What Indeterminate Notation Determines
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Tradi t i on a l notation has been abandoned in so much of the last decade’s music that players are no longer shocked by the prospect of tackling a new set of rules and symbols every time they approach a new composition. Learning a new piece can be like learning a new game or a new grammar, and first rehearsals are often taken up by discussions about the rules—about “how” to play rather than “how well” (which must be put off until later).

The traditional role of notation was to fix certain elements of performance while leaving others to the “musicianship” passed on to a player by his teachers and absorbed from his environment. Many of the things done by the musician, and absolutely essential to good performance, were not to be found in the score: deviation from the metric values, differentiation in timbre and intonation, types of pedalling and tonguing and sliding, as well as aspects of the sort described by a vague word or two—“con fuoco,” “lebhaft”—words so vague they had meaning only to a player culturally conditioned to them.

It was taken for granted that any performer could obey the notation’s literal demands. Whether he was talented or not depended upon whether his “musicianship” could “breathe life” into the music.

In the course of at least one branch of development of serial music, the performer’s “musicianship” came to outlive its usefulness. The composer no longer expected him to read between the lines of his score. Deviation from the notated rhythms was not desirable in a style in which the periodic beat of the meter was no longer felt to pulsate beneath the rhythm of the sounds superimposed upon it. Deviation in intonation, dynamics, timbre, etc., would merely obscure the structures extended to cover each of those parameters. So the player of this sort of music had less to do than he had formerly: his job was now to obey the literal requirements of the score in a deadpan fashion. To make up for the suppression of interpretation, the specifications grew more numerous and exacting than ever before. The degree of precision demanded was sometimes so high that it taxed the ability of the performer and led him to deliver what in fact was a subjec-
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tive interpretation—to play in a way that would "sound as though" he were fulfilling the notation's demands.

Some of the musicians who went through the experience of "total organization" have described the lessons that they thought might be learned from it. It became apparent that the range of sound which a player is capable of covering is so extensive and so susceptible to nuance that no notation can hope to control the whole of it, especially not at once. In such a view the composer, with his rules and his notation, is in a position comparable to the dramatist's, with his stage directions and his dialogue. Both score and script are at the mercy of the interpreter who can make a thousand realizations of every symbol, whether of a noise, a note, or a word. The more a composer tries to control, the larger the number of elements over which the player must distribute his powers of concentration, and the more conventional will be his execution of individual elements—the more will be left to technical reflexes built up in the course of his training. But a "conventional" technique may no longer have an expressive content which the composer wishes to incorporate into his music. His ideal may be to put the player in a fresh frame of mind, to shock him out of an environment which puts a smoke screen of technique between himself and the experience of playing, to make him feel as though the making of sounds on an instrument were a fresh experience. If this is his point of view, then his notation, it was said, "...should be directed to a large extent towards the people who read it, rather than towards the sounds they will make." ¹

Examples of three new notations by two composers are discussed below. The examples were chosen from among works recently recorded (by Columbia Records and Time Records). Each is followed by a transcription, in conventional metric notation, of the fragment's realization on a record. The purpose was to show the relationship between a new notation and its concrete results in performance. Transcriptions were made by transferring the recorded fragments to tape, where pitches and durations could be more easily examined. Distances between attacks and releases of sounds could be measured with a stop watch or ruler.

For the transcriptions of fragments from Durations I and Duet II, the tempo of the stop watch was adopted, with each beat (second) subdivided into two groups of five (10ths of a second). Times were fixed by taking the average stop watch reading after a number of timing trials (made at half-speed). The first sound in each fragment was arbitrarily assigned the

¹Cornelius Cardew, "Notation—Interpretation . . .," Tempo (Summer, 1961), p. 26. Notations carrying this idea the farthest have been made by younger composers. Young, Ichiyanagi, Chiari, and others may provide the player with instructions in written or orally delivered prose; Gordon Mumma’s notation, in "Megaton," consists of advice and physical demonstration given to the player by the composer—both before and during performance.
downbeat of the first measure in the transcription. There is, of course, no
accentsual significance in the relative position of downbeats and upbeats.

