BOULEZ'S STRUCTURALIST AESTHETICS OF MUSIC

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Abstract

Pierre Boulez is an innovator in music not only because of his experiments in composition, but also because of his aesthetics of music, presented in a series of writings dating from the mid 1950s to the 1970s. His aesthetic system, inspired in part by the structuralist school of literary criticism, is logically derived and wide in scope. However, its general outlines have never been presented in an independent scholarly work. That is the purpose of this thesis.

The presentation of Boulez's aesthetics, which makes up the body of this thesis, is preceded by three introductory chapters which situate him within the evolutionary process of music history, and examine his artistic connection with the symbolist poet Stéphane Mallarmé. The next three chapters progress from the organization of basic materials in Chapter Four (Morphology), through higher levels of structure in Chapter Five (Syntax), and Chapter Six (Form). Special attention is given to the concept of *Alea* in Chapter Seven. The problem of translating Boulez from French to English is also dealt with, with a view to establishing a consistent vocabulary of terms with which to describe his theories of music. In an attempt to flesh out Boulez's abstract theories, analyses of musical examples, either taken from Boulez's writings or from his music, are given, in order to demonstrate his aesthetics.

Preface

The idea for this thesis evolved from work done in a graduate seminar on Music Analysis given by Dr. Hugh Hartwell. In that seminar, I examined Boulez's article *Aléa* and applied its principles to his piece for chamber ensemble *Éclat*. This study formed the basis of Chapter Seven of this thesis. A thorough reading of his writings over the summer of 1987 proved to me that Boulez developed a complete system of aesthetics in the late 1950s, an aesthetics unique to music, but inspired by aspects of the structuralist school of literary criticism.

I wish first and foremost, to thank my thesis advisor Dr. Hugh Hartwell, Chairman of the Department of Music at McMaster University, especially for helping me keep some sense of perspective on a work that might easily have been deflected onto a less productive path, or grown beyond any reasonable proportions. I am thus grateful for Dr. Hartwell's advice and input. I also wish to thank those who suggested various sources of information: Mme Marie Bouchard, Dr. William Renwick, Dr. Paul Rapoport, Dr. Jean Rea, and especially Dr. Jean-Jacques Nattiez of l'Université de Montréal who not only suggested important research sources, but personally made available to me a typed manuscript of an article by Pierre Boulez which had previously been unpublished. This article is expected to appear in the next issue of *The Canadian Music Review*.

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1 Introduction

In undertaking a study of Boulez's writings on musical organization, one is hard put to limit oneself to the topic at hand. For Boulez, form is not separate from content. This fact necessitates a discussion of all that content implies: the totality of musical materials. This reflects the structuralist point of view that form is synonymous with content--and Boulez does not hide the influence of structuralist thinking on his aesthetics of music. Only through understanding Boulez's structuralist aesthetics can one take a critical approach to his compositions and to the works of others on whom his music and musical philosophy have had so much influence. Boulez demonstrates his debt to structuralist thinking by beginning his essay *Form* with the following quotation from Claude Lévi-Strauss:

> Form and content are of the same nature and amenable to the same
> analysis. Content derives its reality from its structure, and what
> is called *form* is the "structuring" of local structures, which are
> the content.[1]

Structuralism views all human endeavor in terms of structures. It examines the creation, description, function, and interrelation of structures A unique quality of humankind is its ability to make structures, to divide objects into patterns, thereby creating order. The structuralist philosophy began with the eighteenth-century Italian philosopher Giambattisto Vico, and has continued to develop to this day.[2] At the beginning of this century,

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[1]Pierre Boulez, "Form," *Orientations*, trans. Martin Cooper (Cambridge, Mass.: Harvard University Press, 1986), p. 90.

[2]This information on the history of structuralism is taken from Terence Hawkes' text *Structuralism and Semiotics* (Berkeley: University of California Press, 1977).

structuralism concerned itself mainly with the analysis of language. It expanded to other fields, anthropology and history in particular. In the structuralist view of music which he developed in the 1950s, Boulez brings the familiar comparison of music and language to its logical conclusion.

