceptions about the musical result; any outcome will be acceptable since

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16 Ibid., p. 66.
there are no established results. With this assumption, there can be no errors or approximations. Mistakes suggest a measuring up to expectations; for a mistake to occur there must be some knowledge beforehand of what should occur, a restriction of what may occur.

In chance music communication becomes involvement. The composer no longer determines exactly what will be heard but rather instigates a process, making the listener involve his senses in response to a unique experience.

The performer responds to a score which exists primarily to elicit this response. Earle Brown stresses the idea of a momentary, spontaneous response to a score, an immediate quality; the environment and circumstances are an influence on this response. A work is not re-created complete in details and form but created from given ideas, the score serving as a place to start, an occasion for incident, with the degree and type of chance varying widely from score to score. The performer is given clues or suggested directions but much is left free, allowing the performer to contribute responsively. The end result goes beyond the suggested directives, beyond what the composer had imagined.

A purposeful ambiguity impels the performer to become involved, to respond to the ideas presented by the composer and

17 The reader is referred to Brown's article "Form," Darmstädter Beiträge, 10 (1966), pp. 57-69.
allows the material to take many possible interpretations or
directions. The solution arrived at by the individual performer
should be one out of many possible responses to the materials at
one moment in time.

Some works contain a high degree of ambiguity; no specific
directions are indicated, the clues being vague to the point of
implying almost anything. However, a certain amount of pre-
thinking is needed to grasp the freedoms and limitations given
in the score, and to possibly narrow down the alternatives from
the total field. The difficulty of performing directly from the
score is conceded; the performer may decide to respond to first
impressions of a score, keeping in mind alternatives for possible
use during a performance. The work, however, must not be thought
out or planned to the point of determination; room must be left
for spontaneity to operate during the performance. It is the
allowing for and accepting of contingencies that is important.
Cornelius Cardew feels that the "only criterion for a sound is:
was the player expecting (intending) to make it? If not, it was
a mistake, and makes a different sort of claim to beauty. As a
mistake it comes under criteria for action: mistakes are the
only truly spontaneous actions we are capable of."\(^{18}\)

With the lack of determination of sounds and their
ordering, form as it is traditionally considered does not apply

\(^{18}\)Cornelius Cardew, "Notation, Interpretation, Etc.,”
to chance. Form has traditionally been a relational concept. Beginning-middle-end, antecedent-consequent and periodicity were elements of this form; it was implicit that the end was brought about by what preceded it. According to Brown, form is "not a receptacle but a field of activity." Brown claims that it is impossible for music to be formless, for if it were, we would be unable to perceive its existence. Accusations of formlessness usually are directed toward sounds having an unexpected form. Brown notes that the "form which the work takes each time is a form of collective consciousness as it moves through a labyrinth of environmental influences." Thus, the form of a piece is not a configuration determined by composer or performer; it is a process in a constant state of flux, altering in each new situation.

The Assumptions of Indeterminacy

Tradition is not as completely denied in indeterminacy as it is in chance. By definition, indeterminacy admits the existence of definitive, structured sections. The material within these sections may be subject to traditional assumptions. The work is not totally determined, however. Choices must exist for the performer, perhaps of the ordering of the sections

19 Earle Brown, op. cit., p. 68.
20 Ibid., pp. 60-61.
or of the placement of sounds within a metrically unordered sequence. Choices may be guided to a certain extent, or any juxtaposition or continuity may be allowed, but spontaneity in making the choices is usually assumed.

Prediction of the realization for any one performance of a score is not possible. The possibilities are often more clearly established in an indeterminate work than in a chance work. Also, the performer, as a result of his preparation of the work, might be aware that certain alternatives may or may not occur in the performance. Prediction might occur in this sense although the realization will be the result of spontaneity.

The composer may not predict the alternatives the performer will choose, but depending upon the degree of choice given, he may predict possible, general solutions. In pieces where choices given are limited, the composer may be aware of all possible choices. He may form the piece to allow only certain continuities.

The "totality of possibilities" will be restricted to certain possibilities, even though these may be numerous. Within these boundaries selectivity is denied.\(^{21}\) Ideally the performer should not predetermine any aspect of the continuity, "the final step of definitive arrangement" should be "left out."\(^{22}\) As in

\(^{21}\) See p. 9.

\(^{22}\) Earle Brown, op. cit., p. 60.
chance works, the response to a score will be influenced by the circumstances of the performance. The form a work assumes in each performance will be the result of the performer's spontaneous, momentary selections from the "total field" of possibilities.

The assumptions of chance and indeterminacy will receive further explication in the following discussion of the works. 23

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23 It is suggested because of the references made to the scores and their instructions that the reader of the following analyses consult the works.
CHAPTER III

THE CHANCE PIECES

Although certain of the chance works discussed may be performed with any instrumentation, including two or more pianos, the problems considered are mainly those that would be encountered if the works were performed by one pianist.

In this chapter the pieces are grouped according to notational similarities. There is diversity in notation, but three classifications may be made: (1) works in which only traditional symbols are used, pitches being metrically notated on a staff; (2) works in which traditional and non-traditional symbols are used, one or two parameters being represented by other than traditional means; (3) works in which "graphic" notation is employed, signs of varying shapes having ambiguous meaning, the performer assigning meanings to lines, squares or shapes.

Since each piece differs in its means of occasioning chance, the pieces will be discussed individually. Basically, each piece has been examined to discover what is specified and by implication, what is not specified, with possible "interpretations" of the score being given and the degree chance being noted. Generalizations concerning the chance pieces have been included in the final chapter of the study.
Earle Brown: November 1952

The "defined space" of November 1952 consists of fifty lines containing notes with metric values and dynamic signs. Clefs are not signified; they are "floating." While a note has a position on one of the lines or spaces and is preceded by an accidental, its pitch is not established until a clef is assigned. While at first glance the pitches appear determined, in fact, any clef may be mentally assigned to any note being effective only for that note; a clef is not assigned consistently to any line. If during a performance each note is used once and the curved connecting line ( ) signifies a tie, thirty-four different pitches are possible. The composer does not specify, however, that each note is to be used only once. The question then arises whether, in returning to a note, the note must maintain the same pitch. Theoretically, one extreme possibility of clef assignment could result in all the notes being the same pitch.

There are many possible interpretations of the defined space and floating clefs, however. The performer may make any division of the fifty lines, expanding or contracting the distance between them or their length. He might alter the space between the lines depending upon his interpretation of the clefs.

The layout of the page does not necessarily imply an ordering of the pitches. The piece may be "performed in any direction." No tempo is specified for any part of the piece. The suggested tempo is "as fast as possible to as slow as possible, inclusive." The statement may imply that tempo varia-
tions exist, the proportions of variance being at the performer's discretion. The performer must then decide what meanings to assign to "as fast as . . . ." and "as slow as . . . . ." The meaning may be variable according to the difficulties the performer sets for himself, or variable according to the context, the "style" or concept of the piece. The meaning may be "as fast as possible" while maintaining "accuracy." The notes are given durations, but within a widely fluctuating tempo it is debatable whether they would have any actual meaning. Only if the tempo remained constant for several pitches would their metric value be perceptible.

Neither the manner nor the exact placement of attacks is given. An attack may occur at any point during the length of time defined by the "performance." Since it is possible that two or more symbols will be identical in pitch, dynamics and duration, and could occur simultaneously, two or more symbols might be taken care of with one attack. In an extreme case all pitches might occur simultaneously; the performance would consist of one attack.

Since the attack of any pitch may occur at any point in the performance and within any order, combination, range and tempo, all that has been determined is the occasion for a performance. It is presumed the composer wishes only to stimulate a response to the score. No mistakes are possible unless the performer has established criteria for the performance. The performer needs to understand the instructions accompanying
the score to be aware of his freedom, and he might conceive of possible realizations, but the more spontaneous the performance of the score, the truer it would seem to be to Brown's intent.

