A HISTORICAL AND ANALYTICAL EXAMINATION OF GRAPHIC SYSTEMS OF
NOTATION IN TWENTIETH-CENTURY MUSIC

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A HISTORICAL AND ANALYTICAL EXAMINATION OF GRAPHIC SYSTEMS OF NOTATION IN TWENTIETH-CENTURY MUSIC

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Thesis

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ABSTRACT

This document will concentrate on notational methods of twentieth century music that depart from the traditional European system of musical notation with a focus mainly on newly invented graphical means of notation. Musical examples will be explored based on historical relevance and/or innovative usage. Styles of notation and each musical parameter will be categorized with the aim of understanding how and why graphic notation is used and in ascertaining possibilities of realization in performance. It should be noted that the expression “graphic notation” is misleading and could be literally interpreted to include any music that is transmitted via any type of written score (that is, one not conveyed from composer to performer by aural techniques, recordings, or rote teaching); the term’s use will instead refer to pictorial notations and any that deviate from traditional notational practices, as this is the standard usage in academic and performing circles. Excluded from categorization and extensive examination in this study are all musical systems and styles that developed mostly or entirely independent of European art music, including jazz and the musics of non-western cultures. Being as these styles differ so greatly in cultural, artistic, and aesthetic priorities, it does not seem necessary or appropriate to discuss them in this context. Also excluded are systems of tablature or methods of notating electronic music, since in the former the notation is simply a manner of physical and kinesthetic instruction which provides only basic musical direction, and in the latter the notation is a secondary product of the music and is not responsible for its
creation or performance. Lastly, though there have been literally hundreds of proposals for entirely new systems of musical notation, they will not be discussed here in great detail due to their purpose of replacing the existing system of traditional notation in order to improve readability and not to contribute to new concepts or techniques.

It is hoped that this study will help the reader to gain a greater understanding of graphically notated compositions, better comprehend the composer’s intentions, and to confirm his/her own choices in the performance of such works.
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CHAPTER I

NOTATIONAL BACKGROUND AND DEVELOPMENT

The term *notation* refers to any codified or organized system of scripted characters or visually perceived communication that represents or implies meaning and is capable of effectively transmitting information from one party to another. Examples of notational systems vary greatly in complexity (ranging from simple, representative pictures to intricate systems of code) and in use, representing language, music, choreography, and other modes of expression.

Systems of notation designed specifically to represent musical performance are found around the world and date back at least 2,300 years with each system varying considerably based upon musical and cultural values and societal progress. The single commonality in all musical notational systems is that there is no known society to have created one without first developing a method of linguistic notation\(^1\); it is no surprise then that the pictographic elements, orientation, form, and comprehension in musical systems of notation typically resemble the literary systems of their respective societies and geographic locations. Though some musical societies, namely African and Native American cultures, have effectively existed without written systems of notation, contrary cultural values made a method of writing down music essential and inevitable.

As suggested by the linguistic parallel, musical notation functions first and foremost as a method of communication; it allows the composer or creator to indirectly transfer directions to the performers in lieu of oral transmission. In the form of a score, musical notation also allows the musicians to better communicate with each other and the conductor (if necessary) during a performance. Notation also functions to expand the repertoire of performers by either assisting in the process of memorization or in eliminating the need to memorize altogether. Finally, notation allows for the preservation of music for future performances or study and dissolves the necessity of the inter-generational rote teaching that would otherwise be necessary to allow the same music to be accurately performed for any great period of time.

The degree to which any musical notation is specific varies depending on cultural usage and musical aesthetics. Many of the first systems of notation, such as the use of ekphonetic or neumatic symbols, afforded only approximate directions yet still allowed for relatively consistent musical performances. Later systems provided general instruction to the learned and knowledgeable performer, like the Baroque system of figured bass, or allowed the performer to interpret the non-use of musical direction to intuitively make musical decisions as appropriate within the style (e.g. dynamics, phrasing, rubato, etc.). If there is an observable trend in the degree of notational specificity from the beginning of musical notation to the present day, it is the evolution and accumulation of notational symbols that has allowed the composer to notate.

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2 Ekphonetic notation is a system of accents that was provided for the cantillation of Hebrew biblical texts and was common practice by the 6th century CE. The neumatic notation of Western plainchant, which consisted of a larger and more complex vocabulary of symbols, bore a similar (yet more refined) purpose and came to existence in the 9th century.
increasingly precise musical directions and to maintain finite control of the musical product.

A Concise History of the Development of Western Notation

Though concepts in musical notation first appeared in Asian societies and in cantillized texts of Greek, Roman, and Hebrew origins, it is the development and evolution of the musical notation of Western Europe that most greatly influenced graphic music.

The documented musical activities of medieval Western Europe reside primarily in sacred use. The efforts to standardize the Roman Catholic Mass and liturgical practices by Charlemagne are considered to be at least partly responsible for the attempts to notate chant and sacred music, which had originally been learned by rote. The earliest known example dates from about 840 by Aurelian of Réôme, though it has been suggested that collections of notated chants may have been kept in Charlemagne’s library several years earlier.3

Two distinct methods of chant notation were first employed. Oratorical neumes were written above chant texts and provided the singer with a basic rising or falling shape of pitch on which the text was to be sung. A system of twenty-one different neumatic symbols eventually afforded a more complex vocabulary of pitch contour. A later, diastematic method placed neumes in relation to an imaginary line of definable pitch; the distance of the neumes from the fixed point of reference represented an approximate value of pitch and offered a system that more aptly defined musical content.

From this point, innovation in musical notation entered a period of perpetual evolution as required by musical demands and an increased interest in specificity, objectivity, and consistency in performance. By the end of the tenth century, the imaginary line of the diastematic system became a real one in the score, and more lines were eventually added by Guido D’Arezzo and others to create our present musical staff of fixed pitch. Neumes became noteheads designating specific pitches on the staff and later became responsible for conveying specific rhythm. By the Baroque era, articulation, dynamic, and phrase markings became notated as composers wished to express greater musical direction and leave less interpretive consideration to the performer’s training or intuition.

Further Notational Developments

Though notational innovations slowed and crystallized into an effectively standardized notational system by the nineteenth century, post-romantic composers again began to make adjustments in notational practice as necessary to convey the meaning of the works, and their individual advancements collectively contributed to the air of experimentation that permitted further and more drastic departures from traditional notation. Gustav Mahler’s music is littered with substantial amounts of written directions to the performers and conductor, and though not notation per se, Mahler’s words were necessary to convey musical meaning that no notation in use was able to afford. Other early-twentieth century composers amended existing notations to fit their needs: Henry Cowell’s piano music used thick vertical bars that encompassed the range of the staff to represent tone clusters; Darius Milhaud’s Les Choéphores (1916) eliminated the
redundant lines of the staff and used just one line to notate unpitched percussion instruments; Arnold Schöenberg used X-shaped noteheads to denote his use of *Sprechstimme*; and the use of quarter-tones or micro-tones by many composers has been effectively indicated with variations on the traditionally-used sharp and flat symbols.

The most profound adaptation of traditional notational symbols was invented by Henry Cowell in his *New Musical Resources* (1930), a treatise initially conceived in his study with Charles Seeger about a decade earlier “to rationalize his manner of playing the piano.” Looking to eliminate the “clumsy expedient” of notating asymmetric divisions of the beat with a numerical notation dictating ratio (e.g. “3” over a triplet), Cowell divided a system of distinct notehead shapes to represent various metric proportions. By replacing the previous system of notation with noteheads that concisely specify triplets, quintuplets, septuplets, etc., some of the clutter and extra notations of a score could be eliminated. The following examples show the series that Cowell devised and an example of the notation in application:

4 Though several subsequent composers have adopted this approach in scoring for percussion, it appears that this is the first published example.

