

. . . whence freedom

By Thomas L. Read

I should like to euphonise that.

It sounds an isochronism.

—Finnegans Wake

In much of the music I have composed over the past thirty years, free expression is harnessed to, though not entirely contingent upon, generative processes that are impersonal and mechanical. Often inaudible as such, these processes fabricate polyrhythms and melodic configurations, sometimes archetypal in nature, whose inevitability is real but not always apparent.

Consistent with the dictum that nothing is in the understanding that was not first in the senses, I can recall, from sometime during 1968–69, a dream-state suggesting vast space, with points of light and sound, in patterns that seemed at once both random and strangely inevitable.¹ Then, too, I must have been sensitive to what was “in the air” among many artists and composers: a reviving interest in allowing growth and change to issue forth from repetition and regularity. In any case, as a composer, I was intrigued with the possibility of enlisting both symmetrical construction and proportional (temporal) dissonance to generate extemporized-sounding forms. Intuitively, I sensed that my musical imagination was most freely and effectively engaged when interacting with, and transcending, existent, mechanically sustained rhythmic phenomena; and, quite suddenly, a simple possibility occurred to me wherein the formulation of pitch succession and duration could be united in a single generative process. Simply stated: Each pitch class chosen for a particular composition would recur at equal, evenly spaced intervals of time, or, possibly, at progressively smaller or larger intervals of time. Either way, once intuitively established, the process would be automatically carried out. In the simplest situation, the conflict of periodicities so established could *be* the melodic/rhythmic/harmonic structure of the piece. Of course, such a feature of conventional music as melody, for instance, could be produced, or subjectively apprehended, as a “by-product” of this activity; it could be the outcome of combining 5, 6, 7, or more different-pitched pulses (see figs. 1 and 2).

Figure 1: *Light After Light*: "theme," mm. 19–26.Figure 2: *Suite for Solo Violin*: Caprice di canon, beginning.

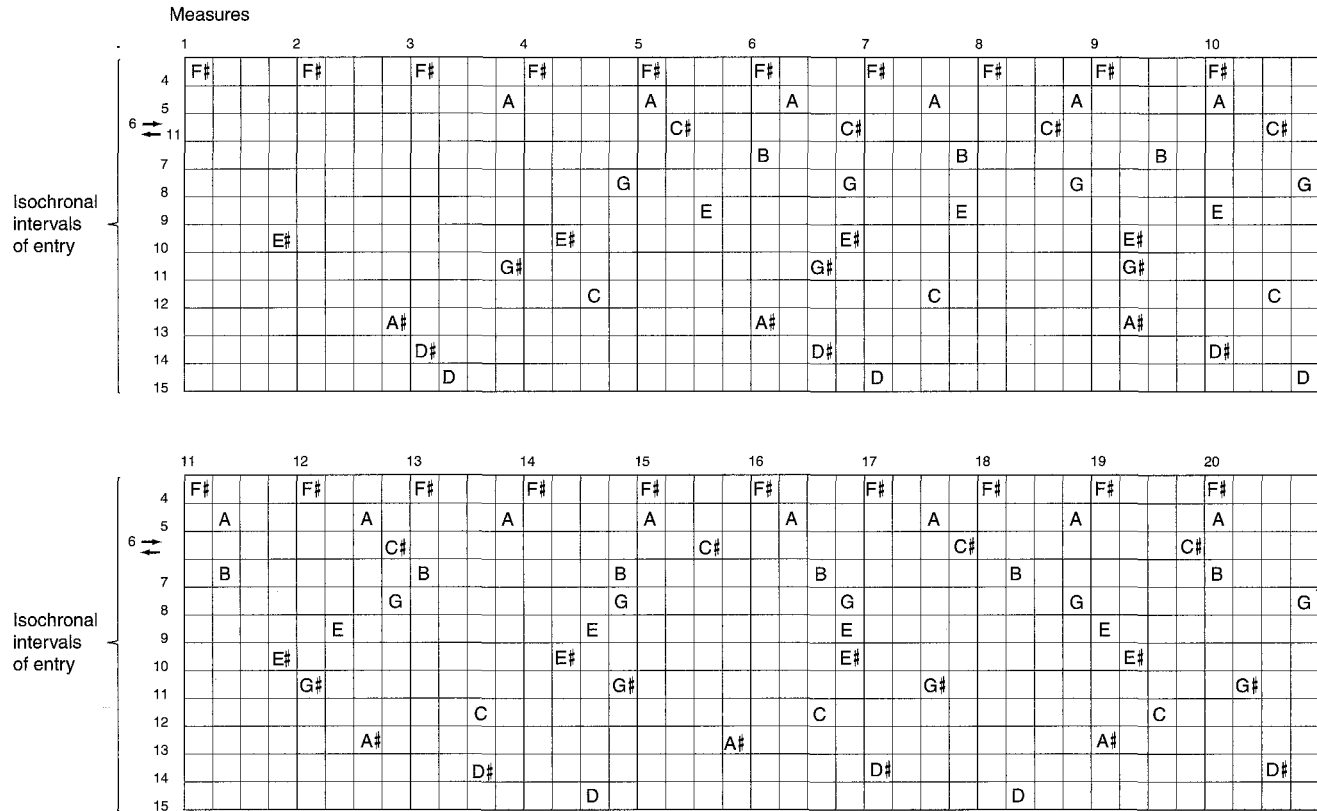
The musical notation for Figure 2 consists of three staves of music in treble clef with a key signature of one flat (B-flat). The music is complex, featuring various rhythmic values and measure numbers (e.g., 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37) written above and below the notes. The notation includes slurs, ties, and various accidentals.