Cornelius Cardew: *Octet '61*

In *Octet '61*, sixty different "events" or composite symbols comprise the score. They are numbered, suggesting that although the performer may begin and end anywhere, once the performance begins, the symbols are to be interpreted in sequence. Most of the symbols contain a single staff incorporating notes and/or dynamic signs and numbers as well as various other signs. Any part of any symbol, however, may be ignored. For example, a performer could heed dynamic indications of an event but apply them to a pitch other than the suggested one. Black notes in a symbol, when used, must be played in the notated register; white notes are free of this restriction. Durations of notated pitches, the "event" and the total performance are free. The score may be "freely" copied by hand. Since the performer may in the end choose any notes for an event, an exact reproduction of the score may be considered unnecessary.

The score exists as a stimulation to bring ideas into existence. It may be interpreted by following what appears to be obvious; it may be used only as a starting point for a more spontaneous interpretation. The pitches or various signs having traditional connotations might suggest some sound to the performer, and the performance may evolve from that point on. To
further spur on the performer, Cardew has written out in the "notes" accompanying the score some possible realizations. Cardew also recommends the performer work out the signs thus providing a "bloc of material." He may include alternative versions of a sign, spontaneously choosing one during performance or he may alter or add to written-out material at the last moment. Some pre-composed material might ensure a reasonable continuity. An idea may be conceived spontaneously, but it is not necessary to leave it unrefined. Ideas from which the interpreter will draw may be well thought through.

One possible "formal" suggestion is given. The performer may include a sign which may be used as "punctuation." It would divide the piece into sections. If Octet '61 were being performed by an ensemble, one player might be assigned to playing only one sign.

There are many possibilities for variation of an event in the Octet, even when using the graphic suggestions; almost anything could happen. To realize that nothing given is necessary and that any notes may be freely added opens the situation completely. In essence, any interpretation would meet the requirements of the score.

Earle Brown: 1953

In 1953 there is a gradual narrowing down of possibilities by a series of choices. The first choice consists of assigning either a bass or treble clef to each staff of the four two-line
systems. Once chosen, the clef presumably does not change during a performance of that line. Each notated event, therefore, has two possible pitches via one position of the score; pitch becomes precise once the clef is determined. Since either side may be up, double sets of accidentals and attacks, which may appear confusing at first sight, are given. The dynamic signs are written in such a fashion as to be legible either side up: or $f^f$, $p'p'$. Duration of pitches is indicated by the length of the "bars" denoting pitches.

Decisions concerning time are made in three stages. First, the total length of the piece must be chosen. Two basic choices are available. The composer suggests the duration may be anywhere from twenty seconds to two minutes. The performer may choose any time length, not necessarily one between these limits. In choosing the total time length the performer might keep in mind that his second stage of determination will be to decide the time in seconds of each two-line system. Here three choices exist: "times pre-set by the composer, times obtained from the composer" or times derived spontaneously.\footnote{Brown is unspecific concerning the meaning of "times pre-set by the composer" and "times obtained from the composer." This is just one more puzzle for the performer.} Within this framework the performer prescribes durations for the individual notes, considering their graphic length in relation to the lengths of the systems and to each other. No notated rests appear. The gaps between "bars" presumably indicate time between events, that is,
"rests" or silences. In this case the performer must assign a relative value to the spaces.

In making decisions concerning duration, many considerations arise. For example, a choice made in the first category will to some extent limit the choice possible in the second category. Durations chosen, the "tempo" will in part determine the simplicity or complexity of the piece. The faster the tempo, the more perceptually complicated the overlapping of sounds and time relations become.

Variable elements in order of settlement are page and clef disposition, and time. The performer begins with an outline for a performance and by steps supplies the details, allowing for spontaneity if desired during the performance situation.

George Cacioppo: Cassiopeia

On the one-page score there are four networks with an ellipse partially superimposed on two of the networks and "islands" interspersed in or around all networks. The ellipse and island symbols are considered fantasy forms. The networks consist of "paths" connecting pitches which are represented by black and white noteheads. For the most part the pitches are specifically designated; a few are not. The spatial distance between the specified and the unspecified pitches may be used as a gauge for determining the unspecified pitches. The size of the notehead is an indication of the relative dynamic level of the pitch. Two ways of choosing time values are suggested. The
linear space between the pitches may suggest a time value, or the values may evolve spontaneously, with no set criterion, during the performance.

The performance may begin in any one of the four networks and may or may not include fantasy elements. From one to four networks -- or as little as a part of one -- may be used. While the performance may include fantasy forms, at least part of one network must be played as well. The performer proceeds from notehead to notehead moving in any direction. When paths intersect between noteheads the performer may change direction. Not all notes on a path must necessarily be played before branching off or reversing direction. The performer may choose to follow a certain pattern, forming a "closed circuit." To form a circuit the performer would have to make use of intersections and "superimposed" paths. The circuit may be repeated any number of times and may be altered at will. To "exit" from a circuit either an intersection or "orbital jump" to any other part of the piece is made. The piece may end anywhere, spontaneously or at the end of a chosen time-length.

While elements are either determined or suggested in the graphic score, there is considerable room for spontaneity. The performer might be aware of certain aspects such as the general pitch layout, dynamics, harmonics, fantasy elements, a time value system and how to get from pitch to pitch or network to network; however, innumerable sound combinations exist. The performer must become responsibly involved in developing the material into
a performance. In dealing with the networks the performer's choices center on ordering material, choosing routes and possibly forming patterns or "configurations." The forming of figures, which may be repeated or permutated suggests choice is operating with some traditional implications. Recurrence of patterns suggests a recognizable structure. The composer is proposing in essence that an "elementary form" may be set up; the piece is not just a series of random sounds, complete in themselves. The performer, however, may choose not to repeat material, not to thus form "figures."

The performer must be familiar with the material of the piece. In order to readily locate a pitch he must become accustomed to thinking of pitches and the keyboard in terms of registers rather than notes on a staff. It would help to notice the general structuring of octave registers in the score. The registers are not mixed in a random fashion within the networks but are "layered"; octave seven is higher than six, six higher than five, and so on down the page. The performer might then gain some knowledge of the possibilities, perhaps deciding what will be played spontaneously and what will be considered or planned.

Whatever decisions, general or specific, are made concerning treatment of the networks, the area within the semi-enclosed dotted lines need not be governed by them. This area may be considered anew, even played by a different instrument from that used for the rest of the performance.
Most subject to spontaneity are the fantasy forms. The performer reacts to a visual stimulation, translating the reactions into a performance. A reaction may or may not lead to an aural experience; the result may be an action, some visual event or theatrical effect, not necessarily producing a sound. The reaction may produce a sound event but from a sound source other than the piano. There are no restrictions on what the performer may derive from the fantasy forms. The ellipse may merely serve as a "cover"; any lines going into it may be imagined to pass behind it, emerging into a new network. Two of the networks may be joined in this manner.

Although some determinations are made by Cacioppo, the considerable freedom that exists is at times of the indeterminate category, at other times chance. Use of terms such as network, configuration, permutation and intersection suggest defined meanings. Pitch is mostly determined, dynamics are given in a general way, suggestions concerning time are made. Ordering of these elements, although subject to rather free rules of play, are open to spontaneity. The instructions are suggestive of possible pre-thought, planning, an awareness of possibilities, the ordering of the materials being indeterminate. The fantasy forms, on the other hand, are totally undetermined. Any meaning, action or sound is possible. Details need not be pre-established but may evolve completely spontaneously, any result being acceptable. The greater unpredictability resulting from the lack of determination places the fantasy elements in the chance category. The
piece must include at least partial networks, the indeterminate aspect, but may also involve fantasy forms, or the inclusion of chance.

