CHAPTER 1

RECENT THEORETICAL WRITINGS ON THE MUSIC OF VARÈSE

SUMMARY AND CRITIQUE

A survey of recently published analytical writings on Varèse demonstrates the diversity of interests that theorists have shown for his music. This chapter presents the basic assertions and conclusions of three such studies, in the areas of texture (John Strawn), rhythm (Robert Morgan), and pitch and register (Jonathan Bernard). As an outgrowth of this survey, the chapter concludes by discussing the need for further study and defining the objectives of the present paper.

John Strawn

John Strawn's "The Intégrales of Edgard Varèse; Space, Mass, Element, and Form"[1] takes an approach which regards Varèse's verbal descriptions of his music as a point of departure for analysis. In lectures, writings, and interviews, Varèse often used such phrases as "Sound

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[1] Perspectives of New Music 17/1 (Fall/Winter 1978): 138-160.

mass," "collision," and "penetration" to explain his music.[2] Strawn carefully examines several related and contrasting quotes in order to bring these descriptions into a direct correspondence with specific passages of Varèse's music.

The tone of Strawn's analysis of Intégrales is set by one such correspondence pointed out explicitly by Varèse himself in a footnote to the score. In a passage at mm. 199-206 in Intégrales, Varèse directs that the combination of oboe, clarinet, trumpet, horn and trombone be regarded as located on two "planes": oboe alone sounding against the single sound of the clarinet, trumpet, horn and trombone ("...très homogènes et équilibres--légèrement au 2me plan."). Using this as a point of departure, Strawn proceeds to divide the complete Intégrales into a collection of puzzle-like juxtapositions such as this, with a four page list itemizing the specific instruments and locations of 110 different "sound masses." Following this list, Strawn continues with a commentary describing ways in which these sound masses interact.

Strawn's illumination of Varèse's concepts of "plane"

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[2] A collection of some of the most important of these sources may be found in: Elliot Schwartz and Barney Childs, eds. Contemporary Composers on Contemporary Music, New York: Holt, Rinehart and Winston, 1967. Also, a study which surveys all of Varèse's known writings and collates them according to subject is: Ann Parks, Freedom, Form and Process in Varèse, Ph.D. dissertation, Cornell University, 1974.

and "sound mass" is quite valuable; the phrase "spatial projection of a plane," for example, quite clearly implies the juxtaposition of one instrumental combination against another, in which the latter is relatively static and the former changes constantly with respect to dynamics and timbre. Two other concepts which Strawn chooses to focus on in his commentary, however, are much less well documented and require a larger leap of logic on the reader's part: the concepts of sounds being "near" and "far," and traveling "toward" or "away from" the position of the listener. Citing Varese's references to "projection into space" in a description of his Poème Électronique, as well as some facts of sound transmission and psycho acoustics, Strawn interprets the footnote described above as implying that the sound mass of the four instruments listed are meant to be heard as being "farther away" from the listener than the sound mass of the oboe; and by extension, such spatial interpretations are implied by any soft or loud dynamic markings. Strawn, however, does not provide a suitable argument for this major assertion regarding Varese's dynamic markings. Varese's indications are often abundant and profusely detailed, and have a variety of different functions; while Strawn's statement is verified by a few passages, it is not successful as a generalization.

Aspects of pitch/pitch-class structure and form are

given only surface treatment by Strawn. Concerning elements of pitch/pitch-class, Strawn provides only a "few basic rules of thumb": "...major and minor seconds, augmented fourths, major and minor sevenths...occur quite frequently ..." and "octaves...are usually avoided." (p. 153) Because Varèse himself denied the existence of any "fixed set of intervals, such as a scale or series" in his music, Strawn concludes that "...a system of 'harmony' is apparently not present in Intégrales." (p. 153) To let Varèse's own words on his music be the final, most authoritative word is a mistake on Strawn's part (sometimes called the "intentional fallacy"); any statement that a composer makes is invariably bound to the position he wishes to assume at the time of the statement, for the purpose of the particular audience he is addressing. To neglect exploring principles of harmonic organization because of Varèse's statement is a rather unfortunate shortcoming in what intends to be a "thorough analysis."