In reading Boulez, one is struck by the integrity of his reflections on music. Though he has had occasion to change his approach to composition, most notably in his redefinition of serialism, it is still evident from his writings that Boulez has maintained a unified sense of aesthetic purpose. Even when looking back and reviewing his "mistakes," he reveals the force of logic which led him to and beyond them. Boulez's extraordinary capacity for deductive reasoning--no doubt the result in part of his early training in mathematics and the influence of Classical French rationalism--reduces the universe of musical materials to a coherent scheme.

The usual method Boulez uses in discussing an issue is to state its extremes, show their latent flaws, and then define his position on the subject somewhere in the intervening middle ground. That position is not always dead center between the two conflicting poles, but may be located on one side or the other. Whatever his final position, Boulez uses the force of logic to defend his choice. This methodology is described by Jean-Jacques Nattiez:

> If a reader of *Orientations* were to ask me what I considered to be the fundamental characteristic of Boulez's thinking I should not have any hesitation in saying, 'The binary principle on which it is organized.' It is this instinctive cast of mind that gives these *Orientations* their individual character. Even a more or less random list of pairs of 'palpable categories,' without any regard for context, will reveal the general lines along which Boulez's mind works..
> The possible explanation of this persistent 'binary' habit of mind may be found in the fact that it is the quickest and most di-

> rect way of approaching the *totality* of any subject. Not that this
> perpetual dialectic in Boulez's thinking denotes actual opposition
> between any two pairs. Like every dialectician, Boulez is able to
> transcend his own contrasts, by making *transitions* (for example
> from striated to smooth time) and by making fluctuations in tempi
> but most importantly in the actual character of his works.[3]

Even his penchant for intellectual rigor is counterbalanced by an intuitive quality. As Dominique Jameux puts it, Boulez is an "orderly anarchist."[4] It is important to remember the balance between reason and intuition that exists in Boulez's approach to music, for it is easy to overlook the latter while being so preoccupied with the former. Boulez calls this to mind in the following quotation:

> Although I have admitted that I would not accept the irrational
> as sole guide, I certainly do not exclude the irrational from all
> musical activities, for without the irrational music would cease to
> exist. Building the universe within which we are to evolve on
> logical principles does not in any sense mean restricting the sum of
> purely intuitive psychological means at the musician's disposal for
> *ascertaining* the efficaciousness of any particular form, for
> *discovering* certain means of expression and *integrating* them in
> the process of composition because they are genuinely interesting.[5]

Whereas Boulez is supremely concerned with ordering his musical universe, he never loses sight of the irrational as an essential element of music.

One possible argument against Boulez's intellectual fervor might be that it engenders arbitrary constructs--artificial monuments raised by the composer to his own mental gymnastics--leading to an arid abstraction of musical creation. To deny this charge one need only look at his output as a composer. Analyses of his works reveal both intellectual rigor and an active

[3] Jean-Jacques Nattiez, "On Reading Boulez," *Orientations*, p. 27.

[4] Dominique Jameux, *Pierre Boulez* (Paris: Fayard/Fondation SACEM, 1984), p. 270.

[5] Pierre Boulez, "Towards a Conclusion," *Orientations*, pp. 97-8.

imagination. The limitations Boulez puts on himself spur both his intellect and his intuition. It is a process which reflects the binary nature of his thinking described above:

> I have the sort of temperament that tries to invent rules so as to have the pleasure of destroying them later; it is a dialectical evolution between freedom of invention and the need for discipline in invention. The two are inseparable; invention without discipline is very often inept, in the literal sense of the word; but discipline without invention is no less inept, since it is not applied to anything. The difficulty is to find a point of balance, or at least a constant interchange, between these extremes.[6]

Boulez has always argued for the supremacy of intellectual rigor over undisciplined feeling in one's approach to composition and analysis. In the following passage from his famous catechism on compositional technique--*On Music Today*--he defends this position to those who would reverse the order of importance of these two elements.

> I consider that methodical investigation and the search for a coherent system are an indispensable basis for all creation, more so than the actual attainments which are the source or the consequence of this investigation. I hope it will not be said that such a step leads to aridity, that it kills all fantasy, and, since it is difficult to avoid the fateful word, all inspiration. Far from seeing the pursuit of a method and the establishment of a system as proof of a withering of the faculties, I see it on the contrary, as containing the most powerful form of invention, wherein the imagination plays an essential, determining role.[7]

Herein lies Boulez's strength, both as a composer and as a musical philosopher: he integrates rational with irrational to create a unified whole.