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Soon my compositions were being shaped not by serial procedures and aleatory operations, as they had been, but by cyclic repetitions of many different sonic moments, carried out independently in the various layers of the musical fabric. My forms grew through manipulation of those processes of cyclic repetition that would *automatically* produce change and variation. At one stage in the development of this compositional strategy (dare I broach the word "method"?), I began to call such pieces *isochronisms*—appropriating the term given by physicists to the equal time intervals of swinging pendulums. Enlisting various "isochronal procedures," I try to integrate elements of sound in a musical web of relations. Harmonic tonality incorporates properties of the natural harmonic series; I like to think that isochronal textures imitate intersecting time cycles that we experience in everyday life.

A graph of the beginning of a simple "isochronal structure" is shown in figure 3. Only the succession of pitches and their intervals of entry are indicated. The intervals of entry were plotted according to the time units—the "formula of proportions"—given in the far left-hand column. The graph is read as follows: an F# is initiated every 4 beats (one square = one beat); an A# every 5 beats; a C# in a progressing cycle of 6, 7, 8, 9, 10, 9, 8,

Figure 3: Isochronal structure.



7, and 6 beats (C♯ has the only expanding/contracting cycle in this isochronal structure); a B♭ every 7 beats; and so on.

The *Vivace* from *Piano Music*, vol. 2, is a realization of these isochronisms, and, as verified by the score (shown in fig. 4), it represents a fairly automatic and mechanical rendering of the graph: octave registers are fixed and no metronomic, dynamic, or pedal markings are given. One beat of the graph is equal to one eighth-note of the score. Some “concessions” have been made to accommodate traditional and practical expectations: “difficult-to-play” simultaneities are arpeggiated, and a rhythmically free, cadenza-like interruption is included in m. 64 (not shown in the example). Isochronal repetition resumes in m. 65, with all pitches transposed a whole step higher than in the initial section of the composition.

Although the twelve fixed time units that produce the interactive rhythmic proportions are additive (whole-number multiples of the basic unit), an extraordinary number of beats must elapse before one can encounter a repeat of measure 6 (the first measure in which all twelve units have entered). Clearly we are dealing with a virtually endless process, what Roger Reynolds might call a “vastly distended periodicity,” revealed here as a nonrepetitive but harmonically static succession of sounds (some would say a mindless, inhuman one—unfeeling, like the universe). How to allow human feeling a place? How, practically speaking, to make a “coda” and an ending? In the case of the *Vivace*, this was accomplished by grafting traditional devices of articulation onto the basic structure. The cadenza and the transposition just described help to give the form a “middle.” A sense of “beginning” in measures 1–5, and a harmonically ambiguous stop at measure 139 (which concludes the *Vivace*) were engineered by gradual, selective subtraction of isochronisms. There are no marks of interpretation in the score. Performers, through habit, convention, or invitation may supply such things in unique and interesting ways.