Toshi Ichiyanagi: Music for Piano #7

The notation of Music for Piano #7 is entirely graphic. Patterns in the centre of the score contain very general indications:

- short sound, non-keyboard, but piano
- long sound, non-keyboard, but piano
- short sound, non-piano
- long sound, non-piano

↑↓ arpeggios

Other symbols on either side of the centre pattern represent a type of sound:

- white and black keyboard used, tones chosen in random order
- only white keyboard used
- black keyboard only

Certain traditional associations may be made from the composer's usage of black and white symbols. A white shape indicates a longer duration as a "white note" traditionally receives more time than a "black note." Also, the black and white centre patterns illustrate the black and white keys. Thin horizontal lines also found on either side of the patterns indicate an approximate range. Lines to the right of the pattern designate
higher sounds, from the upper keyboard; lines to the left designate lower sounds. The notation has a familiar connotation, suggestive of the keyboard arrangement.

Since the indications given by the notation are general, decisions will have to be made at some point. The performer will have to give the horizontal range lines a more specific meaning. An approximate breakdown into areas covered by certain lines might be made. The placement of the patterns down the centre of the score might suggest a traditional division. That is, the pattern might divide the keyboard in "half." When the pattern shows a mixture of black and white keyboard, decisions will have to be made concerning how much of each and in what order the black and white keys will be played. The performer could thus set limits on various aspects of the material and prescribe spontaneity within these limits, so that a symbol consistently represents the same general idea. On the other hand, the meaning of a symbol could change from context to context.

The basic elements of *Music for Piano #7* are not determined. While there may be relative meanings, as one sound is "higher" or "longer" than another, there is ambiguity as to their exact meaning. For instance, a longer line may, but does not necessarily indicate a greater density of sound. A performer could choose one or two notes from a shorter line but similarly could choose one or two notes from a longer line. The exact pitch and even the number of pitches to be chosen is not specified. It is determined, however, that when two or more
notes from a line are chosen they must be played as a chord or cluster. Also unspecified are attacks, dynamics and pedalling; overlapping of sounds is free. The only indication for some sounds is that they are not to be played on the keyboard, or in some cases, not on the piano. In these instances any sounds may be chosen; a wide range and variety of sounds are possible. It is not indicated that non-piano sounds need be limited to established musical instruments. The imagination may be freely engaged; decisions might be arbitrary or quite spontaneous.

The nine pages are numbered, perhaps suggesting they be played in order. Each page may be read either side up, or both ways, and the pages may be arranged so that they overlap, the performer playing only the part of the page showing. Choices in the arrangement of the pages in the above ways is another freedom.

Since all pages are required to take the same time there will be diversity of activity among pages. There are considerably fewer events on some pages than on others. No two pages are exactly alike in the type of content. Some pages contain only sounds produced at the keyboard, some only harmonics. Other pages contain mixtures of keyboard, non-keyboard and non-piano sounds.

Only a general structure has been delineated in this piece. An imprecise area of the keyboard or quality of sound is designated, but the treatment of the nine pages, their placement and their positioning will produce differing overall structures. There are choices to be made in the handling of all elements
comprising the structure. Little has been determined by the composer.

With so few suggestions given, it would be hard to say that any choice made, providing it followed the general requirements, was wrong. How fixed the details are before the performance will depend upon the performer's conception of the piece. He might predetermine details, providing alternative means of performance. He might decide upon general meanings for the graphic indications or he might allow the meanings to change spontaneously during the performance. In any case, individual realizations of the score are bound to exhibit wide variation.

Toshi Ichizyanagi: **Music for Piano #2**

The score for **Music for Piano #2** consists of four small sheets with graphic symbols. Symbols, except those found in the four corners of the sheets, indicate the following features:

a. Register. This depends upon the direction of a branch in relation to a circle. The direction represents one of five ranges into which the keyboard is divided.
b. Location of the sound. The type of circle indicates how the sound is to be made.
c. Relative duration of the sound. Length of the branch indicates this.
d. Simultaneity. Whether sounds are to be played singly or together is indicated by the absence or presence of a "slur."
e. The number of sounds. This is indicated by the number of branches.

Although the graphic notation is different, *Music for Piano #2* is in many respects similar to *Music for Piano #7*. As in the latter, no pitches are specified; only general ranges are given. In the former, however, the performer is directed to choose a specific number of tones, for example, one from the highest register and one from the middle register. (Example 1.)

Example 1. *Music for Piano #2*, page 0.

In example 1 the two notes are to be played separately. The symbol does not indicate which of the two tones is to be played first. It also does not indicate whether they are heard separately or whether one sounds before the other is released. As in *Music for Piano #7*, no dynamic level of the sounds is given. The performer may choose individual dynamics, attacks, general dynamic levels, perhaps choosing deliberately, or spontaneously. Pedalling effects are chosen at the performer's discretion.

The symbols in the four corners of the sheets -- or, on one sheet, the lack of symbols in the four corners -- are the cues or links which join the four pages, providing continuity in the piece. Although not indicated, presumably the performer may begin anywhere, with any symbol from any of the four pages. As
soon as he performs the requirements of a symbol he moves to the page whose cue matches the circle of the symbol he has just played. For example, if \( \text{\textbullet} \) has just been played, the performer would next choose a symbol from a sheet with the black circle cues (\( \bullet \)), and so forth. The four sheets thus would have to be arranged on the piano making all sheets visible. Any of the four sides of each sheet may be up. As soon as all of the symbols of any one sheet have been performed, the sheet is rotated clockwise ninety degrees. The performer then continues playing as before. When any sheet has been rotated four times, the performance is over.

With rotation, symbols alter in meaning. Whereas in one position one would be directed to play inside the piano in the "low" register, with one rotation one would be directed to play inside the piano in the "high" register (\( \text{\textbullet} \text{\textbullet} \)). Thus, each symbol has four possible general meanings. With the rotation of only one sheet at a time, many differing continuities will result. With each rotation the variable aspects of a symbol may receive new meanings. For instance, if in the symbol the two notes connected by the slur and hence played together are performed before the single note, it is not requisite they maintain this order in any succeeding rotation.

Apart from general durations indicated by the branch length, there is no indication of either tempo or chronometric time of the piece as a whole. Nor is there any indication of the amount of time a performer may take between sounds comprising
the symbol or between symbols. Rests or silences, thus, have not been notated.

In *Music for Piano #2* the performer is accorded similar responsibilities to those in *Music for Piano #7*. As in the latter, a general continuity is outlined with details to be completed. The performer will doubtless become quite familiar with the symbols and their general and possible meanings before playing the piece, but this should not prevent spontaneous choices from being made during a performance. Again it will be the performer's conception of the piece and how he handles the variable aspects that will determine the final outcome.

Earle Brown: December 1952

In December 1952 the "defined space" Brown refers to consists of horizontal and vertical lines of varying lengths, width and positions. The score has four positions; with one ninety-degree rotation, a horizontal line becomes a vertical one, each line having four possible positions in the score. It is not specified that the performer must play all events (lines) before rotating the score or even that all events must be played before the performance is complete.

The performer may begin with any one of the lines and proceed in any direction. With thirty-one events many possible orderings exist; presumably there is no pre-selected ordering or interspersion. There appears to be no restriction on returning to an event one or more times.
Two broad choices are given for the interpretation of the lines. The performer may consider three or four "dimensions" as "active." When three are active, they are vertical, horizontal and "time"; the "thickness" of an event may be representative of relative intensity and/or clusters. When four are active (horizontal, vertical, depth and time), the thickness (depth) is not given a specified meaning.

A translation of the lines into musical terms will depend basically upon the performer's conception of the terms "dimension" and "active." The lines have three apparent properties: (1) horizontal and vertical orientation, (2) thickness and (3) position on the page. These properties are to be given musical meanings. They are to be associated with the characteristics assigned to a sound: pitch (register, simultaneity . . . ), duration, dynamics (intensity) and attack.