Figure 1.1:
Chart of Cowell’s Noteheads from *New Musical Resources*

Figure 1.2:
Example of Cowell’s Noteheads in Use

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Though much of *New Musical Resources* is devoted to this system of notating rhythmic complexities, *Fabric*, a brief twenty-one measure work for solo piano, is curiously the only published work by Cowell that incorporates extensive use of this notation, and it seems likely that the primary purpose of its composition is only to validate his concept.\(^8\)

Cowell’s proposal for a change in notational practices was relatively minimal compared to the proposals to reform musical notation by several hundred others who felt that traditionally accepted musical notation was unable to communicate in a clear, efficient, and easily readable manner. Though attempts to adapt all aspects of musical notation have been made, most of the proposals for new systems of notation keep many of the traditional musical symbols while attempting to increase readability or devise a more practical system of pitch comprehension by adapting the staff and/or eliminating accidentals in favor of other means.\(^9\)

Though no reform of traditional notation has been widely embraced, two have emerged as popular favorites. *Klavarskribo*, a word meaning “keyboard writing” in Esperanto, was devised in 1931 by the Dutch shipbuilder and musician Cornelius Pot in order to make piano playing easier and more accessible, especially to younger players. This system uses a kinesthetic method of transcription and realization by equating notes on the keyboard to their position on a vertical system of staff lines representing the

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\(^8\) Cowell’s *Quartet Romantic* (1915-17) and *Quartet Euphometric* (1916-19) incorporate very occasional use of third and fifth-notes, yet, oddly, traditional brackets are used on several occasions where his new notations would have been appropriate.

spatial position of the black keys; the white and black keys of the piano are notated with white and black noteheads respectively, eliminating the need for accidental signs. Read from top to bottom, rhythms occur spatially in relation to fixed barlines. As a visual aid to the pianist, the orientation and direction of the note stems specify the hand which should play the notes.

Figure 1.3:
Example of Klavarscribo Notation\textsuperscript{10}
From top of staff to bottom, the pitches Eb, F, A, C, and B♭/D

\textsuperscript{10} Jo Jansen, “Klavar, in Short,” Homepage of Jo Jansen, accessed 11/12/07.
Figure 1.4:
“Happy Birthday” Notated in Klavarscribo$^{11}$

A more recent proposal is Rodney Fawcett’s *Equiton*, published in Zurich in 1958 and developed by theorist Erhard Karkoschka in the following years. *Equiton* aims to improve readability by notating pitch and rhythm as simply as possible by eliminating unneeded or ambiguous notations. This is achieved by eliminating clef signs and notating each pitch in the same spatial orientation in relation to two staff lines and, like *Klavarscribo*, using solid or hollow noteheads to specify pitch instead of rhythm. Octave designation is made by the presence or absence of black or white boxes at the beginning of each staff. Rhythms in *Equiton* are notated spatially, and barlines and dotted barlines are often added to help delineate metric subdivisions; all rests are specified by the traditional eighth rest, although the symbol itself carries no specific duration but rather implies a silence that lasts until the next note is specified.

![Figure 1.5: Pitch Notation in Equiton](image)

Figure 1.5: Pitch Notation in Equiton

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Though the notations detailed above were attempts to change notation entirely, others have made adaptations as necessary and canonized them in their own works by frequent use. Stuart Saunders Smith, for one, has invented a method that improves on the use of dotted notes. A dot following a note traditionally signifies an addition of half of the note’s value; Smith’s creation of the hollow dot adds one-quarter of a note’s value to its duration and fills a practical need for notating complex rhythms. This method greatly improves readability by eliminating the need for ties and can be quickly learned and applied by the performer.

Figure 1.7:
Stuart Saunders Smith’s Hollow Dot Notation

13 Kurt Stone, “Problems and Methods of Notation,” Perspectives of New Music 1.2 (1963): 11.
A final notational practice that is unrelated to the aforementioned yet still significant and worthy of mention is *augenmusik* (“eye music”). Found recent in recent music but originating as far back as at least the fifteenth century, *augenmusik* uses standardized notation in a way that suggests emotion or extra-musical content to the performer. One of the earliest and most infamous examples is Baude Cordier’s (1380-1440) chanson *Belle, Bonne, Sage* and attempts to convey the love-themed content of the text and music by the distortion of the staff into the shape of a heart. Other examples may use the color of notes to denote themes such as black for death or darkness or white for day or light.14 Though *augenmusik* is mostly a technique of the fifteenth to seventeenth centuries, it has also been used by recent composers. Most notably, George Crumb’s Zodiac-themed cycle, *Makrokosmos* (1972), features three movements that use traditional notation arranged in the shapes of a circle, crucifix, and spiral. When asked about the purpose and meaning of a circular graphic, Crumb replied, “It’s just a way of making graphic the fact that the music is circular in sound. It seemed the right way to notate it.”15

Though *augenmusik* is delightful and interesting in its appearance, its notational value is severely limited, offering the performer a visual analog of something that may be generally conferred from a title or direction while creating sometimes severe problems in readability and comprehension.


Figure 1.8:
Baude Cordier - *Belle, Bonne, Sage*

Figure 1.9:
George Crumb – “Spiral Galaxy - *Aquarius*” from *Makrokosmos* (1972)\textsuperscript{16}

International Conference on New Musical Notation

Music editor and notation researcher Kurt Stone organized the International Conference on New Musical Notation in Ghent, Belgium in 1974, which was attended by several of the world’s most prominent composers, performers, and musicologists. By this time, there existed a massive collection of notational methods utilized by composers. Recognizing that there was a great variety of methods that were developing to communicate the same musical directions or effects, the Ghent conference aimed to create a system of standardization in order to facilitate a better communication between composers and performers and to lessen the burden of learning an unfamiliar notation, promoting a greater number of performances of new music. After soliciting information from composers around the world and examining hundreds of contemporary scores, the conference arrived at several suggested methods of notating contemporary musical concepts. Among the systems endorsed were notations that specifically organized methods of form, pitch, dynamic intensity, duration and rhythm, articulation, and score layout, as well as determining extended techniques for specific instrumental families, including electronic music, and pictographic methods of labeling instruments in the score. The conference used the following criteria: \(^{17}\)

Notation suited for standardization:

1. Proposals for standardization of new notational devices should be made only in cases where a sufficient need is anticipated.

2. Given a choice, the preferable notation is the one that is an extension of traditional notation.

3. The notation should lend itself to immediate recognition. This means it should be as self-evident as possible.

4. The notation should be sufficiently distinct graphically to permit a reasonable amount of distortion due to variations in handwriting and different writing implements.

5. Given a choice, the preferable notation is the one that is spatially economical.

6. Given a choice, the preferable notation is the one that has already received relatively wide acceptance.

7. Analogous procedures in different instrumental families should, if possible be notated similarly.

8. The notation used should be the most efficient for the organizational principles that underlie respective composition.

Notation unsuited for standardization:

1. Graphic notation which is unique to the compositions in which it appears, i.e., notation which is an integral part of the creative effort.

2. Notation specifically designed for nonstandard situations.

3. Notation of procedures or effects so rarely used that verbal instructions would be more efficient.

These guidelines effectively limited the notation suitable for standardization to symbols used in conjunction with elements of traditional notation, as the graphic notation employed in nearly any score in which traditional notation is absent can be said to be unique and/or requisite for the “creative effort.” Although there are musical symbols or graphics from contemporary use that have become canonized and are easily recognizable in their meanings, it is not clear if this result occurred due to the endorsements of this conference or because of a natural evolution from common use similar to that of the aspects of traditional notation. Thus, it cannot be said for sure if any of the conference’s
recommendations have been embraced. It can be observed, however, that some of the endorsed notations have certainly not been standardized in practice,\textsuperscript{18} so it is unclear if the effect of the conference has been substantial. This fact suggests that any widespread use of contemporary musical symbols likely occurred independent of the participants’ consensus in Ghent.