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[6]Boulez. "Towards a New Rhetoric: *Le Marteau sans Maitre.*" *Conversations with Celestin Deliege.* English translation (London: Eulenburg Books, 1976). pp. 64-5.

[7]Boulez. *Boulez on Music Today.* trans. Susan Bradshaw and Richard Rodney Bennett (London: Faber and Faber, 1971). p. 143.

The central three chapters of this thesis--numbers Four to Six--
summarize Boulez's aesthetics as they are presented in the text *On Music
Today* and in several other sources. Chapter Two deals with Boulez's
understanding of musical evolution, and specifically the role his generation
of composers has to play. It is important to understand his critique of the
past, especially of Schoenberg and his followers, in order to see how he came
to adopt his structuralist view of music.

Chapter Three, Poetics, deals with the influence of Mallarme on the
Second Viennese School as well as on Boulez and the serialist movement
forty years later. Any discussion of Boulez's aesthetics must necessarily
refer at some point to the symbolist poet Mallarmé and his work in
restructuring poetic language. Mallarmé's influence on Boulez's aesthetics of
music is twofold. Firstly, his re-examination of linguistic and grammatical
norms parallels Boulez's rejection of pre-existing syntactic and formal norms
in music. Secondly, his concern with the element of chance predates Boulez's
experiments with aleatoric music.

Boulez's structuralist view of music is the subject of the middle
chapters of this thesis. For Boulez, serialism is a means of creating musical
structure through the imposition of hierarchy on musical materials. This
hierarchization can be strict or free, it can be done at any level of musical
structure, from the most elemental to the most sweeping, and it can embrace
any number of musical components to create structures ranging from the
simple to the complex. This point of view redefines the concept of series to
make of it a principle of musical aesthetics flexible and comprehensive
enough to apply to all kinds of music.

The fundamental dichotomy of Boulez's musical universe is reflected in the two words *fixity* and *mobility.* They represent tendencies towards opposite poles of a spectrum of structural organization from absolute predetermination, or *automatism,* to pure chance, or *inadvertence.* In Figure 1 below, I have devised a graphic representation of this spectrum, showing both extremes and the tendencies of musical materials to move in either direction. In laying out his musical aesthetics, Boulez uses the terms fixity and mobility over and over again. Chapters Four, Five and Six deal with fixity and mobility at three different levels of musical structure. They follow the linguistic model of analysis, starting with an examination of Morphology (Chapter 4), then Syntax (Chapter 5) and finally Form (Chapter 6).

FIGURE 1
SPECTRUM OF STRUCTURAL POSSIBILITIES

automatism ←————— fixity mobility —————→ inadvertence
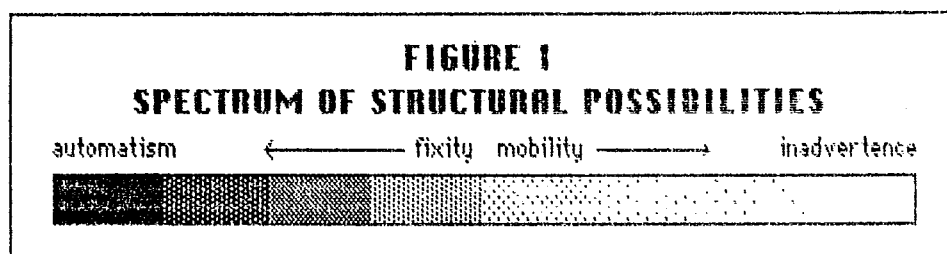
Chapters Four and Five present and explain in a formal and straightforward manner Boulez's most fundamental structural concepts, as contained in his seminal text *On Music Today.* Both the French and English versions of the text are referred to. *On Music Today* stops at the level of Syntax, suggesting that a third level--Form--still needs to be discussed. However, Boulez did set down his thoughts on Form in several essays, the most important of which is titled simply *Form.*[8] Boulez's *Third Piano Sonata* will be examined as an example of formal organization in Appendix C.