When three dimensions are "active," the only property with a suggested meaning is thickness. Even here uncertainties arise. If the performer chooses thickness to represent intensity only, may clusters be represented another way, or if thickness represents clusters only, how will dynamics be represented? Horizontal and vertical might by traditional implication suggest pitch. Horizontal might refer to a number of events in succession, vertical referring to simultaneity, while the length of the line might indicate an approximate number of events. The question remains, then, how the dimension of time is to be represented. A plane such as the score is two-dimensional. In
the instructions, time is conceptually represented in a third dimension, perpendicular to the plane. The third dimensional line might or might not be comparable in size to one graphically representing an aspect of the event.

Time in this work exists on various levels. There is the time or duration of an individual event, the time between events and the length of the piece. The performance length is to be decided beforehand. Time as the third dimensions might presumably be the time of an event. The other aspects of time are not indicated and the composer gives no suggestions concerning tempo. Time between events might possibly be taken from the spatial distance between events. Silence then would not be just the time it takes to go from one event to another, but a momentarily considered part of the composition.

If the number of sounds contained within a simultaneity or a succession is left undetermined, the time of the event might be graphically represented. The length of the line might represent the duration during which the simultaneities or successions occur.

When the performer chooses to consider four dimensions as "active," horizontal and vertical again may be represented graphically. The depth (thickness) of the event may or may not represent clusters and/or dynamics. Time again might possibly have a conceptual position. Basically the same considerations arise whether three or four dimensions are "active," the difference being that thickness in the latter choice has an even
The performer must decide how to interpret "active." One possibility would be to consider a dimension which is not determined, or given a suggested meaning, as active. It might further be considered that while the dimension is graphically represented, the concept of its representation is subject to transformation or modification. The meaning assigned to a certain line would not necessarily be consistent throughout the performance; it could be altered freely. If a performer did return to an event, he might possibly re-interpret it.

With the basic assumptions so undetermined, it might be presumed that a position within the defined space is not necessarily indicative of a relationship. One event need not be higher, lower than or identical in pitch with another according to its position within the defined space.

The composer suggests performances be made directly from the graphic "implication." If something in the score or instructions appears implicit to the performer, however, he may choose to incorporate this idea into the performance. Should vertical lines, for example, seem to indicate simultaneity, the performer may decide that he will do this throughout the piece.

While giving no expressed meaning, the terms used in the accompanying instructions to the graphic score may suggest, even subconsciously, a working-out of the score, or may be enough at least to set a performance in motion. Meanings assigned to the terms and solutions chosen will be multifarious. Almost anything
could result, depending upon the performer's conception, what
seems implied to him, his response and imagination, and
spontaneity. There is no one solution; any alternative is
acceptable.

Earle Brown: Four Systems

For help in understanding Four Systems the performer is
referred to the instructions of December 1952. In each system
the lines of varying lengths and thicknesses are horizontal and
are confined between two "continuous" horizontal lines. Four
such systems comprise the one-page score. The continuous lines
bounding each system "define the outer limits of the keyboard."
It is not stipulated whether the lines from left to right are to
be translated "bottom to top" of the keyboard or whether the
distance between the two lines represents the outer limits.
Apart from the general designation of the continuous lines, no
further indications are made. The performer must decide how the
other elements are to be represented. The length of the line
could possibly indicate duration, the pitch being taken from the
starting point of the line. Or the length could indicate an
approximate number of notes grouped in succession or possibly
heard simultaneously. Dynamics, as in December 1952, may be
represented by the thickness of the line.

No ordering either of the four systems or of the lines
within is specified. It is not indicated in the score whether
lines are to be heard separately or whether any two or more may
be chosen to be heard simultaneously. Consequently, the performer presumably could play any sound (or combination of sounds) at any point during the performance of the piece. Sounds might be heard singly, simultaneously or in diverse overlapping arrangements. The profusion of lines within each system might suggest a type of simultaneity. Although a possible solution, it might be assumed that the system would not be read from either left to right or vice versa, but that events might be chosen spontaneously from any point within a system.

It is not determined whether a performer must play every event within a system before moving to another system. It might be presumed since the entire performance time may be any length, that any event may be returned to any number of times. Some events might not be played at all.

As in December 1952 the graphic score is ambiguously defined by the composer. After becoming aware of how little is specified, the performer should respond to the score, evolving or creating a performance spontaneously. Anything might happen and would be acceptable. A very general outline for a performance exists; all details must be supplied by the performer and they, in turn, depend upon his reaction to the score.

Udo Kasemets: **Timepiece**

The graphic notation of **Timepiece** consists of dots and dashes above and below events. These dots and dashes indicate articulation, denoting the difference between "short/long."
"detached/sustained," "staccato/legato," "etcetera." Presumably the performer gives the dash a meaning, perhaps long or sustained or legato, depending upon the context. It might be supposed the dot would have the opposite meaning. If an event has two dots, or two dashes, the "attack" is uniform; if not, both symbols must in some way be expressed. When both must be used, the proportioning of the notes to one or the other sign is not specified. Dots and dashes appear to the left and right of events, indicating "same" and "different," "colour and/or playing technique." Again the player gives his interpretation of the dots and dashes. Many interpretations are possible; the assigned meaning may vary from event to event, the meaning given being consistent only for that event.

The thirty-six events are represented in two ways: thirty consist of black or white "noteheads" while six events are comprised of larger, black interlocking circles. A white notehead indicates a sound is "consonant" with the preceding or "closest neighbouring sound." A black notehead represents dissonance. Consonant and dissonant "need" not have traditional implications; the performer defines the terms. The definitions set up must remain constant only throughout one performance or "cycle" of the thirty-six events. The terms may be redefined from cycle to cycle.

Kasemets uses the term "etc."; presumably the performer may give the dots and dashes a meaning other than those suggested.
The large black circles represent "clusters, glissando, extra-instrumental noises et al." Two circles is a small "cluster," three a large "cluster" and four a "very large, all-encompassing cluster." The boundaries of the clusters are variable, apart from the general indications "small," "large" or "very large." It is not specified whether the cluster is comprised of black and white keys, all black or white, or what proportions of each. Only the type of sound is given.

Each notehead represents a single note. Notes within an event (there will be one to six) may be combined or juxtaposed in any way. Pitch and range of the notes are subject only to general considerations. A movement from one event to a higher one on the score represents an upward movement on the keyboard, and vice versa. With respect to horizontal movements, two choices exist. The event may stay in the same range or be played in any range. The performer must in some way delimit the ranges. Specific pitches within the ranges are not designated; their choice may be left to spontaneity, allowing for consonance-dissonance limitations.

The position of the events on the score need not represent exact distances or locations on the keyboard, representing instead only a general relationship. Presumably the performer considers only the relationships between two events at a time. When considering events seven and eight, for example, the position of events three and four is not necessarily relevant. Only if the performer chooses to interpret the "geographical" position of
"events" will their position on the page indicate their range relationships to each other. Position would then indicate a specific range rather than just "higher" or "lower."

The horizontal "movements on the score . . . from one attack to the next" are made within given durations:

Movements to the right are "slow":

1 column -- 2 seconds
2 " -- 4 "
3 " -- 6 "
4 " -- 8 "
5 " -- 10 ">

Movements to the left are "fast":

1 column -- 1 second
2 " -- 1/2 "
3 " -- 1/3 "
4 " -- 1/4 "
5 " -- 1/5 ">

The tables may be altered so long as the original proportions remain constant throughout the cycle. It might be implied that the speed with which the event is approached is also the speed of the event. It is not specified; the duration of the event might be free. Two choices exist for vertical movements: they may "maintain the 'tempo' by which the column was approached" or they may be "free."

Superimposed wedges indicate contrast between "softer" and "louder." The dynamic contrast between events depends upon their
relation to the point of the wedge. The closer to the point, the quieter the event.

There appears to be a discrepancy in the instructions. The performer is first advised that he may move from event to event choosing any direction and distance until all thirty-six events have been played once. Later he is told that "any two successive events belong in one common wedge." From this it might be presumed that although wedges overlap, allowing the performer to get from one wedge to another, movement is somewhat restricted; certain events cannot be performed successively.