The pieces written in this notation, which looks at first glance like a
featureless succession of chords, tend to assume four-part configurations
in performance: 1) the opening moments—all instruments attacking
simultaneously (a sound which will occur nowhere else, except through
extraordinary coincidence); 2) the main body of the piece, during which
all players are engaged in moving independently through their parts;
3) the music which occurs after the fastest player has finished, during
which the number of players more or less gradually diminishes; 4) the
ending solo by the slowest player—which can run from a note to a system
or two or more.

In this “race-course” form (“start together, move independently, stop
when you reach the finish line”), the consequence to a performer for
moving the slowest is to be left stranded, with the shelter of his comrades’
sounds removed and his last sounds to play alone.

The proportions of the four “parts” are determined by the degree to
which the speeds of the players vary. Speed is fixed neither by the notation
itself nor by the rules accompanying it, which specify only that “the dura-
tion of each sound is chosen by the performer. All beats are slow.”
(Whether or not a note has the value of one beat is left unspecified—a
conscious omission of the type that has been described as “obliging the
player to seek out just such rules as he needs or as will make sense of the
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notation.”) 2 But in practice there are limits concerning the speed appropriate to the notation, and an interpretation exceeding them would be a poor one. The unwritten rules describing such limits may in fact be imposed in rehearsal by the composer, the conductor, or by the players familiar with the composer’s work upon those unfamiliar with it. They describe the boundaries of a personalized style (or tradition or “common practice”) built up by the composer and passed on in the course of performances to his players. They might be compared to the rules governing those facets of performance, unsettled in the scores of the past, which have become perennial subjects of speculation among musicologists: aspects (such as rhythmic alteration in the Baroque) which were passed on through oral rather than written tradition.

One reason that the notation is not more restrictive is the difficulty of conveying that the average speed of all participants, considered over the whole duration of the piece, should fall roughly within the same scale, so that no player ends with an excessive length of solo, but that the tempo of sounds and stretches should be susceptible of free variation. (The cello, in the transcription below, is playing at half the speed of the violin. The relationships change later in the recording, and the violin’s lead is narrowed.) What happens in a good performance is that the players, by listening to one another, reach a broad understanding concerning their over-all rate of movement (a sense of ensemble which has to do in part with the musical background common to composer and players, in part with the nature of what they are playing).

Another reason is that constraining the player with too many or overly binding rules might change his mood, the spirit in which he makes his sounds, and the sounds themselves. 3 Feldman’s notation and rules suggest as unobtrusively as possible to the player that he produce a kind of sound which it will be pleasurable to hear mingling freely with those of other players, as he moves from one sound to another at a speed and rhythm of his own choosing. Since the sounds are not playing the role of structural building blocks, the fact that they are being made by certain instruments at a certain dynamic level and are heard together is all that matters. (The composer is not concerned with fixing specifically the combination of pitches and timbres that may be heard at any one moment. Calling this “chance composition” would be like saying that the flavor of bouillabaisse has been left to chance because its chef forgot to fix the

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2 Cardew, “Notation,” p. 23.

3 “Suppose the player to behave as follows: he reads the notation and makes himself a picture of the sound (in his mind—the hypothetically imagined sound). He then attempts to reproduce this picture in sound; he compares it with the picture of the sound he had in his mind beforehand, and he may make a few changes, reducing the most glaring discrepancies, releasing wrong notes quickly, reducing the notes he finds too loud, etc., etc.” Cardew, “Notation,” p. 23.

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order in which its ingredients are eaten.) This lack of constraint results often in the appearance of pitch combinations such as widely spaced octaves, or triads, alongside the intervals characteristic of atonal music (such as the “D-major 6/4 chord” appearing in the transcription as three players happen to attack, simultaneously: the flutist and violinist their fifth note, the cellist his third note):

Ex. 2, Transcription of Durations I
What controls are present are of a more general kind. Manifold repetitions of single notes and of two and three note patterns thread their way among shifting pitches:

Ex. 3

In *The Swallows of Salangan*, for instruments and chorus, chromatic pitches intrude at intervals into a texture made up largely of shifting, clustered diatonic pitches. As the players and singers move away from the opening downbeat in a gradually dispersing pack, the chromatic pitches are scattered more and more widely throughout the surrounding diatonic territory. (In performance one may be conscious of nothing more than an increasingly faint, periodic darkening in the sound’s bright surface.)