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[8] Boulez, "Form," in *Orientations,* pp. 90-96.

Following logically out of the preceding chapters, Chapter Seven presents the concept of Aléa, or *choice*. Boulez's use of choice is tightly controlled, following the principles of serialism discussed in Chapters Four to Six. Indeed, in Boulez's hands choice becomes a musical component, like pitch or duration, which can be exploited in the creation of musical structure. Appendix C includes an analysis of Boulez's chamber work *Eclat* as an example of a serial organization of choice operations.

Finally, the Conclusions in Chapter Eight summarize the major aspects of Boulez's structuralist aesthetics of music presented in the thesis, and theorize as to the place of choice within that system. The goal of this thesis is to organize the contents of Boulez's writings on aesthetics into a coherent system which covers the totality of the materials of Western music, with an emphasis on some of the new techniques of composition introduced in the 1940s and 1950s. Special attention has been given to the definition of important terms with the intention of creating standard English equivalents for the original French words. A summary of these terms is given in Appendix A, followed immediately by an alphabetic ordering by which brief definitions may be quickly found.

In order to illustrate aspects of his theory of aesthetics, Boulez has given examples in *On Music Today* and elsewhere in his writings. However, there are no accompanying analyses given with his examples. Appendix B contains my analyses of some of these musical examples. This was done in order to further illustrate how aspects of his aesthetic theories operate.

2 History

Before examining Boulez's aesthetics of music, we will discuss his view of his own place in the evolution of music. Dominique Jameux makes a distinction between "natural" composers, who write as the spirit moves them, and "philosopher" composers, who have a special interest in understanding the compositional process. He designates Boulez as a composer-philosopher. How does this inclusion of Boulez in the tradition of composer-philosophers affect his position in music history? Jameux makes the following observations:

> Let's start from a dichotomy that is, without doubt, a little forced, but perhaps heuristic: those composers who compose as the birds sing, others who compose while, at each moment, setting before themselves the problem of their composition, the problem of composition *in itself*--in other words that of creation.
>
> The former betray a sense of relatedness: Mozart, Schubert, Debussy, Berg and others besides. We leave to them their prerogatives. The latter form as much of a grouping, but by nature more "analyzable," and so more diversified. Beethoven, in a Promethean struggle against Destiny, wants to "seize it by the throat" and "smash it:" Mahler, *à propos* his Sixth Symphony, exclaims himself in a 'genetic eroticism' [sic] of creation. Other names come to mind: Wagner, Schoenberg. And there is no doubt Boulez is included in this lineage of *reflective* composers for whom the work is the true mirror of their creative obsession.[1]

Boulez's commitment to redefining musical aesthetics is part of an evolutionary cycle in which the prevalent language is dismantled and a new one constructed. He sees his generation as the apogee of this cycle:

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[1] Jameux, "L'Expérience Mallarmé," *Festschrift Pierre Boulez,* ed. Josef Häusler (Vienna: Universal, 1985), p. 99. The translation of all quotations of Dominique Jameux, Antoine Goléa and Iwanka Stoianowa are my own. All comments in brackets are my own.

> On the one hand there are periods during which a language is being
> established, its potentialities explored; and these are on the whole
> periods of stability marked by a certain primordial peace
> guaranteed by the quasi-automatic nature of what is happening.
> On the other hand there are periods of destruction and discovery,
> with all the accompanying risks that have to be taken in
> responding to new and unfamiliar demands.[2]

At the time of this statement by Boulez, the period of destruction

which began with Schoenberg was coming to a close and a new era of

reconstruction was beginning. Boulez's concern with serialism and

indeterminacy put him on the leading edge of experimentation. Though he

was a revisionist, Boulez was conscious of the import of the past. As is made

clear from the following quotation, unless a composer has an intuitive

understanding of the forces of history, he will not have a clear sense of his

role in the evolution of a new system:

> Any vision of history actually implies, from the first moment of
> choice, a sharpness of perception in judging the 'moment,' and that
> perception is not explainable in exclusively logical terms. It is all
> part of that faculty which makes the poet a 'seer,' as Rimbaud used to
> insist so energetically. It is the gift that enables him to clarify what
> appears to be a confused situation, to discern the lines of force in
> any given epoch, to take an overall view, to grasp the totality of a
> situation, to have an intuitive hold on the present and to apprehend
> its structure on a cosmic scale--that is what is demanded of any
> candidate who aspires to the title of 'seer'... When I speak of
> clarifying the present situation, it is not simplifications of this kind
> that I have in mind, but a prevision of what the future will show to
> have been merely seminal and what will have proved truly lasting.[3]

In his writings, Boulez treats the question of musical evolution with

deductive logic; dissecting the lines of development of the early twentieth-

century schools (Stravinsky, Debussy and Schoenberg), he reveals their

respective strengths and weaknesses. From this he arrives at the onus

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[2]Boulez, "The Composer as Critic," *Orientations*. pp. 106-7.

[3]Boulez, "Putting the Phantoms to Flight." *Orientations*, pp. 68-9.

placed on his generation to further the cause of musical evolution and puts forward an orientation he feels is needed to bring the process to its fruition. His views of the eras of musical composition near to his own are described in the sections below. Using a grammatical analogy, I have entitled these sections *Past Imperfect, Present Imperative,* and *Future Indicative* to reflect Boulez's attitudes towards these periods of musical history.

Past Imperfect

Boulez's primary criticism of the influence of the past on the present is in the limitations established models have put on both musical language and form. The result is an inertia felt even by those most concerned with redefining the musical universe:

> Formerly... the composer was working in a universe clearly defined by general laws that already existed before he embarked on his composition. From this it followed that all 'abstract' relationships implicit in the idea of form could be defined *a priori,* and thus gave rise to a certain number of schemes or archetypes that existed ideally before being realized in any actual work. Composing amounted to choosing an exact scheme. These schemes gradually ceased to have any real meaning, thanks to the evolution of musical vocabulary and morphology, and their function as regulators came to contradict the material that they were supposed to regulate. This whole scaffolding of 'schemes' had eventually to make way for a new conception of form as something that could be changed from one moment to the next. Each work had to originate its own form, a form essentially and irreversibly linked to its 'content.'[4]

It was the ability to ignore the pressure of the accepted norms that Boulez most respected in Debussy, for example:

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[4]Boulez, "Form," *Orientations,* pp. 90-1.

> For him, form is never *given;* his whole life was a search for the
> unanalyzable, for development that, even in its procedures, would
> incorporate the surprises of the imagination. He mistrusted
> architecture in its petrified sense; he preferred structures that
> mixed precision and free will.[5]

This mixture of precision and free will reflects Boulez's own approach to musical structure. This being the case, it is not surprising to find that both men were influenced by Mallarmé, whose similar techniques in poetry preceded them.

Reviewing the first decades of this century, Boulez notes that the failure of the great innovators was that they did not create a unified language that could apply to all musical dimensions. His break with the Second Viennese School, for example, was over the question of form:

> It was probably the attempt of the Viennese school to revive
> older forms that made me try to destroy them completely: I mean I
> tried to destroy the first-movement sonata form, to disintegrate slow
> movement form by the use of the trope, and repetitive scherzo form
> by the use of variation form, and finally, in the fourth movement, to
> demolish fugal and canonic form... After [my] Second Sonata I never
> again wrote with reference to a form belonging to the past. I have
> always found one that came with the idea of the work itself.[6]

Whereas Schoenberg and his followers may have been responsible for a new *harmonic/melodic* language, their efforts stopped short in matters of rhythm and form. On the other hand, Stravinsky is better known for his innovations in rhythm and meter. The point Boulez makes in the following quotation is that the development of the different elements of musical composition was not achieved in a uniform manner:

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[5]Boulez, "Corruption in the Censors," *Notes of an Apprenticeship,* translated by Herbert Weinstock (New York: Alfred A. Knopf, 1968), p. 30.

[6]Boulez, "Towards the Dissolution of Classical Forms: *The Second Piano Sonata,* " *Conversations with Célestin Deliège,* pp. 41-2.