In Timepiece the performer is given a graphic score with some general restrictions. Limitations are gradually imposed by the performer as he chooses from innumerable possibilities. He might realize the score as its layout suggests or he might impose almost any ideas on certain aspects. If the piece is being played by more than one performer, agreement on treatment of the elements must be made between the performers. Some choices will be established beforehand; there will be a degree of uniformity or consistency. The conception of the performer will determine the degree of chance in Timepiece.
CHAPTER IV

THE INDETERMINATE PIECES

In this chapter the pieces are grouped according to their type of indeterminacy. All pieces are comprised of specified material, the organization of which in some way is not specified. Although it is assumed that spontaneity to some degree will shape all works discussed, the choices are guided in certain works. Spontaneity is limited.

The works fall into two basic categories:

1. works which are clearly divided into sections, the treatment of these sections involving choices.

2. works in which the given material is in a determined sequence, the metric relationship of the sounds being unspecific.

Works in the first category vary; the ordering of complete sections may be freely chosen or guided, sections may have to be integrated, or choices between determined material within sections may have to be made.

Variations I and II by Cage do not coincide with either category. It is assumed that most choices will be made while determining a part to be used in performance, but that some aspects will be left for last minute decisions.
Cardew gives a stated purpose for the indeterminacy of *Two Books of Study*: the work is "a study for the pianists (two) not only in the rhythmic presentation of sounds in time, it is also a study in combining these sounds with those presented by the other pianist."\(^{26}\)

Pitch is determined in the *Study*. No omissions or repeats are allowed and pitches must be played in their written order; attacks and clusters are also specified. The duration of each page is one minute. The piece is divided into sections or "groups," the beginning and end points being strictly assigned by the minute and/or second they occur. Within the groups pitches are rhythmically notated. Although there are spatial gaps between the sounds, no rests are notated. Within designated time boundaries the distribution of the notated sounds is free, to be decided by the performer. The performer also chooses a general dynamic level for each group with specific dynamic markings being indicated for individual sounds. Pedalling decisions are left to the performer. When a chord which ordinarily would be joined to other chords on a beam is given a separate flag, the notes of that chord are to be played singly in any order.

Each pianist's part consists of "layers" or groups. It is up to the player to integrate the groups, superimposing the parts

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in "counterpoint." Thus it might be that two individual sounds are heard simultaneously, or, because the sounds of all groups may be freely distributed within time limits, sounds of one part may be inserted between sounds of another part.

The two players must collaborate, integrating their parts into a two-piano work. Several alternatives are given: material from the two parts may be heard simultaneously, there may be overlapping, or sounds from one part may be interpolated between sounds of the other part.

There are three ways Study may be approached. The performers may choose the version which has been already integrated by the composer. In this case it is suggested the piece be titled Music for Two Pianos. Or the two performers may work out a version beforehand, collaborating in the integration, each having ideas about his part, but remaining flexible. In this case the piece becomes essentially determined. The piece also may be indeterminate in performance. In this case, the performers may be quite familiar with the score, giving pre-thought to various possibilities and even working out on the bottom (empty) score passages which might be too difficult for a spontaneous approach.

While the performer is faced with decisions prior to and possibly during the performance, the spontaneous aspect does not appear to be stressed in Study. There are a series of decisions for the performer to make -- disposition of notes within a group, general dynamic level, integration of groups and parts, and
degree of indeterminacy -- but the composer is not concerned about the degree of predetermination the performer chooses. Although choices are left for the performer, the score is worked over, even in cases where indeterminacy will be operating during the performance. The exact results may not be foreseen by the composer, but it is probable that the performers will have at least some expectations regarding the performance.

Sylvano Bussotti: Pour Clavier

Apart from some rhythmic flexibility, the details in Pour Clavier are specified. The indeterminacies occur in the ordering of the material. On some pages of this piece the performer plays exactly as written. On other pages there are limited choices. The performer may not produce just any juxtaposition, may not insert material just anywhere, but is restricted to certain alternatives. There are to be no interruptions or pauses except those marked in the text. The means of providing choices varies from page to page.

The first choices in ordering occur on pages 3, 4 and 5. The performer is given three alternatives:

1. to play as written, ignoring dotted lines and arrows accompanying numbers.
2. to follow the dotted lines and numbers, omitting groups in parentheses.
3. to play a mixture of the first two choices.
Choices again are guided on pages 10 to 13. For live performance, two alternatives are given:

1. to play as written, ignoring "boxes;" or rectangles.
2. to segregate the material, playing the material in the boxes before playing material outside the boxes or inside another box. The order of the material is slightly different from that suggested by the page layout. Numbers followed by brackets refer the performer to page 17 which contains fourteen small groups. These groups may be inserted at the indicated points.

If the piece is being recorded, the segregated materials may be separately recorded and later pieced together, their superimposition and juxtaposition not being subject to a determined time scheme.

Insertions of groups from page 17 may also occur on pages 14 to 16. Page 17 is to be memorized. When the performer chooses not to play any of the page 17 groups at any point on pages 13 to 16, page 17 is to be played "normally," group 1 through 14. The performer may consider pages 20 and 21 separately, or he may place them side by side so that they become one page, the staves joining. Page 22 may be performed "normally," ignoring dotted and solid links, or by following the lines and grouping the sounds together. The performer is to aim for the greatest degree of simultaneity "possible." In the recorded version of page 22, editing, as done for the recorded version of pages 10 to 13, may be done. The composer points out that it is possible to reduce
the page to five groups, played simultaneously. Dotted lines and arrows guide the performer through the alternatives of page 23. Presumably each group may be inserted in only one of its possible places.

In *Pour Clavier* choices are often between using the determined order or a slightly less determined order where some alternatives exist. Thus, while some material is mobile, its movements are restricted. The composer guides the choices allowing certain juxtapositions of blocks of materials. Matters of simultaneity may be slightly less predictable. The blocks to be heard simultaneously are designated, but the composer does not control placement of individual sounds within the blocks. The familiarity with the score required for a performance of *Pour Clavier* suggests the performer is probably cognizant of the results of the various alternatives. Last minute choices between possible, pre-planned results, could make the work indeterminate of performance.

Henri Pousseur: *Caractères*

Most aspects of *Caractères* are determined and even the undetermined aspects are guided. The composer has limited the choices to alternatives maintaining his determined harmonic and durational scheme. Spontaneity is thus restricted.

There are two parts — Ia and Ib — to the score. In Ia two possibilities for shaping the performance exist. The first choice is with which of the six double pages the performer is to
begin. During the performance of a double page further choices arise. The performer chooses between one of the two upper groups, then plays all the remaining groups without repetition. The performer may proceed from the first chosen group to any "neighbouring" group below, going from left to right or via a rising diagonal. Performance of the double page ends with one of the two lower groups. Next, the performer chooses one of two letters from the "index," turning to the double page adjoined by that letter, performing it, and so on through the piece. If in the course of playing the piece one of the letters of a double page has already been chosen, the performer must choose the other. If both have been chosen, the piece ends.

The second possible way of performing Ia begins as the first possibility did. Groups, except groups acting as transitions from double page to double page, may be repeated. It is not necessary to play all groups, although the page must end with a lower group choice. One may return to a page which has already been played.

In Ib the performer makes choices, but prior to the performance. The work is indeterminate only in this pre-performance stage, juxtaposition of materials being decided at that time. The score consists of a double page written on both sides and four single pages with windows. The performer first chooses either side of the double page, which will serve as an "envelope" or cover. The single pages are put in any order and placed in this cover. Ib is then played like a normal volume.
Whatever shows in the windows is performed. Some material on the single pages will not appear in the windows and not be played in that performance. Not all material can be heard in each performance.

Karlheinz Stockhausen: *Nr. 7 Klavierstück XI*

The score of *Nr. 7 Klavierstück XI* consists of nineteen "groups" assembled on a large sheet backed by a wooden frame. This layout enables the performer to keep all groups readily within view. Only the ordering of the groups is indeterminate.