Strawn's treatment of form in his section "Form and Process" is similarly cursory. He feels that the only governing process is "continuous variation," for "...it is impossible to derive a 2-, 3-, or 4-part form by examining the relationships shown..." (p. 158), and that formal procedures such as the introduction, repetition, and development of themes, harmonies and motifs are absent as an organizational principle in Varèse's music.

However limited Strawn's approach may be in some respects, the study does provide a careful account of the surface of the work, which might function as a point of departure for a further study of form and pitch/pitch-class elements. Strawn's procedures for segmenting Intégrales into its constituent masses are in fact quite sound. For example, his analysis of mm. 199-206 (Strawn, p. 145) reveals careful observations regarding pitch intersection, dynamics, degree of pitch change, and instrumental range as determinants for segmentation according to their associations and disassociations within various musical domains. The list of "Elements" on pp. 152-154, a "small repertoire of motifs and procedures," with such names as Appoggiatura, Prolongation, Reiteration, and Alternation, are also valid descriptions of activity in Intégrales, which may be applied to analyses of other Varèse works with worthwhile results.

Robert Morgan

In "Notes on Varèse's Rhythm"[3] Robert Morgan presents an analysis of the rhythmic organization of pitch elements in the first 24 measures of Integrales. He shows that small motivic elements introduced in the first three measures reproduce themselves on subsequently larger levels of organization, which themselves in turn become motivic elements of proliferation. Such motives consist of, on the lower level, a basic two-note cell with the durational pattern long-short and the grace-note figures of the Eb Clarinet, and, on the larger level, the entrances of chords in woodwinds and brass in relation to the middle-level organization of the lower-level elements.[4]

For illustration, example 1 below shows the assertions of Morgan's analysis of mm. 1-6. The "basic unit" consists of the grace-note and short-long elements mentioned above, which multiplies to form a larger scale long-short motive on the middle-level, as a "motivic parallelism." The punctuation of brass and woodwind chords in combination with the middle-level form a larger motive, "two units