In the same composer’s “graph” pieces, the principle of selective control is maintained, but free and fixed elements are reversed. In *Projections* I and IV, *Straits of Magellan*, and *Intersections*, etc., the (relatively) fixed elements are time of occurrence, timbre, number, and dynamics; and the (relatively) free one is pitch. Pitch is fixed only in regard to whether it falls within the high, middle, or low portions of the instrument’s range. Boundaries of these ranges are for the player to determine.

Here as before, an argument in favor of leaving an element unspecified is that fixing it would be irrelevant—would not change the flavor of the music, which is already well established. Again, in leaving the player free to make decisions about one element, the composer is directing a psychological measure at him in hopes of making him think twice about what he is doing. As part of his interpretation, the player must ask himself what sort of pitches are most appropriate—in effect, what sort of music it is that he is playing. In a piece of thin texture, such as *Projection IV*, the pitches chosen by each player will be heard individually, and the resulting sound will be a combination of the decisions characteristic of both of them.

The meter of the original notation is retained in this transcription. It should be read conventionally (by assuming that the players furnished with it deviate somewhat from the written time values).

The violinist stresses sevenths and fourths here, and avoids octaves—all this legitimately in the tradition of serial music. But we know from some of his other works that the composer enjoys octaves too: in fact, his notation provides the likelihood of their appearance here as intervals between pitches of the two instruments.
I = Tempo 72

Violin
- pizz.
- arco

Piano
- keyboard
- harmonic (depress silently)

Numbers within boxes = number of pitches simultaneously

= high  = middle  = low

Ex. 4, Feldman, Projection IV, first page
In the notations discussed above, a single element—pitch or speed—is left almost free of control, while another, dynamic levels in both cases, is confined to one end of its spectrum. Selectivity in control is essential to Christian Wolff’s recent notation as well. In his work the relationships among fixed and freed elements and the degree of specification of elements shift about from symbol to symbol. And added to the player’s concerns is a novel method of linking what he does, and when, with the sounds he hears being made by other players.

(Duration: ● = 1 second or less; ○ = any; □ = very long to medium.)

H (Horn player) ○ start and stop together ○ P starts, holds till H sounds; both release together ● P plays (short note). H begins short note as P’s note ends.

H plays short note. P starts at its end, holds any duration. play 3 notes of any duration, together, overlapping, or mute (1) separate. Silence between tones is free. Mute one of them.

* = a noise

Ex. 5, Transcription of *Projection IV*
\[ a = \begin{array}{c} \text{prepared} \\ \text{b} \end{array} \quad b = \begin{array}{c} \text{prepared} \\ \text{b} \end{array} \]

Horn sounds: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ 10

Horn:
\[ \begin{array}{c} \text{m} \quad \text{y} \quad \text{z} \quad \text{b} \quad \text{x} \quad \text{high as possible} \end{array} \]

Piano:
\[ \begin{array}{c} \text{p} \quad \text{pp} \quad \text{f} \quad \text{m} \quad \text{p} \quad \text{mute (1)} \end{array} \]

\( \hat{f} = \) line means 1) notes must be unequal in some respect (e.g. duration or loudness); 2) notes must be varied each time the section is repeated.

[2 = 2 notes are to be attacked simultaneously.]

\( a_{\frac{1}{2}}, b_{\frac{1}{2}} = \) transpose any of the tones in the source half a tone higher or lower.

\( b_{\text{half}} = \) raise or lower pitches (of source b) half a tone and transpose to any higher octave.

\( m^y \) and \( m^z = \) two different kinds of mutes or muting (to be chosen by player).

Ex. 6, Christian Wolff, Duet II
This is one of six fragments which make up the score of Duet II, for horn and piano. The order in which the fragments are played, the number of times they may be repeated, and the total duration of performance are free.

In performing the piece, the players follow two sorts of procedures alternately:

1. To begin, and every time a fragment has been completed: the first player to make the next sound determines which fragment is to come next by playing the first sound of that fragment. The other player hears the sound, recognizes the fragment that it begins, and responds by playing his own part in that fragment. Or, he may a) fail to recognize the cue, b) start another fragment himself simultaneously with the first player. In any case, the directions provide that as soon as the players realize that they are not playing the same fragment together, they should break off and “start” over again (follow the procedure just described). Such breakdowns in coordination are a part of the piece and have musical characteristics, in performance, of their own—rhythms and pitch structures, for instance, which have a quality different from the rest of the music.