Basically the performance is as follows: To begin, the performer chooses the first group that "catches his eye." He may then choose a tempo, dynamic level and articulation for this group. At the end of this group, however, there are tempo, dynamic and articulation indications. The performer must apply these to the next group that he at random chooses. This procedure continues until a group is played three times, whence the conclusion is signified. Groups returned to for the second time may be varied. For example, the instructions in brackets will vary the part of a group over or under which they appear. The variation appears in the form of shifting of the material up or down an octave, or adding or deleting notes.

Two initial choices are made: (1) a starting group and (2) its tempo, dynamic level and articulation. From then on only order is unspecified. Ideally, the performer should look over the score with no preconceived notions about any of the groups, or
about where to start. To perform the work it would be requisite that the performer be "familiar" with the nineteen groups, skilled at performing them so that once his eye caught a group he could perform it fluently. He should have no hesitation or preference with respect to any group.

Since the performer may go from any group to any other group, innumerable realizations exist. If it is possible for the performer to get away from any preconceptions about the various groups and from any tendencies towards certain routes, then it is possible that no two performances will be alike. It is suggested that when possible the piece be performed at least twice during a program, thus showing at least two different realizations of pre-formed materials.

Christian Wolff: Duo for Pianists II

The score of Duo for Pianists II, consisting of a part for each pianist, is comprised of "blocks" and "pitch sources." The blocks may (1) contain reference to a pitch source outside the block, (2) designate the number of pitches to be played from the pitch source and (3) give suggestions for dynamics, durations, articulation and block timings. However, in no single block are all these specifications made. The pitch source is incorporated in some blocks while in a few blocks there is neither the inclusion of a pitch source nor reference to one. In the latter case any pitch may be played. The pitch sources are notated in the traditional manner.
Illustrative of the greatest degree of specification in Duo is the following block:

Following fifteen seconds of silence, two tones from pitch source "a" are played in three seconds. There is a choice of dynamics and durations. The measurement of time is chronometric; it is indicated in seconds rather than in unit beats and measures. The note values, also, represent a specified number of sounds:

\[ \frac{1}{4} = 1 \text{ second}, \text{ also} \]

\[ 1 = 1 \text{ second} \]

These are values of durations of individual tones, their spacing within the time limit being unspecified. The plus sign (+) indicates the presence of durational possibilities.

At times dynamics are left unspecified, at times, as illustrated in the preceding example, there are choices to be made. The performer, for example, may use one indication for all notes or one indication per note, and so on. When indications are given at least one must be used in some way. At times two, for example fp, may be applied to one note.

Further specifications exist. The performer may be required to shift a note up to any higher octave (\( \times \uparrow \)), down to any lower octave (\( \times \downarrow \)) or he may be asked to play it in any octave (\( \times \rightarrow \)). Articulations such as mute, touch, snap and
pizzicato are included in some blocks. The following pertains to a specific means of attack and release:

\[ 9 \binom{2}{2}^3 \]

Of nine tones, two \( \binom{2}{2} \) are released simultaneously, their attack not being determined and two tones \( \binom{2}{3} \) which are played three times are attacked but not necessarily released simultaneously.

The ordering of the blocks is by response to cues. The cues, which are the same for both pianist's parts, consist of "low mute," "high except ff," "low pp," "middle ff," "high ff," and so on. They are found at the beginning of each block. The performer listens for a cue as he is finishing the realization of a block. After he has recognized the cue he moves to a block preceded by that cue. Each performer must be aware of the other player's part. It is anticipated by Wolff that a performer may miss a cue. In this case the performer moves to "no cue" where two general possibilities exist: (1) 17 seconds of two tones from pitch source "g," or (2) 3 seconds of four tones from "e." In the second choice, the performer is faced with choosing four out of seventeen pitches and then playing these pitches in three seconds. It might be presumed that the performer would have to be quite familiar with the piece to keep the blocks anywhere near their designated time-lengths. It might also be presumed that by compressing much activity or many instructions into a short space of time, indeterminacy of an unintended type might result. A cue may be misinterpreted in some way, and the stipulation of
"no pause between sections" may cause a misjudgement. Also, requiring the performer to measure fractional seconds is bound to lead to inaccuracies. The requirement appears to be an exactitude, but to correctly measure that amount of time would be impossible. The greater the restriction or specification, the more likely unspecified indeterminacy will occur.

While there are aspects of the score which are undetermined or variable, possibilities or alternative methods of handling the material can be almost pre-determined. That is, the performer might approach the piece from a teleological point of view, for example choosing dynamics for a purpose such as emphasizing some point in the piece, or arranging possible specific tones within a rhythmic pattern. The performer may construct from the given material certain pre-formed ideas about its usage. Despite this, contingencies may still occur in the handling of the choices. There are, then, aspects of the score which are prone to indeterminacy and even with the most planned solutions of the score, the demands could lead to either errors or last-minute choices.

The degree to which the piece is pre-determined will depend upon the performer. He may decide how he will perform the materials of each block, he may work out alternative versions to be chosen at the last minute, or he may have only very general ideas of how to work out the blocks in performance.
George Cacioppo: Pianopiece II

Pianopiece II is comprised of four groups, each slightly different from the others and designated by the Greek letters \( \Omega \) (Omega), \( \Phi \) (Phi), \( \chi \) (Chi) and \( \psi \) (Psi). One of the four groups (Phi) consists of a network similar to those of Cassiopeia. The other three groups (Psi, Omega, Chi) contain networks which are located on a staff. Pitch is determined in each of the four networks. Simultaneity at times is indicated (Phi), at times suggested, but when indicated the tones within the symbol still may be played singly.

In Pianopiece II certain aspects are determined, others undetermined. In groups Phi, Chi and Omega, dynamics are proportional to the size of the notehead. The string cluster in Omega, however, is marked ff. Dynamics are notated traditionally in Psi. Suggested time lengths for the four groups (structures) and for the time between groups is given. The sounds within these groups may be freely distributed. A measure of guidance exists, however. In Chi, time may be proportional to the linear distance between sounds and in Omega the sounding of the string cluster with the soft-headed drum mallet is represented by a decay envelope, sounds notated below the envelope possible although not necessarily being performed as the cluster dies. The curvature of the lines joining sounds in Omega represents ritard and accelerando. In Phi no time suggestions are made, but the performer might use linear distance as a guide. For Psi it is suggested that the small-headed notes may be free in tempo, to
fit the structure.

Further freedoms concerning time may be taken. The performer may disregard the above suggestions, developing all values according to his own ideas. Thus, the performer has two alternatives: he may choose durations suggested in the score or freely develop all values.

**Omega** consists of five pitch groups, separated by a comma (,) which indicates a brief pause. Within the pitch groups further sub-groups may be made; these sub-groups may be played in any order. It might be presumed that the pitches within the sub-groups follow an order suggested by their layout and connecting lines. Their vertical alignment, however, is not necessarily indicative of simultaneity. If a sub-group is repeated, the previously chosen order of pitches may be permuted. Thus, the performer first decides on an order of groups and then considers possible sub-groups and their ordering.

In **Psi**, six pitches are depressed silently and held while a chord is played. While the chord is struck **sfz**, the small notes above are played at a dynamic level relative to their size. The other half of **Psi** is a group of nine small-headed notes, played **pp**, in any time.

The **Phi** network contains open-ended paths. The performer starts at any open end and follows the networks, choosing directions at the intersections. If his choice leads him to an open end, he is faced with four further choices: (1) the performance of the structure may be ended, (2) he may turn back,
and, covering the same path, either play it exactly as before or permutate the pitch, order and time values, (3) he may turn back, moving via an intersection to a new route, or (4) he may jump to any other open end and then follow a new route. Presumably the performance of Phi could consists of two to four of these alternatives. Phi may be further structured by segmenting the sound path linearly into two or more sounds, the segments possibly being repeated literally or permutated. Groups of sounds may be played simultaneously, or linear and simultaneous sounds in any mixture may be played. As in the networks of Cassiopeia, the pitches are layered, the highest register taking top position in the network and so forth down to the lowest register. The performer follows the paths, moving from pitch (or pitch group) to pitch (group), often using intersections.