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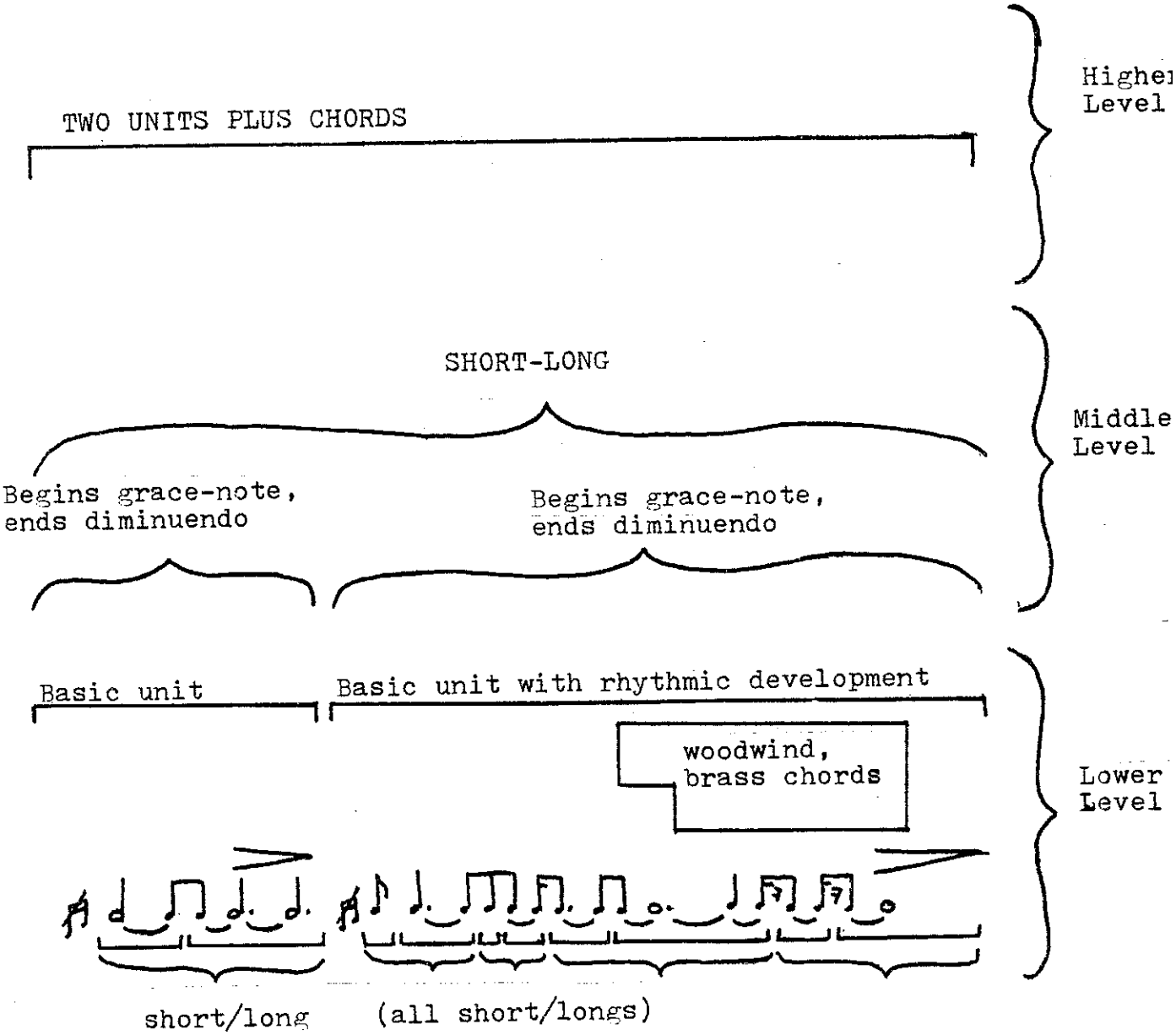
[3] Sherman Van Solkema, ed. The New Worlds of Edgard Varèse; A Symposium. I.S.A.M. Monographs: Number 11. New York: Institute for Studies in American Music, 1979.

[4] The clarinet line, woodwind chords, and brass chords are identified by John Strawn as "sound masses" 1, 3, and 4, respectively.

plus chords," on the next level up. This motive structures the whole of the passage which Morgan considers: it occurs five times, in mm. 1-6, 7-9, 10-11, 12-15, and 20-23.

Example 1: Robert Morgan's analysis of Intégrales, mm. 1-6



There are other, co-existing strata of organization proposed by Morgan as well; for example, the combination "basic unit plus chords plus basic unit" is a motive which appears twice in mm. 1-24.

The approach taken by Morgan is one that might effectively explain the many similar passages of Varèse's music which contain continually varied juxtapositions of relatively fixed, static elements, such as a single chord or a repeated melodic motive (unfortunately, few such passages occur in Ecuatorial). Such an approach is necessary, according to Morgan (in order to answer the question he poses in the following quote), where pitch functions in an entirely non-linear fashion:

> . . . each pitch appears to occupy more a position in musical space than a moment in musical time (p. 10) . . . the pitches appear to have lost their sense of linear direction, to have relinquished their tendency to form connections defined principally by stepwise motion (p. 9) . . . Since the pitch is not part of a linear span directed toward an eventual (pitch) goal, one does not hear it pointing forward in time toward this goal. (p. 10) . . . How is the music to proceed--that is, to move forward--when the pitches have no inclination to move toward other pitches? (p. 15)

The actual properties of these static elements---their interval contents and spatial distribution---are essentially not considered by Morgan. His brief analysis of the opening of Hyperprism, however,

contains certain observations of pitch and pitch-class closely resembling approaches used by both Jonathan Bernard and the present author. Morgan shows that the opening C#4 is symmetrically expanded by [23][5] by the D2 in bass trombone and the C6 in flute,[6] and that mm. 1-16 complete a SC 9-1, a procedure identified as "space-filling" in the present study.