\textsuperscript{18} For example, the conference’s suggestions for pictographic representation of percussion instruments and implements have not been widely used by composers. Current symbolism for this purpose continues to vary greatly from one composer to another, and any use of such notations is generally ineffective or confusing without explicit definition.
CHAPTER II
CLASSES AND EXAMPLES OF NON-TRADITIONAL NOTATION

All examples of graphic notation can be fit into four broad categories with some belonging to two or more. Though it would be impossible to adequately describe all of the possible uses of graphic notation, the author considers that the subsequent examples identify and aptly demonstrate the four categories and present scores that are significant in the development of graphic practices and/or are especially original and interesting. With a few exceptions, scores chosen for inclusion in the following chapters were selected from the works of composers who were among the most prominent users of graphic notation.

Adaptations of Traditional Notation

Referred to as “parameter-freed” notation by Leigh Landy, this category includes any notation that allows the performer a moderate degree of choice in regard to one or more musical elements that are typically notated in a strict manner. Without proper clarification, Landy’s term is problematic since nearly all departures from traditional notation contain elements that may be construed to be freed from standard musical parameters; his expression is instead referring to notations that give specifications to the performer that are strongly suggestive yet partially indeterminate. This method is usually

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found in a notation that is either derived from established models or is used in combination with elements from traditional notation and can be a favorable style of notating new musical concepts or directions due to the relative ease with which a classically trained musician can realize the discourse.

The works of Earle Brown of the 1950’s and 60’s contain several appropriate examples of parameter-freed notation or, as he referred to it, “time notation.”

His collection, *Folio* (1952-54), an opus consisting mostly of graphically notated pieces, includes several methods of notation that suggest specific actions yet are broad enough to allow the performer a great amount of interpretive freedom. Brown’s *1953* for piano [just one of his *Twenty-five Pages* (1953)] consists of eight single staves in which sounds are notated by horizontal lines of varying lengths on a page that may be read in one of two orientations (due to symmetrical articulation, dynamic, and autograph markings, the composer has eliminated a “right-side-up”). Pitches are strictly determined by the location of the lines on each staff, although clefs are omitted and may be chosen by the performer. Each note is marked with a dynamic specification ranging from *pppp-ffff*. In this example, it is the parameter of linear time that is “freed.” The instructions to the work state that each system should last between five and fifteen seconds and that the relative proportions of the lines should be observed in the respective durations of each of the notes, but the exact length of each sound is determined by the performer instead of by strictly notated rhythmic symbols. This notation not only frees the performer from the traditionally strict demands (and ideals) of the composer but also liberates the music of the rhythmic rigidity that is typically found in traditional notation by abolishing the

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concept of pulse and the durational relationships created by the subdivisions of a consistent beat.

Figure 2.1: Earle Brown, 1953 for Piano

Also from Folio, November 1952 ("Synergy") allows the performer more options in choosing pitch material than 1953. Here the pitches are placed on a fifty-line staff in which the performer is invited to place “floating clefs” throughout the system that will define each pitch or set of pitches by allowing them to be read in the context of a traditional five-line staff. Though each pitch is notated using traditional rhythmic values, the absence of tempo markings, time signatures, and barlines offers the performer great freedom in performing the rhythms, and Brown ambiguously directs that “attacks may be interpreted as completely separated by infinite space, collectively in blocks of any shape, or defined exactly within that space.”

Krzysztof Penderecki’s Threnody: To the Victims of Hiroshima (1960) for 52 strings, a popular subject of music history texts, represents an extension of traditional notation in regard to specific pitch. Though a portion of the score uses traditional notation and directs the musicians to perform specified tones, it commonly uses graphic lines of varying densities that specify both rhythmic occurrences (in relation to a time line) and
pitch. In the example below, a graphic symbol for the orchestra’s ten celli specifies a
tone cluster beginning on the pitch F and gradually expanding to a range of
approximately D ¾ tone to G ¼ tone. A direction below the cluster symbol instructs the
first and tenth celli, respectively, to perform the upper and lower boundaries of the cluster
with the remaining players performing unspecified notes within that range. This method
of notating clusters is common throughout the work.

Figure 2.2:
Krzysztof Penderecki, Threnody: To the Victims of Hiroshima (1960)

Abandoning traditional notions of pitch, melody, and harmony in favor of clusters of
noise and indistinguishable tones, Threnody embraces the concept of overlapping
densities of sound. Though the clusters that make up much of the work could possibly be
notated using traditional means, Penderecki’s method of notation is much more efficient
and makes reading the score more comprehensible to both the director and performers.

Morton Feldman’s Projection 1 (1950) for solo cello is perhaps the earliest example
of a graphic score that features an entirely original notation. The score employs a three-
tiered system with each level corresponding to a different timbre (harmonics, pizzicato,
arco). Quadrilateral shapes within each level signify actions, and their spatial position in
each system represents pitches of the performer’s choosing within the specified but ambiguously-defined “high,” “middle,” or “low” registers. Each tier is divided into measures of four beats by dotted barlines, and though the notation is novel, it maintains a traditional approach to rhythm in its precise notation of the specific icti on which sounds occur, maintaining a traditional approach to rhythm. Though the score seems to be quite abstract, the composer still assumes control over all elements of the performance except exact pitch and dynamics (which are not notated or mentioned in the directions to the score).

Grid Notation

The category of grid notation describes any score where sounds, events, or actions are contained in a grid or matrix of boxes that organizes the separate and unrelated musical fragments to form a patchwork-like composition. Typically, the musical content of each box may be performed at any moment within the time frame that each box represents.

Though in some instances, similar results could be achieved by using other notational means (placing notations in spatial relation to a timeline, for example), this method creates more indeterminacy and allows the performer to use his musical intuition to a greater extent.

Feldman was the most prolific composer of grid notation, and many of his works of the 1950’s and early ‘60’s fall into this category. *Intersection 4*, another work for solo cello from 1953, reveals an evolution of Feldman’s grid notation since *Projection 1*. The three-tiered system has now been condensed in size by eliminating separate zones for each timbre and by instead specifying timbral techniques as necessary within a three-box system that again represents high, middle, and low registers of pitch. The significant difference in this work is the rhythmic autonomy given to the performer. Here, Feldman has opted to use numbers to designate the number of sounds that are to be played in each box of the grid; the exact placement of these pitches within the time frame is left to the cellist. Unlike in *Projection 1*, the listener’s perception of pulse has been eradicated despite the metrical consistency of each unit of time. *Intersection 4* and Feldman’s grid notation create an intricate sonic landscape filled with bursts of tone color and aperiodic rhythm. Although Feldman eventually abandoned grid notation after 1965, his later, traditionally notated chamber works achieve a similar aural aesthetic by means of rhythmic complexities and autonomously moving parts, such as in *Why Patterns?* (1978).
The first of three “trans-media” works for performers of any artistic discipline, Stuart Saunders Smith’s *Return and Recall* (1976) represents a significantly more indeterminate system than Feldman’s due to a more complex vocabulary of actions and a much more profound concept.

A “source of information” (a movement, sound, object, word, etc.) is chosen by the performers, and all actions are produced in relation or variation of the source creating a sort of theme and variations. Each performer begins in the upper left corner at X with a statement of the source in its original form and then independently chooses a horizontal or vertical route to proceed through the score, assigning a variable duration of one-tenth to thirty seconds per box. There are four categories of graphics, which reflect actions that modify the source material:

1) Imitate an aspect of the source, introducing new material if desired ( ○ )
2) Develop material already presented (D)
3) Repeat fragments of presented material (Z)
4) Replicate, blend, or match another event in unison with another performer ( ⊗ )

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Each direction may be altered with variations or combinations of the symbols: S – short and/or fast, L – long and/or slow, M – medium; arrows mean “more, higher, bigger” or “less, lower, smaller.” Numbers in the score represent restatements of the source, which are subject to modifiers that alter the total length of the statement and of each of its components (found on a different page and not included here).