To invent far-reaching elaborations, to explore the possible interactive gestures and concomitant cyclic interchanges set up by the isochronisms, to highlight the synchrony of emergent lines, indeed, to use the simple structure as a scaffold on which to build free elaborations (much as the ancients used isorhythmic constructions or the cantus firmus and the ground bass) are the proper responsibilities of the composer rather than the performer. I have enthusiastically taken on such responsibilities, not only in the *Vivace* variations included in *Piano Music*, vol. 2, but in all of the isochronal music I have composed. This experience allows me to describe, in a by-no-means exhaustive or systematic way, a list of principles that have been variously useful to me.²

Figure 4: *Piano Music*, vol. 2: *Vivace*, mm. 1–26

(1) *Integration*. A collection (arbitrary, to be sure) of isochronal durations may be used to govern change and succession in all parameters, just as it is customary for the content of a single pitch set to exert pervasive control in integral serialism. (*Isochronisms No. 2*, for string quintet, first movement, exemplifies pervasive isochronal procedure. For discussion of this principle, see below, and figs. 8, 9, and 10.)

(2) *Contextual Adjustment*. Limitations may be placed on the amount of influence exerted by isochronal procedures. For instance, dynamics and articulation may be contextually determined rather than isochronally derived (as they might be expected to be in (1), above) so as to complement or highlight specific isochronal elements of the form (see *Contraries*, for handbell choir, where dynamics and register are contextually determined and where both isochronal *and* change-ringing procedures are used to generate pitch succession).

(3) *Division*. Isochronisms may be embellished and elaborated using repeated notes (as in the conventions governing immediate pitch repetition in dodecaphonic music) or by division with scales or arpeggios (see *Light After Light*, for violin, clarinet, cello, and piano, beginning of part 2; *Alcyone*, melodrama for narrator, chorus, and ensemble).

(4) *Layering*. A form may be built up from free or systematic alternation and superposition of independent isochronal aggregates (see *Light After Light*, part 1; *Variations for Eight Instruments*).

(5) *Filtering*. Isochronisms may be "gated" or used selectively. Only those pitches or events are used that will, at a given moment, produce an effective *gestalt*, harmony, or counterpoint (see the *Nocturne* and *Vivace Variations* from *Piano Music*, vol. 2; *Isochronisms No. 2*, first movement, mm. 120–51; *Adventura*, for orchestra, especially the central section with its overlapping chords; see also fig. 11, below, where after m. 99 the expected recurrence of G \sharp —after every four eighth notes—is sometimes suppressed).

(6) *Articulation*. Phrase and section dimensions may be controlled by filtering freely, or in accordance with a cyclically repeated pattern. To illustrate this, a graph of a rhythmic structure fashioned according to (4) and (5) is shown in fig. 5. Two collections of six isochronisms each are graphed. Filtering is applied to articulate both phrasing and texture: in the first collection (durations 2 3 4 5 6 7), each isochronism is repeated three times in succession, followed by a "pause" lasting up to the last beat of the fourth measure; in the second collection (11 13 17 19 23 26), one "silent" isochronism separates three consecutive sounding ones. (In the graph, the *sounding* isochronisms of each collection are circled.) "Selective gating" is applied to mm. 5–10, wherein only those isochronisms of the first collection are permitted to sound that are congruent in time with the sounding (circled) isochronisms of the second collection. (In the example, congruencies are shown by vertical brackets.) A sonic realization of the verticalities of these measures (5–10) will likely produce a discontinuous, random-sounding succession. It is also possible that the ear will discover "connections" consistent with traditional harmonic progressions. One can't be sure: Is that configuration fortuitous, or was it 'engineered'? I enjoy such paradoxical, sometimes serendipitous moments in music, and in life, where "causal necessity" is hidden to understanding.

(7) *Acceleration/Deceleration*. By expanding and contracting the duration of individual isochronisms, thus modifying the frequency with which specific pitch classes are initiated, one can approximate traditional harmonic modulation, or transform the predominant, perceived metric grouping (see *Variations for Piano Trio*, concluding section; *Nocturne* from *Piano Music*, vol. 2).