Although Morgan makes only a passing reference to Varèse's term "sound mass," his analysis of Intégrales takes the most convincing step of all the authors toward identifying and interpreting the significance of this feature (as well as the concepts of "collision" and "penetration") in Varèse's music. The article does not study the elements of pitch and pitch-class in Intégrales (as the present study does with Ecuatorial), but not by omission; rather, it is a well-organized and detailed account of the parameters of duration, repetition, and their proportions contained in the opening of Intégrales.

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[5]Bernard's concepts of symmetrical expansion and contraction are explained in the critique of his study contained in this chapter.

[6]All references to specific pitches in this paper will be made according to the notation suggested by the Acoustical Society of America, where middle C = C4. For convenience, a string of pitches which appear in the same register will be surrounded by parenthesis and indicated by a single registral number to the right; for example, (D-Eb-F)5.

Jonathan Bernard

Jonathan Bernard's A Theory of Pitch and Register for the Music of Edgard Varèse[7] is the largest study of Varèse's music available to date, as well as the only study to propose an entirely original and well-defined theoretic approach to Varèse's music. Because of the significance of this major work, it will be summarized in considerable detail here. Since it contains the only available analysis of Ecuatorial, this portion of the study will be reviewed in an especially critical light, in order to define some of the areas needing further investigation.

Two theories, a theory of pitch collections (including a set of transformations which produce related forms), and a theory of "boundary interval" are proposed in Bernard's dissertation. Complete analyses of three works, Intégrales, Ecuatorial, and Déserts, explained in the form of both verbal description and analogue representation on graph paper, make up its largest portion. Also included is a critical discussion of several other analytic studies on Varèse's music, as well as two computer programs for the purpose of musical analysis with Bernard's approach.

Bernard's theory of "spatial forms", like atonal theory, seeks to reduce the available amount of possible

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[7]Ph.D. Dissertation, Yale University, 1977. Another study on Varèse is currently in preparation by the author, forthcoming in publication by Yale University Press.

note collections (limited to trichords in Bernard's study) into a smaller collection of classes. A spatial form, however, is not a pitch-class set, but a set of pitches; that is, the registral location of each pitch is specified. The trichord A#3-G4-F#5, for example, which is identified by Bernard's spatial form notation [9][11] (the adjacent interval spans), is unrelated to (F#-G-A#)3, [1][3]. Hence, the notions of pitch-class, interval-class, octave equivalence, and mod-12 arithmetic are entirely absent in Bernard's theory.[8]

There are four transformations on a spatial form which do produce related forms, however. Two of them, projection and rotation are simply the familiar operations Tn and TnI (respectively) adapted to the pitch realm, operators expressed as T_n^p and T_n^pI by John Rahn.[9] A projection, then, is simply the pitch transposition (T_n^p) of a given collection of pitches to a higher or lower registral position; their spatial form does not change. A rotation of a pitch collection simply inverts that collection in registral space (T_n^pI) so that the spatial form simply reverses: [x][y] becomes [y][x]. Example 2 shows an instance of rotation in Ecuatorial between the timpani part of m. 30 and the trombones of m. 37, beat one. By reading the

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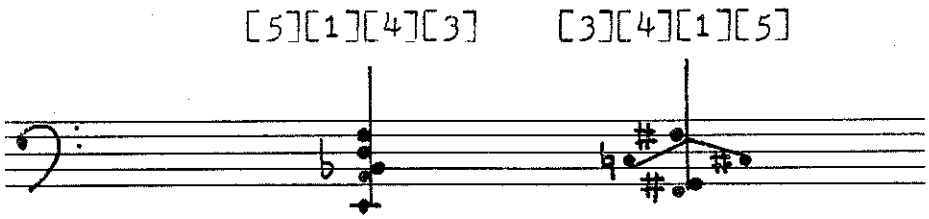
[8]The distinctions between pitch and pitch-class, and interval and interval-class will be maintained throughout this study.