*Return and Recall* is a primary example of a work that could only be produced with an originally-conceived system of graphic notation. A detailed score that could be read simultaneously by artists of different disciplines could not possibly be notated by traditional means, nor could the imitative actions required by the directions. Smith’s notation could not be any more clear, concise, and specific, yet it allows for a high degree of indeterminacy and permits a multi-media performance that is at once subjective and well-defined.
Pictographic Notation

Though this label could theoretically apply to many unorthodox notational systems including those that are extensions of traditional methods, it serves instead as a general classification for graphic notations that do not fall into the others included here. More specifically, the symbols and pictographs in these scores are generally unique to the composers who use them and have been invented without concern for previously used methods of notation. Though some scores included in this category may have a visual appeal, the notations are typically not meant to function as visual art but rather are intended to denote musical content and directions that are unable to be facilitated by

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traditional notation and/or new techniques not associated with traditional notation and performance.

Pictographic notations can afford the composer varying degrees of determinacy, and as in this example, several are often utilized within the same work. Randolph Coleman’s *Format 2* (1971) spans the gamut from traditional and objective musical notation to one that is completely indeterminate. Though it does not seem likely that this work was designed to act as an educational model for the various degrees and uses of graphic notation, it serves nicely for that purpose. The score consists of three types of large geometric areas that each contain notation of varying degrees of specificity:

1) **Quadrilaterals** contain relatively specific and traditional musical notation. Notes and rhythms of defined values are notated on a five line staff with articulation and dynamic markings. Aside from nuances of interpretation found in all traditionally notated music, the only choice afforded to the performer is to assign a clef to each staff—a indication that also allows the work to be easily played by any instrument.

2) **Circles** containing traditional notation in a vague and subjective context. Many critical aspects of determinate musical notation are absent, yet the performer is provided with information that allows relative realization. There is no staff, yet varying placements of noteheads provide the performer a spatial interpretation of pitches. Likewise, no dynamic markings are given, but noteheads of varying sizes suggest approximate intensities. Though rhythms are implied with solid and hollow noteheads, beaming, and other means, there exists no defined context for rhythmic relationships, and so this too must be approximated by the performer.

3) **Triangles** consisting of invented and completely abstract shapes and symbols. These shapes represent the greatest amount of indeterminacy and are void of any recognizable musical direction. Here, the performer is directed to use extended techniques or produce “nontraditional sounds.” Unlike the other areas where the given symbols are related in a musical way, each of the sounds in the triangle shapes should be separate, detached, and unrelated to any of the other sounds of the event.

Specific durations of each event are left to the performers, yet the length of the performance of each shape and the consequent silences between them must adhere to a
strict relationship set forth by the composer. The order and method of the performance of each section is also left to the performers, although Coleman suggests several possible realizations.

Figure 2.6: Randolph Coleman, *Format 2* (1971)

Herbert Brün pioneered the use of computers in graphically notated music scores in the mid-sixties, and *Stalks and Trees and Drops and Clouds* (1967) for percussion, the final piece in a trio of solo percussion works of the same year, represents one of the first pieces created by a computer plotter. In the work, thirteen different instruments or

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groups of like instruments are chosen by the performer and are each represented by a
different shape of notehead. Sounds are notated spatially in relation to two time axes,
with the lower containing dry sounds and the upper, resonant and ringing sounds. The
“stalks” and “drops” of the title are notated by noteheads connected to vertical lines
emerging from the lower and upper time axes, respectively, and signify single attacks.
The “trees” and “clouds” are single structures of continuous attacks comprised of
noteheads that converge at a single point on either axis. The vertical distance from each
axis determines the dynamic intensity of each sound, and the size of each notehead
determines the timbral intensity or fullness of each sound – a degree of timbral specificity
that appears to be unique to Brün’s music and notation. The composer’s method of
notation is one that provides the performer with precise and detailed direction as to the
performance of each sound in an extremely efficient manner. Though the dynamic and
timbral intensities are relative and subject to the performer’s choice of instruments,
implements, and personal preferences, the score can be regarded as being highly specific
yet simultaneously subjective.
Robert Moran, a disciple of Roman Haubenstock-Ramati, produced *Four Visions* for flute, harp, and string quartet in 1963. The score consists of four complex and abstract images that are to be performed as separate movements. Moran specifies instructions including durations for each movement and that each performer should start at either side of the image and read directly across. Directions of varying degrees of specificity are given for realizing the thirteen different shapes that make up the images; for example, hollow dots mean “mute, no vibrato, use of harmonics,” or X’s as “auxiliary sounds.” Though the instructions to the performers are quite specific, each player’s speed of reading, choice of starting point, and inclusion of graphic elements to perform results in a work that is highly indeterminate.

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Abstract Notation

This category is quite broad and includes any scores that are nearly void of objective and/or rational direction to the performer (if instruction is included at all). This music epitomizes the post-war aesthetic of compositional collaboration between the composer and performer, and in many instances, the performer’s creativity is more greatly highlighted than the composer’s own compositional input. Other examples provide explicit directions that accompany a graphic score, yet require the performer to define the specific musical parameters that will ultimately create the performance. Regardless of the composer’s method, the great degree of indeterminacy of these scores insures not only that two performances will sound different, but also that they may not even be recognized as the same work.

Judging by its nearly universal inclusion in music history text books, Earle Brown’s *December 1952* from the *Folio* collection is perhaps the best known of any graphically
notated piece. It would appear obvious that the work’s infamy is due to its stark contrast in both appearance and musical content to nearly all scores that preceded it, as well as to its inception in the early part of the graphic notation era. Brown drew significant inspiration from the works of the painter Jackson Pollock (1912-1956) and particularly from those of the sculptor Alexander Calder (1898-1976), whose hanging mobiles (see Figure 2.9) produced a markedly apparent influence in December 1952 and subsequent works.

![Alexander Calder, Sumac II (1952)](image)

Figure 2.9: Alexander Calder, *Sumac II* (1952)

In December 1952, thirty-one black lines of horizontal and vertical orientation and varying degrees of thickness are scattered randomly about a single page, which is to be performed by “one or more instruments and/or sound-producing media.” No specifications are given that suggest pitch, rhythm, timbre, or duration. Brown does, however, give vague instruction on the performer’s perception of the score. If the

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performer chooses to approach the score as an object and in a traditional two-dimensional manner of reading, the thickness of the lines should indicate “relative intensity and/or (where applicable) clusters,” a statement that, although specific, is at the same time contradictory, as its direction allows for the same symbol to be interpreted as a distinction of either dynamic intensity, pitch, timbre, or any combination of these elements. If the performer opts instead to view the score in a more profoundly three-dimensional manner, much as one would view a Calder mobile, then the elements of the score should be “subject to continual transformation and modification.” No further elaboration or instructions are given to the performer who chooses this method of realization. Though the composer states provisions for performances that can be either improvisatory or preconceived, it would perhaps seem most appropriate to intuitively choose actions during performance that are based on the imagined perception of the objects of the score independently floating in space, much like the elements of a Calder mobile.

Figure 2.10: Earle Brown, December 1952
Though *December 1952* is influenced by and perhaps even analogous to visual art, the score is designed strictly as instruction for musical performance and carries no extra-musical purpose. According to Brown:

> the “decorative” value of a score is in itself a pleasure but I am more concerned with the possibilities of a notational system that will produce an aural world which defies traditional notation and analysis and creates a performance “reality” which has not existed before. ²⁷

Others, however, have created scores that are indeed meant to cross disciplines and exist simultaneously as both graphic art and musical score.