The composer's use of the terms structuring, developing and permutation would seem to indicate his point of view. Certain elements are left unspecified for the performer to freely define, or the performer may choose certain alternatives, but it might be presumed that forethought be given to the pieces. Some familiarity with the pitch designation, possible combinations, permutations of combinations or possible interpretations of the network might be made. Details are given, the freedom existing in their organization.
Earle Brown: October 1952

In October 1952 the clef signs do not appear in the score but the traditional treble-bass relationship is assumed. Pitch and dynamics are determined. Pitch events are given a value, but the exact metrical relationship of the events is indeterminate. The score is to be thought of in terms of a "discontinuous, spatial-coordinate." Events occur at a point in space; they can be plotted in terms of a point on the staff. The performer appears to move through "space" (the score). The score might appear to indicate that the sounds are joined, but the composer has simply not inserted the rests. The performer moves from chord (note) to chord without directly joining them. Not only the size of the rests but also, in some cases, their placement is obscure. There are spatial gaps between the sound symbols (single notes, chords) in most instances, suggestive of possible interpolation of rests. Although a gap might suggest a rest, the performer need not insert one relative to the size of a gap. In fact, he need not even insert a rest, it not being specified whether there necessarily are rests between all events.

Individual pitches are given a relatively determined duration but the tempo of the piece is undetermined. It may be constant or variable, chronological or intuitive. It might be supposed that this would affect the perception of the assigned time values, that notated durations function perceptibly only when the speed is consistent.
In October 1952 it is vague metrical relationships which give rise to indeterminacy. If rests between the events were supplied by the composer the piece would be determined. However, with the free insertion of frequent rests and varying tempos, many different arrangements of material are possible.

Earle Brown: March 1953

March 1953 is similar in concept to October 1952. Pitch, dynamics and time values are again determined. A rate of speed \( \frac{1}{\text{J}} = 87 \) is also given. As in October 1952 there are no notated rests; the exact position of the otherwise determined events within the composition is not determined. While a group is in progress, the group itself will be relatively exact in relation to the given tempo, but the exact simultaneity of or time between figures, chords and single notes is to be determined by the performer. Similar considerations concerning the values given to the spaces between events arise in March 1953 as arise in October 1952. Exact simultaneity of events is slightly more ambiguous in March 1953, but the overall tempo is more specific. In both, performance could be made directly from the score without pre-planning or forethought apart from awareness of determined and undetermined aspects. The performer could spontaneously react to each performance situation, producing many versions of the same basic material.
Earle Brown: **Dance**

*Dance* is a transcription into sound symbols of the floor plan of a dance by Carolyn Brown. Forty notated pitches are sparsely located on four staves. The two types of duration existing in *Dance*, determined by the odd and even numbers of the sequence chart of the dance, are: ♩ ("till inaudible") and ♦ ("shorter"). The latter duration in particular is not explicit. Since dynamics are not given, the applied meaning of the two durations would in part depend upon the forcefulness with which the note was struck. "Till inaudible" implies a sustained note; "shorter" may imply a sustained or detached note.

The given duration of the piece is the "length of the (original) dance." Presumably the total duration is purposely ambiguous. It is possible that the spatial gaps between the notated sounds are suggestive of an approximate length between attacks. Rests, not being notated, are presumably left for the performer to insert.

Duration of individual notes and of the performance as a whole, as well as dynamics and attack, are undetermined, but pitch and the general course of events are determined.

John Cage: **Variations I**

The score of *Variations I* consists of six pieces of transparent plastic, five containing five lines each and one with dots of four sizes. The dots, or points, represent events, the size of the point indicating the number of sounds within an event.
Multiple sound events, or "pluralities" may be played together or as "constellations," that is, groupings of sounds. The five lines of each square represent five parameters: (1) lowest frequency, (2) simplest overtone structure, (3) greatest amplitude, (4) least duration and (5) earliest occurrence within a decided upon time. Presumably the performer takes five readings, making five determinations for each event. For each sound within a plurality, a different position of a square (there are four) or a different square must be used. The total performance length might be decided beforehand.

With these instructions the responsibility of making a part devolves upon the performer. All aspects are "determined" by dropping perpendiculars from a point to a line. When dropping perpendiculars, distance may be "measured or simply observed." The measurement may be definite or approximate. Meanings will have to be assigned to resulting measurements; criteria will have to be set up. Some planning, even of a general type, might go into the taking of measurements. That is, the performer might intentionally make a certain measurement large or small according to the aspect being determined or his conception of the piece.

Making measurements rather than, for example, simply determining that the least duration will be a certain value, suggests a taking of the human will out of decisions. There is some element of chance in what the value will be. For instance, the manner in which the squares and dots are to be arranged is not specified. It could possibly be accomplished spontaneously. The
performer's conception will shape the piece; it will determine how he feels it should be put together, how capriciously the measurements will be made.

In designating the five parameters of a sound only very general indications are given. A measurement taken from one line, for example, might indicate the lowest frequency. "Lowest" suggests that a limit or restriction is going to be applied. The sound may be any pitch but no lower than a certain one. In these determinations, then, there is the suggestion that variety exists on one side of a limitation.

Aside from "earliest occurrence" of sounds there is no specific ordering of material. Certain events presumably might appear any time from the beginning of the piece onward while the placement of other events, determined to appear towards the end, would be more specific. There is no given form; a very general form arises after the determinations are made.

The performer is responsible for making his own part. By dropping perpendiculars and taking measurements, aspects of the piece are decided, certain limitations are determined. At this point there is still considerable freedom. If only the greatest amplitude or least duration is established, at some point the performer will have to further define the sounds. It is not specified whether this definition occurs before or during performance, by further determinations or spontaneously. In any case, an infinite number of realizations of the score are possible.
John Cage: *Variations II*

This score consists of eleven transparent sheets, six having a single line each, five with one point each. Sheets may be partly superimposed or entirely separated. Perpendiculars are dropped from the points to the lines and readings are taken to determine the following: frequency, amplitude, timbre, duration, point of occurrence in an established period of time and structure of the event (number of sounds making up an aggregate or constellation). Thirty readings may be taken from one position of the sheets. The position of the sheets is altered before taking further readings. It is not specified that all thirty readings must be taken before changing sheet positions. Any questions arising are to be answered by dropping perpendiculars.

The reading is to be measured "by means of any rule." Criteria, as in *Variation I*, will have to be "established"; a consistent system for measuring presumably being chosen. The results of the readings will be more determined than in *Variation I*. For example, in *Variation II* a reading could determine a specific frequency, whereas in *Variation I* the frequency might be anything above a determined lowest frequency. Thus, by assigning definite meanings to the measurements, the performer could come up with specific answers. It could be possible by making enough measurements to completely determine the details. Or, the measurement could indicate a general range, or area, with final definition occurring spontaneously.
Through calculations the performer must decide whether the event is to be an "aggregate" or "constellation," that is, a simultaneity or a linear event. The number of sounds in an event is not graphically indicated. Ordering of the events also is not specified. The sounds might be heard in the order they are determined, or the order might be decided by dropping perpendiculars.

The performance may be any length; any number of readings may be taken. Having to decide all factors by calculations calls for many measurements in order to produce even a relatively short piece. It is possible, but the performer might leave some aspect to be spontaneously decided during the performance. This might be a question for a dropped perpendicular. Whatever the possibilities, many solutions should arise; no two performances are likely to be identical. Again the performer's conception shapes the piece.