[9]John Rahn, Basic Atonal Theory. New York: Longman, Inc., 1980.

pitches as positive and negative integers with C3 = 0, we see that (-8,-3,-2,2,5) transforms into (6,1,0,-4,-7) under the operator $T^{p}_{-2}I$.[10]

Example 2 Ecuatorial



Timpani, m. 30 Trombones, m. 37

Both of these operations produce set-class equivalencies; that is, if we reduce the pitches to pitch-classes, a projection or rotation of a pitch collection will stay within the same set class.

The two transformations "folding out" and "folding in" are more original creations, for they assert relationships among different spatial forms which in the set-theoretic realm would be non-equivalent sets. Both operations consist of the changing of the position of one pitch in relation to another, stationary pitch, by a pivot of 180° around the position of the stationary pitch. Example 3 demonstrates a folding out of [3][8]:

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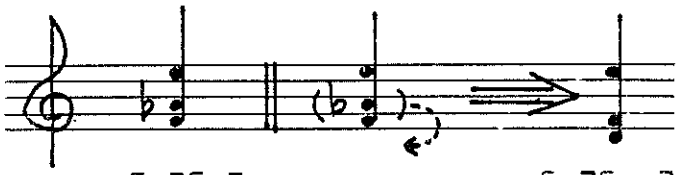
[10] The inversion of (-8,-3,-2,2,5) is (8,3,2,-2,-5), and its transposition down two semitones is (6,1,0,-4,-7).

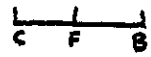
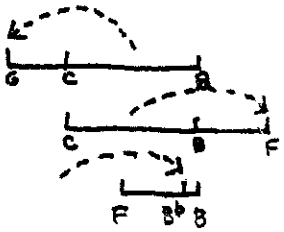
Example 3 Folding Out



[3][8] (SC 3-3) [3][11] (SC 3-2)

The complete group of available folding operations can summarized quite easily by the formula shown in example 4. Demonstrations are shown to the right of the solid vertical line.

Example 4 Related spatial forms under folding operators

Given	[x][y]	[5][6]	(C-F-B)4	
where	(x≤y)			
folding out =	[x][y + x]	[5][11]	G3-(C-B)4	
	[y][x + y]	[6][11]	(C-B)4-F5	
folding in =	[x][y - x]	[5][1]	(F-Bb-B)4	

Bernard's generic term for a complete collection of related spatial forms is the <u>form constellation</u>.[11] That is, when [x][y] is identified as a form constellation, it includes [x][y] and all the possible projections, rotations, and foldings of [x][y].

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[11] The word "related" is emphasized here; these operations do not produce equivalencies in the strict sense of the word. Bernard is careful not to confuse the two.

The idea of the "boundary interval" concerns the transformation of the pitch range of either a single instrument, a group of instruments associated in some domain (usually timbre), or the complete tutti ensemble, by symmetric expansion or contraction, or by projection. Symmetric expansion (or contraction) of an interval occurs when the initial boundary interval is expanded (or contracted) by equal distances on each end to form a new boundary interval. A typical compositional example of this, in say, a string quartet, would be if a solo viola line encompassing A3-G4, a boundary interval of [10], was followed by a tutti passage encompassing C2-E6, a boundary interval of [52]: the tutti passage would be related by symmetric expansion to the viola line because each end of A3-G4 was elongated by [21] to produce C2-E6. Projection of a boundary interval, of course, is simply the transposition of a span to a different register without changing the actual size of the span.

Before evaluating Bernard's analysis of Ecuatorial it is important to consider the intended scope of his study. In his chapter 2 Bernard points out that his primary focus (in all three analyses) is on local, point-to-point structural connections.