Roman Haubenstock-Ramati’s *Kreise* for Sprechstimme and Percussion consists of two similarly-sized circles, one containing various abstract shapes and the other fragments of newsprint, numbers, and even snippets of crossword puzzles. No directions are given other than the instrumentation. It is not even dictated which of the circles each performer is to play, or if they should realize both; however, a circle of shapes identical to the one on the left below is also used in Haubenstock-Ramati’s *Duo* (1972) for guitar and percussion and a similar graphic is used in his *Batterie* (1969) for solo percussion, so it seems implicit that the percussionist is meant to perform the circle on the left of the page and the vocalist the texted circle on the right.

Herbert Brün’s continued experiments with computers resulted in *Mutatis Mutandis* (1968/95), a large collection of computer-generated graphics that double as visual art and material for interpretation in any artistic medium. The performer is not asked to equate certain shapes into musical figures or events as in *Four Visions*, rather Brün describes the images as traces left by a process - that is, the process of giving mathematical commands to a computer plotter, and it is the performer’s role is to design a similarly conceived, albeit entirely different, artistic event that s/he imagines would leave an identical trace. As in all of his graphic music, the composer expects the interpreter to *compose* rather than improvise, as similarly abstract scores might suggest. The consequence of this distinction is a sort of collaborative dialogue between the composer, interpreter, and computer that results in a multi-dimensional artistic creation.
One of the most substantial graphic works is Cornelius Cardew’s 193-page epic, *Treatise* (1963-67). Cardew, who at one time was employed as a graphic designer, seems to have had an aesthetic of visual art in mind in the composition of this work; however, despite the composer’s visually stimulating creation, its graphics are designed to influence and inspire musical creativity from the performers, whom Cardew preferred not to have a traditional musical education so as to be free from the rhetorical constraints of traditional orthodoxy.\(^{29}\)

With limited exceptions, each page of the score consists of a “lifeline,” a line that divides the page in half and provides a point of reference for other objects on the page, and two staves at the bottom, which exist for the performer to make notes or realize the score in traditional notation. Other shapes appear including numbers, circles, and warped renditions of traditional music symbols, and often incorporate or distort the lifeline in their images. No instructions are given for the realization or instrumentation of the score,


though possible methods of realization of specific shapes or symbols are suggested by Cardew in his *Treatise Handbook*.

Figure 2.13: Cornelius Cardew – *Treatise* (1963-67)

Dick Higgins’ *Ten Ways of Looking at a Bird* (1980) for violin and harpsichord incorporates a different type of artistic abstraction, one that demands the performer to embrace emotional decision-making based on the given imagery rather than the rational and intellectual interpretation expected in most other scores. The work is in ten movements, each notated on a separate page with blank staff lines superimposed over a blue-tinted photograph of a young, naked man. Some rules of performance are specified.

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by the composer, including duration of the movements and pitch material for the violinist (printed at the top of each of the ten movements); however, the content and style of each movement is to be determined by the performer based on the mood suggested by each photograph. The indeterminacy here is unique in that a realization of the score may not reflect the performer’s musical training and aesthetics as much as it does his/her personality, as the neutral and vague content of most of the photographs does not strongly suggest any single emotion or situation, and the style of any performance would most likely be a manifestation of the performer’s extra-musical life experiences as s/he draws on personal events for inspiration to determine the musical content. The harpsichordist’s role is even more indeterminate; the directions specify the performer to play twenty traditionally-appropriate sounds (in each movement) of varying and inconsistent timbre, texture, and rhythm in a manner that should attempt to “surprise” the violinist. It is not clear whether the harpsichordist is invited to interpret the photographs or to perform independently of them.
Yet another form of abstract graphic music is a category that Landy appropriately refers to as “do-it-yourself” scores, a type of work in which the performer defines specific musical parameters based on given criteria and, as in the following example, actually creates the performance score. 31  John Cage’s Cartridge Music (1960) best exemplifies this type of work. The piece requires the performer(s) to insert objects (other

than the traditional needle) into the cartridges (pick-ups) of amplified phonographs and to produce sounds by any means using these objects.\(^{32}\)

The score includes twenty pages with one to twenty solid-lined shapes, and four transparent sheets that contain solid points, hollow circles, a curving dotted line, and a stopwatch. The interpreter(s) creates the performance score by superimposing the transparent sheets in any orientation over the page that contains the number of shapes that corresponds with the number of cartridges (the example below is just one of an infinite number of arrangements and represents a score that would be performed by two performers).

_Cartridge Music_ embodies the aesthetics of Cage’s music of this period, including the use of chance operations and the allowance of the performer(s) to largely or entirely dictate the character of the sonic material.

![Diagram of Cartridge Music](image)

**Figure 2.15:**
John Cage, _Cartridge Music_ (1960)\(^{33}\)

\(^{32}\) In the directions to the score, Cage suggests wire, toothpicks, pipe cleaners, twigs, etc. as potential cartridge objects.
The instructions for realization are as follows:

- The dotted line marks the path of the performer(s) and its intersections with other points on the page determine sound events.

- The stopwatch circle and its intersection with the dotted line determines a duration of time in seconds that an event should occur (in the above example, twenty-four to thirty seconds). The total duration of the performance is left to the performer(s) to decide.

- An intersection with a point within a shape signifies a sound to be performed in any manner with an object in the cartridge, whereas an intersection outside of a shape represents any auxiliary sound produced by any means other than the phonograph.

- An intersection with a circle within a shape indicates a change in the amplifier’s volume and a change in tone when it occurs outside of a shape.

- Tape loops or other repetitive patterns are implied when an intersection occurs within sections where the dotted line crosses itself (in the above example, such events would not occur).

- If a circle is intersected by both the dotted line and a solid line, the object in the cartridge should be changed.

Once all of the points have been performed, the interpreter(s) is allowed to rearrange the transparencies any number of times in order to create a new performance score.

Though they are technically not graphic by my previously stated definition, prose scores must be included in this category due to their unconventional means of conveying musical information. Prose scores include any works that consist mostly or entirely of written instructions for performance. Due to the inability of language to explicitly describe musical direction in a concise manner (thus necessitating the original need for musical notation), scores of this nature are nearly always largely indeterminate, if not completely abstract. Cage’s *Child of Tree* (1975), for example, contains four pages of

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33 Copyright © (1960) by Henmar press, Inc. Used by permission of C.F. Peters Corporation.
hand-written instructions and directs the performer to improvise over a chance-derived structure using cacti, pod rattles, and other plant materials outfitted with contact microphones.

The prose score was also a common tool for Fluxus artists like LaMonte Young and Nam June Paik, and for experimental groups of non-musicians such as Cardew’s Scratch Orchestra. Musical notation, of either the traditional or invented graphical varieties, was not useful or needed to accomplish the artistic and aesthetic goals of the Fluxus movement, which rebelled against the supposedly elitist conception of music-making that was limited only to the trained artist. Perhaps the most infamous of this type of performance (or “happening” as events such as this were usually called) is Young’s *Piano Piece for David Tudor #1* (1960), in which the performer is instructed to bring a bale of hay and bucket of water on stage for the piano to ‘eat and drink.’ Some of Young’s other works feature more indistinct information, such as his *Piano Piece for David Tudor #3* (1960), which provides only:

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most of them
were very old grasshoppers
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Prose scores such as this only vaguely resemble “music,” if at all, and often only because their creators, like Young, were once known to be composers of more traditional sound-based music. But despite their ambiguity and questionable “musical” content, the prose score and the activities and “happenings” associated with them knocked down any existing barriers that had been established by traditional musical customs simply by being accepted by some as legitimate artistic events, and they allowed for future notational and artistic possibilities that could not be compromised.
CHAPTER III

GRAPHIC NOTATION DISSECTED

Though there are essentially only four classes of non-traditional notation, there is of course an infinite number of notational possibilities and options for the composer. This poses a significant challenge to the performer, who must learn to decipher the composer’s intentions (which may or may not be easily understood) and attempt to realize the score in a way that maintains the integrity of the work’s concept.