Variations I and II

Both scores are graphic; the materials given are to be further developed. Guidelines are given for the particularization of parameters. In both scores dropped perpendiculars establish a distance, the distance then being given significance. It is possible to determine Variation II to a greater extent than Variation I. Both variations take form in three basic, successive stages:

1. Materials exist in a graphic form; general instructions
are given. There are innumerable choices at this point.

2. A more determined stage follows as some aspects are further defined, some or all details established.

3. The performance is one realization of the work.
CHAPTER V

CONCLUSIONS

Difficulties arise in approaching chance and indeterminate scores from a theoretical standpoint. The analyst can only point out some of the questions posed by the scores, noting possible implications of the instructions and possible solutions to various aspects of the score. It is not possible to suggest that the performer choose any specified way of considering the score. A discussion of the instructions and suggested solutions may give rise to a performer's spontaneity, possibly inducing his train of thought along certain lines.

Some general features appear to be common to both chance and indeterminate works. In both categories denial of intended teleological orientation exists to some extent. That is, the performer is given choices and is responsible for the final definition of the work. It has been assumed that spontaneity exists to some degree in all the works discussed.

In this study the terms chance and indeterminacy were attached to two distinct categories, the pieces within a category exhibiting common features. The discussion of the features focused on three broad areas: the instructions of the scores, the notation, and possible solutions.

The instructions of the indeterminate scores discussed were found to be relatively straightforward. The performer usually is given clear "rules" for interpreting the scores. He
is made aware of his choices or alternatives. Any explanations of the notation are usually for the sake of clarification, not in order to point out purposeful ambiguity. The instructions deal primarily with the manner of performance, how the score is to be handled. Nr. 7 Klavierstück XI (Stockhausen), Caractères (Pousseur), Two Books of Study (Cardew) and Pour Clavier (Bussotti) exemplify this approach. With March 1953 the performer needs to be aware that Brown's "discontinuous, spatial-coordinate" simply implies a lack of rests; the value and position of the rests are to be spontaneously chosen by the performer.

In the chance category instructions are needed in order to explain what is given in the score and how extensive the freedoms are. Instructions are often enigmatic; the composer is careful not to be too explicit about any aspect of the notation. In Four Systems, for instance, Brown uses terms such as "active" and "dimension" but is indefinite regarding their meaning. In Octet '61 Cardew gives possible solutions to several signs, but makes it evident in his "notes" that it is the responsibility of the performer to determine the details, to interpret the signs in whatever manner he chooses. Explanations often appear to suggest meanings rather than to deliberately state them, leaving the performer to search out implications. For instance, the tempo direction "as fast as possible to as slow as possible" may be given, but without considering the statement in terms of a
conception of the piece, little actual meaning is obvious. Implications possibly will assert their influence subconsciously on the performer, resulting in certain spontaneous reactions not pre-planned by him. For example, use of terms having a definite meaning in another, non-musical field might immediately suggest possible musical meanings. The composer might have just provided a graphic score and noted that nothing is determined except the occasion for a performance. Instead there are often several pages of instructions noting what "may" be done and what is left for the performer to define. The reading through of the instructions in conjunction with the score should influence the performer's response. Often, however, it is what is not given in the instructions that will define what is given. The obliqueness of the instructions allows each performer to interpret the score individually; many differing solutions are likely to result. The performer will not be led to one particular solution; within certain limits whatever comes to mind may be an interpretation.

The notation of works in the indeterminate category on the whole is "traditional." The notation may be altered in some way but retains a resemblance to its traditional source. In Duo (Wolff), material is organized in "blocks" but traditional symbols are used to represent dynamics, metric values and pitch. In Pianopiece II (Cacioppo) some of the pitches are connected by

28 In November 1952 Brown gives the indication "as fast as possible to as slow as possible, inclusive."
"networks" but they are still represented by "noteheads." In indeterminate works time may be measured chronometrically; a section is sometimes bounded by time limits or a note may have a chronometric value, as $\boxed{\downarrow} = 1$ second.

Considerable diversification occurs in the notation of the chance pieces, the degree of departure from traditional notation varying greatly. In November 1952 Brown relies basically on traditional symbols; pitches with accidentals, metric values and dynamic signs are located on a fifty-line staff. The familiarity of traditional notation might readily provoke an interpretation. Other scores such as 1953 (Brown) and Octet '61 (Cardew) combine traditional and non-traditional symbols. In these scores the traditional symbols might serve as a place to begin the performance, inducing the performer's spontaneity. His imagination set in motion, he may evolve possible meanings for the non-traditional symbols. With the use of entirely graphic (non-traditional) notation often little is suggested to the performer. The notation of Music for Piano #7 (Ichianagi) suggests very general ideas -- representation of a type of sound and general range from which the sounds may be chosen constitutes the score. In Timepiece (Kasemets) the approximate number of sounds to be played is indicated by the symbols, but the nature of these sounds depends upon further restrictions the performer must necessarily make. He must, for example, define dots and dashes, "consonant" and "dissonant." In the scores Four Systems and December 1952 (Brown) the notation does not provide even general
solutions. Terms used in describing the score have a defined meaning in a mathematical context and might possibly provoke musical meanings; all symbols are to be defined by the performer. Spatial distance may be used in graphic scores as a measurement specifying either a general area of pitch, as in one possible interpretation of *Timepiece*, an approximate duration of events, or a relative duration between events, as possibly used in December 1952.

The possible solutions of indeterminate works will involve either the juxtaposition or the metric relationship of material. In *Nr. 7 Klavierstück XI* (Stockhausen) the performer's spontaneity ideally could produce countless juxtapositions of its sections. In *Caractères* (Pousseur) the ordering is more limited. There are choices but the composer wishes only certain solutions. In *Ib* of *Caractères* choices are made before the performance; once the page ordering is chosen *Ib* becomes determined. In *Two Books of Study* (Cardew) the determined material fits within time limits, but juxtaposition, interpolation or superimposition of the material leads to innumerable solutions. Material too difficult to manage spontaneously might be worked out ahead of time. Owing to the complexity of the groups in general and their necessary integration within a time limit, it would seem that spontaneity, while it may be a factor, is not stressed. In *Pour Clavier* (Bussotti) choices exist only on certain pages; other pages are determined. Juxtaposition of material is guided by dotted lines, arrows and other such means. The choices, rather than being
decidedly affected by spontaneity, appear to be between
(1) following the guided alternatives and (2) ignoring the
alternatives, playing the work as it is laid out. Indeterminate
works might be considered in terms of the visual analogy of
viewing an object from different angles. Differing sequences of
musical material may offer varying effects. With indeterminate
works the analyst need only point out freedoms or alternatives
available, noting the degree of spontaneity likely. The performer
must learn the determined material, applying pre-thought to that
end, but allow spontaneity in some measure to give the work its
final shape.

Solutions to the ambiguities of chance pieces may arise
spontaneously, but for the sake of continuity it is likely that
some pre-thought will be given to these solutions. The performer
may not realize prior to attempting a solution how little is
given in a chance score. Many small choices must at some point
be made. The performer might define terms, impose meanings in a
general way, still allowing for last minute choices to be made
during the performance. When the performer begins to shape the
piece he will likely discover how one decision hinges on another.
For instance, when ordering is free the question of time between
events may partially depend upon the order chosen. Solutions
will represent a drawing out of the performer's ideas. The basic
idea of the composition is to make the performer become more
involved. The performer faced with a score such as *Four Systems*
or *Timepiece* cannot automatically or mechanically reproduce sounds
according to the composer's relatively clear-cut intentions. A response to the basic ideas is needed to produce a solution to a chance work. The interpretation may be a final solution, that is, a direct performance from the score, or, more likely, an intermediate stage where the performer becomes aware of possible solutions, the final choice occurring spontaneously in performance.

Finally, a theoretical examination of chance and indeterminate works for piano has illustrated certain of the diverse means used to provoke spontaneity. It has also shown how the underlying philosophy has been applied to the works. Explication of some of the steps the performer must make prior to the performance and some of the problems encountered in examining such scores was of primary consideration. The study exists to aid the performer in the realization of chance and indeterminate works.
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