> Since use of space is a primary consideration for Varèse, a reasonable assumption is that a a study of intervallic adjacencies offers the

> most promising means of assessing the process of evolution in sound material. (p. 72)
>
> Because of the special nature of Varèse's compositional procedures, immediate succession is often the strongest way in which related materials can be presented; each new formation must result in some fashion from what has preceded it, in turn to be operated on to produce the next stage in evolution of material. (p. 64)

As a result, the associations of material he makes by boundary interval or spatial form relationships usually span passages which are fewer than ten measures apart.

A second controlling factor in the scope of the project is the limitation set upon the theory of spatial forms: the largest component which can be considered is the trichord, for anything larger produces an unwieldy amount of available folding operations. Thus, descriptions of large vertical structures are stated in terms of their multiply overlapping trichordal components (each named according to its membership in a form constellation-class). An effective application of the approach which Bernard observes in mm. 22-23 of Ecuatorial is shown in example 5.[12]

The problem with these two limiting factors (trichords-only and the focus on immediate succession) is that they restrict both the discovery and assertion of large-level structural connections. Despite the significant reduction of available spatial forms to a smaller collection of

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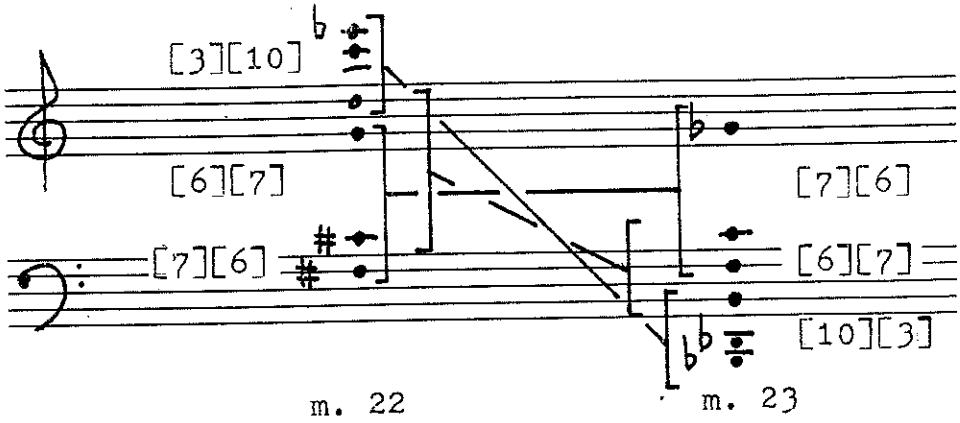
[12]Volume I, p. 157 of Bernard's dissertation.

Example 5 Ecuatorial, mm. 22-23, brass and organ



form constellations, the exhaustive trichordal "assays" of every structure still produce too much uninterpreted data. While Bernard lists the dominating form constellations found in each passage in his summaries which follow each main section, these observations seem only to provide patchwork descriptions of the work and do not provide a satisfying "resolution of the musical structure into relatively simpler constituent elements."[13] Secondly, the exclusive focus on immediate succession seems to be an unfortunate limitation, since for example, there may well be duplications of the same boundary interval processes throughout the work, not just in point-to-point connections. If for example, boundary interval [x] is projected to another registral zone in one passage, are

[13] The New Grove Dictionary, 1980 ed., s.v. "Analysis" by Ian D. Bent.

there other passages containing a projection of [x], and can we draw a connection between them? Or, is there a frequent association of two specific timbral groups by symmetric expansion or contraction throughout the work? Such connections may lead to the discovery of structural "returns" which were previously not apparent.[14]

Perhaps the reason such connections are not made is due to the way Bernard regards repetition of material in Ecuatorial. Although he does notice many of the repetitions and varied repetitions in the work, he feels that such recurrences have no "implications for structure at a higher level" (p. 194) and that they "serve a structural function essentially different from that of the material that they resemble." (p. 195; Bernard's italics indicated by underlines) He prefers to describe such events with the terms "recollection or reminicsence" (p. 195) without attributing a structural value to them.