The following chapter will dissect music to the elements of form, pitch, rhythm, dynamic intensity, and other musical characteristics, and will explore the various ways in which they may be manifested in a graphically notated score. In addition to the theoretical value in scrutinizing the usage of these elements, it is hoped that by understanding the various styles in which each attribute can be used and notated, the performer can achieve a greater comprehension of the composer’s intent as well as more quickly recognizing his/her own.

Just as works may contain elements that place them in more than one classification of the previous chapter, all of the following musical components may fall into one or more of the subsequent groups, creating more complex hybrid styles.
Form

Though it is most often imperceptible to an audience, the form of a graphic score, both at local and large-scale levels, plays a vital role in determining the order of events and shaping the work as a whole. It is typically found that the degree to which form is determined is intrinsically related to the overall specificity of the work.

1) **Linear form** is perhaps the most common method of form. It is much like the method of reading traditional notation and probably used so frequently because of its nearly universal use in reading and comprehending most forms of written language. It was particularly used in the early stages of the graphic notation trend and especially in the works of Brown, Cage, and Feldman. Unlike in traditional notation, linear form in graphic notation does not typically adhere to a pulse. Chronological progression in accordance with a time line is common, as in Brün’s *Stalks and Trees and Drops and Clouds*, but it is also often found that a performer may progress at his/her own rate in relation to a total duration for the piece or graphic, as in Moran’s *Four Visions*. Though linear form is usually not difficult for the performer to perceive, complications can be hidden, especially in performing the later graph works of Feldman, in which each box is expected to progress at a consistent tempo, yet the events within each are free. In this scenario, the performer is confronted with the challenge of maintaining a strict, internal pulse while attempting to portray to the audience that one does not exist.

2) **Performer-selected form** allows the performer to choose from specified substance that will be included or excluded from performance. Karlheinz Stockhausen’s *Nr. 9 Zyklus* (1959) for solo percussion includes graphic structures that provide this kind of option. In the following example, the performer plays the staff system in the middle of
the page and chooses only one of the boxes on each side of it to perform, omitting the other entirely from the performance. The resulting music is thus one in which the performer has a degree of compositional input, yet the composer still maintains a large amount of creative control.

![Figure 3.1: Karlheinz Stockhausen, Nr. 9 Zyklus (1959)](image)

3) **Chance-derived forms**, used primarily by John Cage, involve the composer and/or performer using a method of chance operations to determine the overall structure of the performance. Once the structure is completed, which usually occurs in preparation but may occur spontaneously during the event, there is typically a set of specific rules for performance, as in Cage’s *Cartridge Music*. Though this technique is designed to provide an unlimited number of unique sounding performances, the specificity of the directions allows for the possibility of several different performances to be recognizable as the same work.
4) **Open form**, also called “mobile” form, was coined and first implemented by Earle Brown. It refers to any system in which fixed elements are free to be arranged in an indeterminate order of the performer’s choosing. The result is much like a Calder mobile, in which each piece is unable to change shape or color but is free to spin independently of the rest; it is in fact undeniable and easily recognized that Calder’s influence on Brown resulted in the creation of this style of musical structure. Open form is of course present in *December 1952* but also several of Brown’s other works including *Twenty-five Pages*, in which the single-sheet pages may be arranged and performed in any order, as well as in *Available Forms, Nos. 1 and 2*, in which a conductor cues numbered events as he wishes. Open form allows for a spontaneous method of performing specific material and for achieving extreme rhythmic complexities as contrasting parts are layered without care for synchronization and has been used to this end by a number of other graphic notation practitioners, including Roman Haubenstock-Ramati, Robert Moran, Karlheinz Stockhausen, and Stuart Saunders Smith.

5) **Graphic objects** with little or no directions for performance represent the most abstract and free style of form. They require a virtuosic level of creativity of the performer, who must translate the visual image into sound. Brün’s *Mutatis Mutandis* and Haubenstock-Ramati’s *Kriese* are prime examples and offer the performer complete control over the realization of structure.

**Pitch**

1) **Traditional use** of pitch is found in graphic scores but is somewhat uncommon; a score in which this treatment of pitch is effective can likely be notated mostly or entirely
by traditional methods. Where it is found in graphic scores, traditional pitch is usually used in conjunction with graphic elements, as in Brown’s Twenty-five Pages, and/or it is used in a more subjective way, as in Coleman’s Format 2.

2) **Extension and variation of traditional notation** adapts standard models of notating pitch in order to achieve greater specificity or to facilitate new musical techniques. Although they are now canonized as a part of our traditional notation, the graphic adaptation of sharp and flat signs to denote quarter-tones represents an exacting demand of specific pitch. Other examples include methods that improve notational efficiency such as that of Penderecki’s *Threnody: To the Victims of Hiroshima*, which provides a specified but approximate range of pitch.

3) **Reformed systems of notation** are typically rare but are present in the works of some composers and include objective direction of specific pitch in a new context. In many of his works, Anestis Logothetis used a “chromatic staff” system in which each of the twelve tones is notated in a way that does not include sharp or flat signs (see below),34 this allows them to be positioned without a staff system anywhere on a page while still designating specific pitch material. A quick glance at any of his scores illustrates that, to a large extent, Logothetis designed his scores with an extra-musical aesthetic, which may be the primary reason for utilizing such a system of notating pitch.

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34 This or similar methods of pitch organization are common to many of the past and present attempts to reform musical notation. See the website of the Music Notation Modernization Association for more examples: http://www.mnma.org.
The signs may be interpreted by each player according to the possibilities of his instrument. They are divided into noise-symbols and tone-symbols. Pitch and range are left to the performer.

Dynamics and accentuation may be seen in the form of the symbols.

- Normal playing
- Sharply accentuated
- Like a potato
- Noisy tone
- Tremolo, trill, fluttertongue, etc.

(Tone groups)

(to be played in each octave)

Figure 3.2:
Anestis Logothetis, Legend to *Agglomeration* (1960)

Figure 3.3:
Anestis Logothetis, *Agglomeration* (1960)
4) **Diastematic** methods provide a relative representation of pitch in relation to a fixed point, such as a line, or in a graphic symbol’s spatial relation on the page. The latter is found in Cage’s *Aria*, in which the height of the page represents the vocalist’s tessitura and the pitch of each sung word or phrase follows a contour approximated by its position on the page and the shape of the line that accompanies it.

![Figure 3.4: John Cage, *Aria* (1958)](image)

5) Graphics or words with relative directions for pitch allow the performer to determine exact pitch but within an approximate range determined by the composer. The graph works of Feldman are best representative of this method, with grids consisting of undefined “high,” “middle,” and “low” registers being common throughout his

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compositions of the 1950’s and early 60’s. Smith’s *Return and Recall* also features such a system, with possible interpretations of arrow symbols to signify the performance of higher or lower pitches.

6) **Free treatment of pitch** is found in the more abstract models of graphic notation. These scores are the most indeterminate method of notating pitch and are void of any material that implies tone either explicitly or implicitly, leaving most or all of the pitch material to performer choice. Cardew’s *Treatise* and Brün’s *Mutatis Mutandis* are good examples.

Rhythm

1) **Traditional use** of rhythm in graphic works is perhaps more uncommon than the scarce usage of traditional methods of pitch, and its rarity is for the same reasons. Most graphic scores seek to escape the conventions that a metric pulse implies, and so the traditional use of rhythms of related proportions is generally not appropriate. However, it does occasionally occur, usually in combination with graphic elements, which Coleman’s *Format 2* again aptly demonstrates.