(8) *Oscillation*. Pacing can be modified by allowing controlled but regular oscillation between passages that have free octave-register changes, and those in which registers are fixed or are changed in cycle. For example, in quadruple meter, octave-register shifts might be located after 3, 2, 1, 3, 1, 2, and 3 measures, such a cycle being the resultant of 5:3 time units; or, based on the resultant of 8:7 units, a shift could be located after every

Figure 5: Systematic filtering of isochronisms.

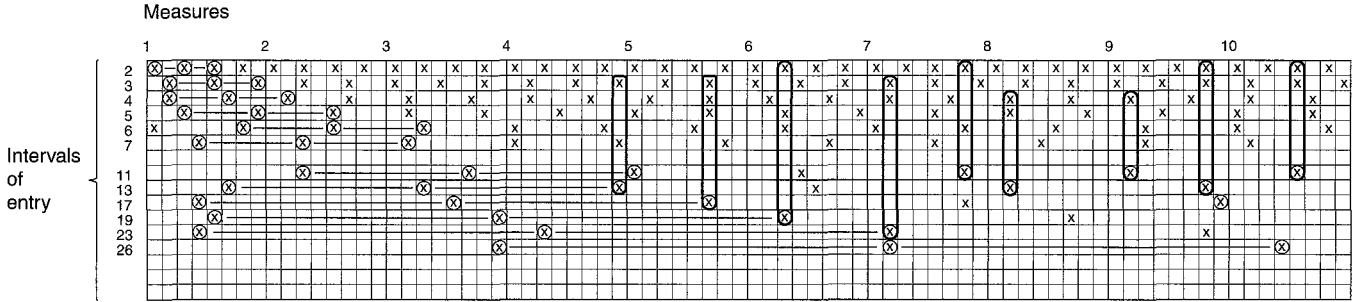


Figure 6: A palindromic structure, from *Light After Light*.

Durations 3:4:5 { 3 4 3 4 3 (3) (3) (3) 5

Pitch palindrome

Rhythmic palindrome

"da capo"

7, 1, 6, 2, 5, 3, 4, 4, 3, 5, 2, 6, 1, and 7 measures (*Symphonic Episodes*, for orchestra, explores this principle). Such palindromic series as these, are, of course, an inevitable by-product of isochronal and polyrhythmic processes. This attribute can be highlighted by condensing a palindromic durational series into single lines, as shown in fig. 6.

Mensuration canon is also a potential by-product of isochronal procedure. A straightforward production of such a canon is graphed in fig. 7. In the sonic realization of the graph, the diagonal lines linking isochronisms are each assigned to a different voice and register. (Another such canon is shown above, as fig. 2.)

The principle of combining isochronal units can be extended to determine many layers of a musical fabric. As a demonstration, the steps necessary to establish the framework of a piece in which succession and length of the structural divisions replicate a portion of the piece's isochronal rhythm may be summarized as follows:

- (a) The graph of the isochronisms is compiled, assigning the same number of beats to each graph page.
- (b) Each graph page delimits a section of the work's gross form.
- (c) Each section (having the same number of beats but not necessarily the same tempo) is associated with one of the isochronisms and is, similarly, repeated and combined with other congruent sections (see fig. 8, below).

We can imagine a piece having a total of five different sections, or continuities, defined in any way we choose—by melodic content, by tempo, by instrumentation or whatever—and we can use the first twelve beats of the graph as a basis for ordering and repeating the five sections to produce, finally, a cyclic interchange of different musical textures.

Figure 8: Cyclic interchange of textures.

Intervals of entry	Beat	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Assigned section content:	
		3	x			x			x			x			x				x
4		x				x				x					x			B	
5			x					x						x				C	
7					x								x					D	
11										x								E	
		(A B C A D B A C E																	A - D A B - A)
																			B - C

Using the first twelve beats of the graph, the gross form of our composition (a strange kind of rondo!) can be outlined as follows:

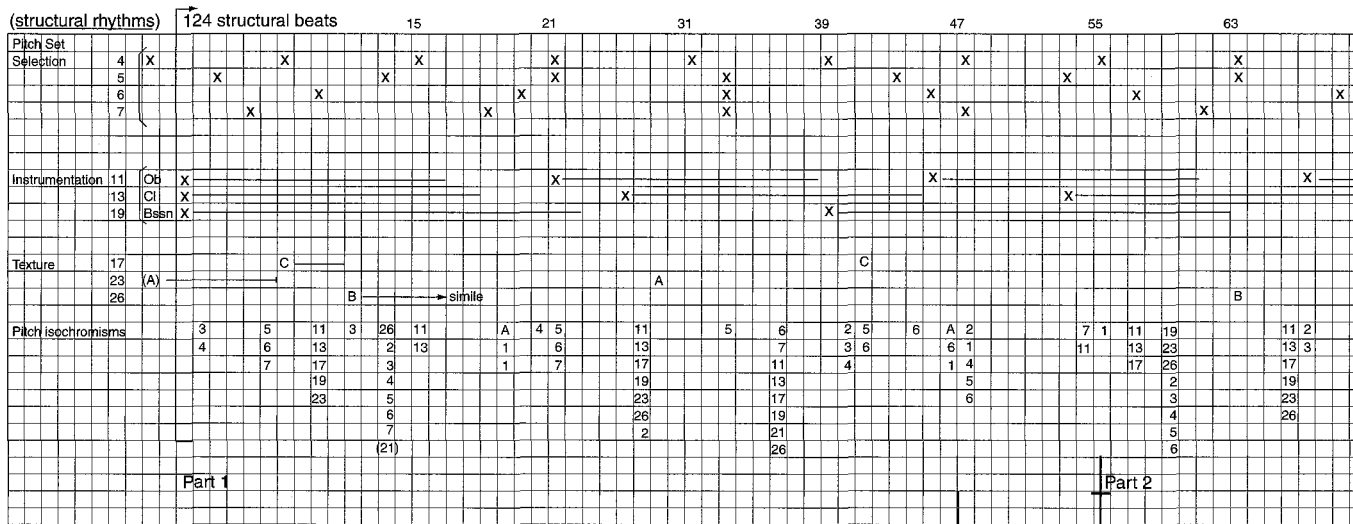
section	1	2	3	4	5	6	7	8	9	10	11	12
graph page	1	1	1	2	1	2	3	2	1	4	_____	2
											3	_____
content	A	B	C	A'	D	B'	A''	C'	E	A	_____	D'
											B	_____

NB: A = 3 duration units; B = 4; C = 5; D = 7.

If such divisions, shown above as A, B, C, . . . are expressed as discrete harmonic entities, one can, as in traditional chaconne procedure, compose a melodically and rhythmically "free" variation form. I used such an approach in composing *On October Ground*, a concert piece for chamber orchestra. In the *Nocturne* from *Piano Music*, vol. 2, pitches for the isochronisms were reassigned for each phrase, in a sequence consistent with the first 33 units of the work's isochronal matrix. The succession and hierarchy of the *Nocturne's* harmonic regions that were produced in this way are indicated in fig. 9, below. A more complicated layering procedure was used in composing *Corrente*, for oboe, clarinet, and bassoon. Aspects of the design of this single-movement work are diagrammed in fig. 10.

What I am describing as isochronal procedure may seem an unnecessarily mechanical and artificial approach to music composition, and I must admit that my addiction to working this way has given me ample doses of relevant doubt and anxiety. I was encouraged to discover what appeared to be similarly plotted cyclic changes in speed and timbre in an exhibit of Elliott Carter's graphs and sketches. Additional encouragement was provided through study of Conlon Nancarrow's player piano music. I also found sympathetic resonances in areas outside of music, such as Balinese calendric systems, the world of the Gyres argued in Yeats's *A Vision* (1937), the criticism of Rollo May, and, of course, the *Wake*.³

Figure 10: Isochronal layering in *Corrente*.



(Each structural beat = 7 notes of music)

For a fully notated realization of the bracketed segment, see figure 11.

Figure 12: Register oscillation of isochronal pitch classes, *Corrente*, mm. 98–103.

(2:3:4:5:6) also govern pitch entries in the example's remaining measures. The succession of pitch entries in all the instruments together (composite rhythm) is also shown in the reduction as a demonstration of varied pattern repetition in an isochronal structure. In this instance, the pitch isochronisms produce two varied repetitions (cf. number and location of grace notes) and two transformations of the initial six-beat pattern (♩ ♪ ♩ ♩ ♩ ♩).