When the players have come to know the piece well, one may even try to disguise his cues to the other in hopes of confusing him (when a cue’s pitch is unspecified, for instance, he may use a pitch belonging to another cue’s pitch-source).

2. During the fragments themselves—after one has been “cued in” by one player and responded to by the other—the players have a path to follow, from sound to sound, until they finish the last symbol in the fragment. The time at which a player begins or ends his next sound may be determined by him or by a sound made by the other player. In the latter event, he must wait for the other’s sound to occur and then react to it—sometimes as fast as he can—without the benefit of advance warning. (For the horn player, this is the situation at his 6th, 9th, and 10th sounds above.) Here the player’s situation might be compared to that of a ping-pong player awaiting his opponent’s fast serve: he knows what is coming (the serve) and knows what he must do when it comes (return it); but the details of how and when these things take place are determined only at the moment of their occurrence.

The game-like features just described seem closer in spirit to certain Oriental musical traditions than to those of the West. The disguising of cues is similar to a technique in Indian Music called Laratgheth—a cross-rhythm generated by soloist and percussionist when, in competition, each tries to confuse the other with rhythmic patterns played off the strong beat.

In moving from symbol to symbol, the player is required to shift his
attention continually from one aspect of what he does to another. Each symbol has its own combination of controls, applied selectively:

\[\sqrt{\text{determined to some extent (fixed, or possibilities narrowed)}}\]

\[P = \text{determined by pianist...by way of notation}\]

\[S = \text{simultaneity (determined by the first to act next)}\]

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<th>3rd</th>
<th>4th</th>
<th>5th</th>
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Horn Part

The degree of control is relative. Where the pitch column is blank, as at the 1st sound, the player must choose any 1 pitch from among the 36 or 40 or more pitches within his range. At the 7th sound, his possibilities are cut down by about half (see below): he must choose one pitch from among the 15 or 16 of the transposed, shifted pitch source which fall within his range. At the 10th sound, he must choose 1 from among 6 pitches; at the 5th, 1 from among 3; only the 3rd sound is fixed (the slanting line means that the D is to be played slightly flat).

The same sort of scale, running from fixed to free, is applied to the other elements as well. The dynamics run (in the horn part) from unspecified, through any selection or combination in any order of three levels (9th note—pp, f, mp) down to fixed (2nd and 10th sounds).

The transcriptions below approximate two realizations of the notation quoted above. They were made from the performance by David Tudor and Howard Hillyer (the fragment happens to occur twice during their six-minute version, on Time Records 58009):

If one were comparing these two fragments and had no access to the original notation, their relationship would surely seem puzzling. The two are obviously the same music—the groupings of sounds, the general continuity, many of the pitches, are the same—but varied seemingly without method, full of small, erratic changes in pitch, configuration, numbers of notes. A glance at the original makes clear that the discrepancies come about through an active use of the indeterminacy linking composition with notation, instrumental technique, and the players' personalities. It is impossible to know, in advance, what specifically will result from a
symbol such as \( \text{horn's fourth note} \). The player here must concentrate at once upon beginning the next sound when he wants to or playing immediately if the other player beats him to the draw. The same applies to its time of ending. Since there is no advance warning, there will be a slight pause between the attacks and releases of initiator and follower—the time it takes the follower to translate information received by his ear into mechanical action on his instrument. (The interval between the time a driver sees an unexpected obstacle in the road and his application of the brakes is comparable.) The attack will have a rushed, nervous, cramped quality that could not have been notated in any other way. It is this quality that the composer is concerned with, rather than with the sounds' other measurements.

What sort of delayed reactions result from this notation may be seen in both transcriptions: in the lack of simultaneity in releases of horn and piano at the horn's 3rd, 4th, and 5th notes; and in the pauses separating the horn's 6th note from its piano neighbors.

A list of operations to be performed by the horn player in making the fragment's ten sounds would include the following:

**SOUNDS**

1st and 2nd

1st is short, of any pitch, muted by one of two methods selected for use in the piece; its dynamic ingredients are ff and/or p. It is connected, legato, to the 2nd sound: short, same mute, any pitch, mp.