2) **Spatial or linear** methods of notating rhythm are perhaps the most common in graphically notated works. Notes or symbols are read and performed in relation to their position on the page. This system is often used with a time line, as in Brün’s *Stalks and Trees and Drops and Clouds*, but can also be effectively incorporated without a specified measure of time as in Brown’s *Twenty-five Pages* and *1953*. A spatial rhythmic notation affords the composer varying levels of control over rhythm; using time lines allows the composer to place notes outside of a strict rhythmic framework while still maintaining
uncompromising control, while other models permit the composer to establish consistent and determinate rhythmic relationships yet allow the performer interpretive choice in the exact duration or placement of each sound.

3) **Grid notation**, like that of Feldman, is not so much a method of notating specific rhythm as it is one of specifying texture. In Feldman’s works, each box contains a number of sounds that may be performed at any point within the specified duration of the box. This technique allows the performer free choice (be it spontaneous or predetermined) in the placement of the rhythms; however, the composer maintains a broader degree of control in regard to overall rhythmic density and pacing.

4) **Graphics or words with relative directions** convey a general concept to the player and allow the composer a small degree of rhythmic direction while leaving most of the specific action to the performer. Christian Wolff’s *Edges* (1968) for any instrumentation and number of performers, a mobile-form work with various words and graphics distributed randomly on a single page, displays two different examples of this notation; a written direction - “slow” - and a graphic symbol derived from traditional notation that is specified as meaning “very rapid”. Though these guidelines are specific and unambiguous as to the composer’s intentions, they are subject to each performer’s semantic interpretation of the directions and technical capabilities, and in this particular piece, they are not attached to any specific action and are free for the performer to decide when and how to apply them.

5) **Free rhythm**, that is, an absence of rhythmic direction, is found in most of the abstract graphic forms but can also be present in combination within other systems of rhythmic notation. In Brün’s *Stalks and Trees and Drops and Clouds*, the “tree” and
“cloud” structures are meant to be heard as continuous events of sound; being that they are performed by percussion instruments that are unable to truly sustain sound, it is necessary for the performer to continually strike the instruments to create this illusion. Though the beginning and ending of these structures are strictly specified, as well as the specific timing of entrances of the instruments that may make up the events, both the number and rhythmic placement of the pulses contained in each tree is indeterminate, which affords the performer a considerable amount of freedom in shaping the textural content of the structures.

Dynamic Intensity

1) **Traditional use** of dynamic intensity is not uncommon in graphic works. This may be due to the fact that traditional dynamic markings are already subjective and imprecise, traits that perhaps justify their use in a music that is often purposefully indeterminate. Usually traditional dynamics can be found in scores that use other traditional parameters and/or are variations on conventional models.

2) **Dynamics proportional to size** are quite common in graphic works. Typically, note heads or other graphics of the largest sizes represent the upper extreme of the performer’s capability while the smallest represent the lower; all sizes of symbols within this range represent dynamics that correspond accordingly to the dynamic tessitura of the performer’s instrument. This method appears to be popular for several reasons: 1) it gives the performer a visual comparison of dynamic intensity using a broad range of symbols, and thus is more specific than traditional dynamic markings, affording the composer greater control; 2) it allows for a more concise and efficient way of reading and
notating intensities; that is, a performer may obtain dynamic direction from looking at the note, rather than having to looking elsewhere on the page for information; 3) the composer can more easily specify several dynamic changes in a small area without cluttering the page with several symbols; 4) proportional dynamics allow any instrument to explore more effectively its dynamic range and capabilities than traditional notation allows. By the mid-1960’s, this method was so common, it became implied (or at least suggested) that noteheads of varying shapes represented dynamic intensity, and the technique continues to be employed in music today. It may be found in Stockhausen’s *Zyklus* and in numerous other works.

3) **Diastematic dynamics** are those that are proportionate to a reference point and may be likened to the diastematic method of notating pitch. Though not as common as the previous method of notating dynamics, this style is equally effective. Brün’s *Stalks and Trees and Drops and Clouds* demonstrates this style with the distance of each notehead from the time axes representing relative intensity. Cage’s *27’ 10.554” for a Percussionist* (1956) features a similar but different method in which each staff line (designating different families of instruments: **Metal**, **Wood**, **Skin**, **Auxilliary**) represents a supposed *mezzo-forte* dynamic; dots (single sounds) or lines (crescendi and decrescendi) above or below each line specify dynamics that are proportionately louder or softer. In some scores, a marked reference point is not always present, as an object’s physical location on the page can also suffice.
4) **Graphics or words with relative directions** can also be used to denote dynamic intensity. Invented notations, such as the arrows in Smith’s *Return and Recall*, can effectively serve as methods of approximate dynamic direction, as can traditional symbols used in an ambiguous context, such as Wolff’s crescendo sign in *Edges*. Regardless of how these directions are conveyed to the performer, it is typical that objective levels of intensity are unspecified, giving the performer a great degree of freedom.

5) **Free dynamics** are common in many works, as indicated by the absence of specifications, and allow the performer to determine most or all of the dynamic content. Several of the works discussed so far fall into this category, including Cage’s *Aria*, Higgins’ *Ten Ways of Looking at a Bird*, Moran’s *Four Visions* and the graph works of Feldman (although some performers will play these as soft as possible to adhere to the composer’s later dynamic and textural tendencies).

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*Figure 3.5: John Cage, 27’ 10.554” for a Percussionist (1956)*

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Other Musical Attributes

Though this covers the main parameters of traditional notation, there are several other notational methods that detail specific musical techniques that traditional models of notation are unable to specify. The following describes musical directions that can be found in graphic notations yet defy classification in the manner above due to the great degree of specificity in their notational usage.

Timbre has always been a crucial aspect of musical performance, yet most composers using traditional notation have failed to fully address the aural capabilities of instruments and performers or simply left such decisions to be based on established performance practice. Edgard Varèse was one of the first composers to move timbral considerations to the foreground of his compositions, yet he accomplished this by using traditional methods of notation in combining various densities of dynamics with unorthodox instrumentation and creative orchestration. Composers of the post-war generation, looking back to Varèse’s early works and at his current experiments with electronic music, further explored the timbral characteristics of individual instruments, and several - including Brün, Moran, and Wolff - devised methods of notating or suggesting timbral variation.

Similarly, graphic notation allowed musical effects to undergo a stage of evolution and development. Previously standardized techniques, such as trills and vibrato, became more highly regulated, giving composers greater control over the effects; for example, a graphic adaptation of the trill sign could be condensed and stretched to represent varying speeds of alternation or motion instead of allowing performer choice and experience to dictate as before. The line symbolizing the traditional glissando is also frequently used,
although often in new a way that does not directly join two notes of different pitch, but rather follows a changing contour of indeterminate tones that provides the performer a visual representation of the desired sound, as in Cage’s *Aria*.

It has also been necessary to derive methods of notating extended techniques or procedures of creating untraditional sounds, such as auxiliary noises executed by clicking valve keys, creating harmonics, or playing the shell of a drum. Likewise, there exist instances of notations that indicate specific playing areas on string or percussion instruments, achieving timbres or sounds that would be difficult to express effectively with traditional notation.

Lastly, new aesthetics of performance have demanded new methods of notation. The post-war era ushered in several composers who were influenced by the big band and bebop jazz styles of the 1930’s and 40’s and the continuing evolution of the genre. Of particular focus was the improvisatory aspect of performance – a trait mostly shunned by classical musicians and composers since the end of the improvised cadenza, but one that several post-war composers sought to realize in contemporary art music. Though several graphic works have elements of improvisation that are inherent by the type and form of notation, some composers have used graphic notation to designate the method of improvisation, such as in Smith’s directed imitation in *Return and Recall*. 
CHAPTER IV
REFLECTIONS

It is easily observed that the period from 1950-1970 represents the era in which graphic notation was most significantly and widely used. Both the large number of works from this time which contain non-traditional notation as a central concept and the development of graphic notation by composers of all nationalities and aesthetic orientations characterizes this trend as a greatly significant aspect of musical history. It is worth pondering then the causes of such a trend. Though it would be impossible to assign a single motivation, there are a number of philosophies that are likely to have contributed.