In contrast to the approach of Bernard, the present author believes that a viable structural analysis of Ecuatorial can be made which takes into account both the underlying structural returns and surface repetitions as mutually supportive assertions of form. While such

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[14] The "immediate succession" stricture limits the potential use of the spatial form theory as well; for example, the rotation demonstrated in example 2 of this chapter goes unnoticed by Bernard.

repetitions do have evocative powers of "recollection or reminiscence," having different functions upon each re-appearance, such surface recurrences are in fact often primary structural determinants as well, which may be shown to be reinforced by associations on the deeper levels.

While some of these returns are literal or varied repetitions, there are many returns of an abstract nature which set-class terminology is best suited to describe. Bernard's trichordal/spatial form theory provides a valuable method of association on the basis of interval identity, but it remains oblivious to the many abstract returns based on interval-class identity. Often some of the obvious surface returns go unobserved in Bernard because even minor variations in their reappearance introduce enough change in their respective interval configurations to disassociate them on the basis of spatial form content.

The following may be cited as an example. The passages at mm. 45-47, 82-83, 102-105, 200-203, and 211-213 are essentially the same passage (they are identified later in this paper under the name "explosion"[15]) with variations: each has the same set-class components, distributed in similar ways on each appearance. For Bernard, only three of them are associated, the ones which are near-exact pitch transpositions of one another: mm. 102-105 "bears some

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[15]See pages 54-57 for analyses of these passages.

resemblance" to mm. 45-47 (Bernard, p. 188), and mm. 211-212 is "quite close in structure" to mm. 102-105 (p. 221). On the other hand, the association of all five by their set-class relationship illuminates their importance as articulators of form: "explosions" one through three bind two large formal sections in the first half of the work, and "explosions" four and five reinforce the sense of structural return after the prolonged absence of familiar elements throughout the middle section of mm. 125-154.[16]

Thus, the set-theoretic approach of the present paper deals with both literal and abstract returns of elements, as they occur in both immediate succession and over long spans of the work. The description and identification of these elements uses Allen Forte's system of set-class labels,[17] and the language used in describing the functions and interactions of these elements are derived from the set-theoretic approaches of Forte, Robert Morris, John Rahn, and Eric Regener.

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[16]The formal functions of the "explosions" are discussed in more detail in the Preliminary Analysis, chapter 3.

[17]Allen Forte, The Structure of Atonal Music, pp. 179-181. New Haven and London: Yale University Press, 1973.

CHAPTER 2

Preface: Explanation of Symbols

The integer notation of pitch-classes in this paper uses C♮ = 0, while the pitch-classes B♭ and B♮ are represented by A and B, respectively. When integers are placed within parenthesis they represent a set-class at the Tn/TnI level and ordering of its prime form. Integers within curly brackets represent an unordered set at a particular Tn/TnI level; as a convention, they are usually ordered so that they resemble their prime form (e.g., SC 4-5 at T_2 is {2348}; in an inversion the pcs appear in descending order, e.g., SC 4-5 at T_0I is {0BA6}).

Jonathan Bernard's symbols for spatial forms are used occasionally. [3][10], for instance, represents a trichord made of the directed interval-spans i(3) and i(10); e.g., (C-E♭)4-D♭5. [3][10] also stands for its rotation [10][3] (e.g., (C-B♭)4-D♭5), but not for any of its foldings.[1]

The names of sets which are members of a Z-related pair are indicated by the numbers of both pairs, where

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[1]Bernard's operations are explained on pp. 11-13.

the first of the two numbers indicates the set. For example, SC 6-4/37 indicates SC 6-Z4, and SC 6-37/4 indicates SC 6-Z37. When a Z-set is preceded by "SCs," it indicates both sets of the pair: e.g., SCs 4-15/29 stands for both SC 4-Z15 and SC 4-Z29.