(In the first transcription there is a pause between the 1st and 2nd horn sounds. Perhaps the horn player was unsure about whether the pianist had begun the same fragment that he had, broke off, reassured himself about the pianist's activity, and went on to his second note.)

3rd

Horn player waits for pianist's next sound which may come very quickly after the first group of five or after any length of silence; plays his 3rd sound (a slightly flat D\(_2\) at any dynamic, without muting, beginning any time after the piano note's attack but before its release or fadeout; the two players release simultaneously (cut-off is determined by the first player to act next).

4th

(After a pause of any duration): any pitch, any duration, dynamic ingredients f and/or p, begun and ended together with the next sound of the pianist. (Horn is the initiator in both transcriptions.)
Ex. 7A, Transcriptions of Duet II
5th Played a short time after the pianist’s next two attacks (which may be overlapping, simultaneous, or separated by any amount of silence); using one of the three pitches given; at any dynamic; with the second kind of muting; released simultaneously with the end of the pianist’s second sound.

6th Any dynamic, any pitch, duration short; begun just as pianist’s short pp sound is released.

7th Beginning, duration, dynamic free. One pitch is to be chosen from among 15 possibilities. (To find the pitch of this note the player must raise or lower one of the three pitches in Source b a half-step and transpose it any number of octaves up or down. It turns out that 15 or 16 of these transpositions fall within a horn’s range. The player has any time in which to jump this small hurdle.)

8th Any noise (made with the instrument), character and dynamics unspecified, played between the attack and release of pianist’s square note.

9th Begun when pianist’s square note ends; highest pitch possible; dynamic ingredients pp and/or f and/or mp; duration, otherwise free, may here be determined by the context (sound must be broken off in time to play the 10th sound).

10th Short; begun at end of the last of pianist’s three sounds; dynamic pp; one pitch chosen from among six available.

First transcription: after his 7th note the horn player hears a number of piano sounds and must decide which ones correspond to which symbols. Evidently the pianist’s low F corresponds to his square symbol and the E above it to the black, since the E is followed by three sounds (the 3 symbol) while the F continues. Piano’s releases beyond this point are not audible on the record. (The horn player may “see” the release of these sounds as the pianist’s hands leave the keyboard; or he may guess about the time they are released.) Note: the horn’s 9th and 10th sounds will appear in reverse order if the piano’s F is held after the D and Eb are released.

Second transcription: The 9th and 10th sounds of the horn seem to come two or more seconds after the release of the last piano sounds. Such a situation arises often in playing from this notation. Waiting for the release of a sound—hard to hear if it is a sustaining piano note—one hears other,
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lother sounds intervene and then realizes that the original note is no longer sounding. Knowing that one has missed the cut-off cue, one proceeds (tardily) to the next symbol.

The complexities of this notation are directed less at an arrangement of sounds resulting from performers’ actions than at the conditions under which their actions are to be produced. (It addresses itself to the player’s mind as well as to his fingers). By comparison, even the most complex “totally organized,” conventionally written scores seem simple—if considered from the point of view of what the player has to think about (his part tells him which note to play first, how to play it, how long to hold it, how long to wait before playing the second sound, etc., etc., until he has finished). Wolff’s notation approaches the role of rules governing the conduct of games. It tends to produce characteristic sound combinations, recognizable as the composer’s “signatures,” just as a game has its characteristic “moves.” (Among them are grace notes jumping back and forth among players, the sudden cut-off of a long sound just after another begins, the thin sustaining sound made by a player who is waiting for his cue and is not sure whether he may have missed it.)

One of the criteria with which to judge a notation is the question of what, if any, the consequences are of playing well or badly (what incentives are there for realizing the notation in the way intended and expressed by the composer). In Wolff’s notation, the players must listen with such care to one another that an inaccuracy is liable to alter the signal received by one’s partner and so to disturb the continuity. The same is true of the notation used by Feldman in de Kooning and Vertical Thoughts, in which a chain of sounds links player to player (one is directed to begin playing at the moment when another’s sound begins to fade). Elsewhere, Feldman’s scores present the player with an “honor system” notation. With no one to check up on what he does, the player’s incentive for doing his best is (presumably) the pleasure of contributing to a sound world whose transparency is such that the smallest detail remains perfectly audible within it. Expressed in the notations of both artists is an idea that music must remain a creative activity for players as well as an arrangement of symbols by the composer.

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