The obvious and most appropriate response to this question is that new notations were required in order to effectively communicate new musical concepts. Imitation, timbral specificity, improvisation, and theatrical elements were all significant developments in the music of this period and often required concise visual notation (as opposed to written directions) in order to be most effective. Also needed were notations that could appropriately dictate extended playing techniques, new sound sources (created instruments or non-musical objects, such as phonographs in Cage’s Fontana Mix), or the incorporation of non-Western musical instruments for which there existed no standard form of notation (or for which traditional Western notation was ineffective).
In addition to the post-war concept of extending traditional musical practice and embracing new ones is the ideal of composer-performer collaboration and the sharing of creative efforts. The original Cagean philosophy of the egoless composer is evident not only in his works but also those of Smith, Moran, Logothetis, and many others. The open and subjective character of many graphically notated works best facilitated this artistic interface and resulted in the creation of the concerted performances that these composers intended.

A common observation is that a listener is often unable to identify a serial work of great precision, order, and exactitude from an aleatoric or indeterminate work of spontaneity. Though they are completely contrary to each other in terms of compositional techniques and performance concerns, works of complete control and complete freedom often share a similar aesthetic, and the musics produced using these contrary compositional methods began to sound quite similar due to shared traits such as extreme rhythmic complexity, atonality, and erratic changes in dynamics, articulation, or other musical attributes. Another observation can be made that there exists not only a transversal relationship between notational exactitude and musical possibilities, but in models of extreme control, the performer is unable to perfectly and accurately perform the music to the degree that it is prescribed. It was ultimately those who were willing to eschew the traditional archetype of the composer (and music in general) who finally abandoned the supposedly superior model of serialism for a method that both allowed for more creativity from the performer and, in some cases, made the work technically easier to perform.
On a related note, Earle Brown suggests that the “American aleatorism,” a term used in a context referring mostly to the music of Brown and the rest of the New York school (but also applicable to the efforts of other composers discussed here), arose not from a deliberate opposition to the aesthetic sensibilities of serialism, but rather from a contrary environment and culture. Separated by an ocean and far from the reach of twelve-tone thought, Brown and company were not swayed by revered composition teachers and a canonical musical system but by their local colleagues in music, sculpture, and painting. By sharing and developing new ideas instead of following those of others, the members of the New York school created music that was unashamedly different and original. It was not only because of new concepts of musical performance that necessitated new notations, but the graphic music of the New York School was also due to the composers’ proximity to new trends in visual art and an attempt to embrace abstractness.

A final possible influence is the experiments in percussion music in the 1930 and 40’s and the continued exploration of percussion in the music ensuing after World War II. Composers, especially John Cage, who was responsible for much of the percussion music of the time, must have realized the sonic ambiguity in composing for any type of percussion instruments. For example, any two flutes will be of the same size and shape and will produce very comparable sounds; thus music specified for “flute,” in most cases, will sound very similar from one performance to the next. Any two performances of

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38 There of course exists a significant body of graphic and aleatoric works composed by European composers, but most of the contributing composers, including Stockhausen, Haubenstock-Ramati, and Logothetis, began composing in the vein of European serialism before experimenting later with graphic notation.
music specified for “gong,” however, will most likely sound vastly different. A gong may range in size from just a few inches to several feet in diameter; it may have a tonal pitch, a wide range of harmonics, or even an upward or downward glissando effect; it may come in one of dozens of different varieties from around the world; each with a unique sound and timbre. The variety of sounds that a gong may produces is further compounded by the huge variety of available mallets, sticks, and implements, each capable of making a markedly different sound when used even on the same instrument. In short, a composer scoring for “gong,” or, for that matter, “bass drum,” “cymbals,” “triangle,” etc., cannot aptly define the exact sound of the instrument no matter how specific s/he attempts to be. It is perhaps possible then that the naturally and unavoidably indeterminate quality of scoring for percussion translated to a more subjective and even aleatoric approach to musical performance in general and one that allowed the performer a broader sonic spectrum – even for non-puncussive instruments.

Though composers today continue to incorporate graphic notation, its use is both more rare and conservative than during its peak in the 1960’s, and the vast majority of contemporary composers and performers have reverted back to works that favor standardized notations. There appears to be a multitude of reasons that have contributed to its decline. Despite his early usage of new notations in his works, Cornelius Cardew eventually became one of the most outspoken critics of graphic notation, and it is likely that other composers shared his sentiments. Declaring that “musical graphics are a substitute for composition” and that his own Treatise - and scores like it - inhibit and 39

39 For testimonies from composers both for and against the use of graphic notation, see John Cage, Notations (New York: Something Else Press, 1969).
prevent communication between the composer, performer(s), and audience, Cardew pinpointed two of the most significant problems with new notations. During the acme of the graphic notation era, it would appear that a number of composers jumped on the bandwagon and wrote works in new notations simply because it was in vogue to do so. This unfortunate practice resulted in works that simply mimicked methods of experimental discourse used in previous pieces and lacked any original artistic concepts. Cardew’s assertion regarding communication is almost certainly due to his intense advocacy of socialism, and his musical ideals after Treatise favored a music that could be perceived and appreciated by the proletariat; though the relevance of his assertions should be taken cautiously because of his political bias, the concept of communicative information being explicitly shared between performer and audience in any style of music is one that is subjective and arguable, and it can be agreed that graphic notation is sometimes ineffective in this regard due to its extreme abstraction. Communicative issues may have also prevented graphic works being embraced by performers, as the realization of graphic scores requires the learning of a new linguistic system, a problem that could deter many performers from playing scores with new musical concepts or in which the composer’s intentions are vague.

A more profound problem with graphic notation is that it requires the listener to alter and abandon his/her previously learned behaviors of listening and his/her concepts in perceiving a musical performance. Many who hear abstract works are confused – and rightfully so. Most performances of graphic scores betray the uninitiated listener by

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denying metrical pulse, melody, observable form, and/or other clear and definable
musical aspects that are the stuff of the classical and popular canons. Without these
things, the novice or inattentive audience member is unable to appease the unconscious
critic within and compare what he heard to previous musical experiences. Similarly,
graphic works often defy canonization since performances of the same piece may have
nothing at all in common. Lacking its own “Beethoven’s Fifth,” graphic notation
struggles to attract the concert audience that is uncomfortable with anything that lacks the
safe haven of familiarity. These disappointing truths are likely contributors to the rarity of
graphic score performances.

Despite the possible problems in composing with graphic notation, there are a
multitude of benefits that arise in its use. Most significantly, the subjectivity of graphic
notation often separates infinite sound possibilities from finite notational possibilities.
Put another way, it expands the sonic, musical, and extra-musical capabilities of both the
performer and the instrument in a way in which traditional notation (even with detailed
instruction from the composer) cannot possibly effectively duplicate, and it allows the
composer and performer to explore a musical spectrum that had been greatly limited by
the ideals associated with traditionally-notated music. Similarly, graphic notation allows
for much greater artistic expression and liberates the performer from the constraints of
established performance practice, and, for the first time, it permits the performer to ask
questions and then provide the answers. Graphic notation thus allows the performer to
embrace creativity, expression, and artistry to a much greater extent than music
previously afforded. Lastly, these factors provide a more subjective and open listening
experience for the astute audience member, an experience that may be perceived
according to personal experiences and aesthetics instead of one implicitly suggested by the composer.
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