Further comparison of the score with a portion of the isochronal layering graph, fig. 10, structural beats 49–55, illustrates three ways for guided choice and subjective manipulation to play a role in foreground realization of an automated form:

(1) Measure 94 is derived from an isochronal texture graph that requires the oboe to play two pitches simultaneously on the first eighth note of the measure. This mechanical impossibility is circumvented by scoring one of the pitches, in this case a B \flat , as a grace note "embellishment" to the other, an A \sharp . Similar contextual decisions account for all of the grace note figures in this graph and throughout *Corrente*.

(2) A gradual change in the rhythmic flow and harmonic content of mm. 94–104 is effected by suppressing some isochronisms, such as the expected entry of G \sharp , second eighth note, mm. 100 and 102; the expected B \flat and C on beats 3 and 4, m. 103; and by the substitution of B in favor of F after the second beat, m. 101, and of A in favor of E \flat after the fourth beat, m. 100.

(3) Register placement of pitch classes in mm. 94–104 is specific to the passage and, though systematic, not "required" by the gross isochronal form. Figure 12 is designed to illustrate the systematic register oscillations of the B \flat , the C, and the A in mm. 98–103, as well as the above-mentioned A/E \flat substitution in mm. 100–103. Examination of the full score will reveal, as well, systematic register oscillations of the B and the G.

Figure 13: Homophonic elaboration in *Celebration*, mm. 372–92.

The figure displays three stages of musical elaboration for measures 372-92. The top section, labeled 'basic isochronal succession', shows a single melodic line with a tempo marking of '(1 = ♩)'. Above the staff, numbers 5, 9, 6, 12, 9, 15, 6, 9, 6, 12 indicate specific durations. The middle section, labeled 'primary collection', shows a bass line with numbers 4, 3, 9, 6, 12, 15 below it. The bottom section, labeled 'orchestra', shows a piano accompaniment with dynamic markings such as *p*, *cresc.*, *fp*, and *pp*. Measure numbers 372, 377, and 385 are clearly marked. A 'Simile' marking appears in the middle section at measure 377. The score illustrates how a simple rhythmic pattern evolves into a complex, multi-layered texture through the addition of different voices and harmonic richness.

A three-stage elaboration of five isochronally repeated trichords is shown in fig. 13. In the first stage, four different 037 trichords and two different 047 trichords are associated with six different duration units: 4, 5, 6, 9, 12, and 15. In this stage, condensed in fig. 13 as “primary collection,” a C-major triad recurs at the beginning of every four quarter-note beats, an E-minor triad at the beginning of every five beats, and so forth. In the second stage, labeled in the fig. as “basic isochronal succession,” simultaneous recurrences are revoiced as polychords (e.g., m. 373, beat 1). In the final stage, labeled “orchestra,” the chords are revoiced with considerable freedom, and with doubling of selected chord members. As a result of such free elaboration of regularly and independently recurring triads, a linear polyphony of from four to six voices with a purposeful and, sometimes, surprising succession of harmonies is produced.

In these two passages, and many others readily found in my music, singularity is created from a plurality of self-imposed automata. Freedom of expression is gained not by abolishing necessity, but by alternately embracing and transcending it and, sometimes, by “rolling with the punches”—finding effective alternatives to a preconceived notion of how a passage will go.

Notes

1. Borges says somewhere: There is no chance; what we call chance is our ignorance of the complex machinery of causality.

2. I cite as examples works of mine, which are published by C. F. Peters, Trillennium Music, American Composers Edition (ACE), and the American Society of Composers Journal of Scores (see References, below), to suggest the adaptability of the principles to various genres and instrumental idioms.

3. As others have suggested, and apposite to Joyce’s “years dreams return”: Many sentences in *Finnegans Wake* embody cyclic recurrence of words and themes (e.g., “Teems of times and happy returns. The seim anew” [1939: 18]; “We dreams our dreams tell Bappy returns. And Seim annews [277]; and “Themes have thimes and habit reburns. To flame in you [614]). Other instances are cited in Kain 1959.

4. Eight of the studies are included in Garland 1977.

5. Not surprisingly, the *Quintet* is very difficult to perform as “chamber music,” and at its premiere it had to be conducted. Nancarrow’s *Studies* are written for a single instrument—the player piano, over which he had almost total control.

6. Passages such as rehearsal 74 through 80, and 131 through 133 in *Persephone*, while invoking a sense of “controlled indeterminacy,” consist of polyrhythmic ostinatos. The effect approaches that of *Three Pieces*.

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