...there was, beginning about 1910, a phase of destructive
researches that abolished the tonal world on the one hand and the
regular metric on the other. Stravinsky evolved rhythm by entirely
new structural principles based principally on the asymmetry, the
independence, or the development of rhythmic cells... In another
way, serial evolution supplies a new methodology for giving
structure to pitches. That view certainly is somewhat simplified,
there being, on both sides, significant offsetting factors.
Nonetheless, it remains true that the two levels of research--
language, properly speaking, and rhythm--do not coincide.[7]

Within the Second Viennese School, it was only Webern, according to

Boulez, whose use of the series extended beyond the one dimension of

harmonic language. His first tentative efforts to apply the series to form

were the precedent for Boulez in his researches in serialism.

Webern was the only one of them, in fact, who was conscious of
a new sound-dimension, of the abolition of horizontal-vertical
opposition, so that he saw in the series only a way of giving
structure to the sound-space, in a way, to give it fiber. He reached
that point, in the final analysis, by specious means that, in some
transitional works, embarrass us. Nevertheless, that functional
redistribution of intervals toward which he tended marks an
extremely important moment in the history of the language.[8]

Present Imperative

The process of destruction, having originated with Schoenberg,

attained its apex with Boulez's generation. Now a new process of

reconstruction and stabilization began, placing a creative responsibility upon

the composers of the new era. In the following quotation, Boulez articulates

the position he feels he and his musical contemporaries should hold:

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[7]Boulez, "Eventually... ," *Notes of an Apprenticeship*, p. 150.

[8]Ibid., p. 149.

> What remains for us to attempt after that? Is it not to assemble
> the bundle of possibilities elaborated by our predecessors and to
> demand of ourselves at least a minimum of constructive logic?...
>   In view of that intention, we must expand the means of a
> technique already discovered; that technique having been up to
> now, a destructive object linked, for that very reason, to what it
> has wanted to destroy, our first determination will be to give it
> autonomy. And, furthermore to link rhythmic structures to serial
> structures by common organizations, which will also include the
> other characteristics of sound: intensity, mode of attack, timbre.
> Then to enlarge that morphology into a coalescent rhetoric.[9]

From the ashes of the period of destruction, a new unified system of

musical language must arise. This, the task of the new generation, is what

sets it apart from its predecessors. The need to find a coherent system to

link all musical dimensions explains Boulez's interest in serialism. It is the

same motivating force that led him to work with elements of indeterminacy

when a rigid approach to serialism had failed to produce the desired results.

For Boulez, the need for a unified musical language did not mean a

new codification. He wanted something flexible enough to include an infinite

variety of approaches and styles. However, he did impose some principles as

parameters for the creative process. These are the basis of his aesthetics,

and are systematically described in his exegesis on contemporary music, *On

Music Today.* The following quotation is a synopsis of this point of view:

> It seems that the present generation can now take leave of its
> predecessors; it has reached a self-definition sufficiently precise
> and explicit so that it need no longer accept sponsorship, need not
> suffer patronage. One knows the chief living forces of recent musical
> evolution... It is our duty to discern the seeming aspect of these
> contradictions, to resolve them in a justified synthesis... It seems
> that the great preoccupation has not been to overthrow an aesthetic
> in the name of noisy principles... but much rather to coordinate all
> the constituents [*composantes*] of the language, or be it all the

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[9]Ibid., p. 151.

constituents of sound... in a unique system of references, taking into
account the disparity of their perception [10]

Boulez tended to be inclusive, rather than exclusive, in developing his
system. He demanded an intellectual rigor, but without the limitations of
past systems which resulted in stylistic stagnation and impeded creativity.
In his writings, he sought principles universal enough to apply to a myriad
of situations, but integrated enough to form a discernible, unified edifice.
This was the ultimate goal of his speculations:

> To retain their validity, speculations must be integrated into a
> *systematic whole;* then they justify themselves by contributing to
> this theoretical edifice and of themselves point the way to general
> principles, the real target of all speculation. It is now essential to
> forge ahead with this coherent system; it will give impetus to the
> future development of musical thought and alert it to deviations
> and to useless, cramping hypertrophies.[11]

The reference made above to future development is demonstrative of
Boulez's view of musical continuity. The composer-thinkers of his generation
were not only concerned with fulfilling the impetus of the past, but with
forming a basis for later researches. From these principles came attitudes
towards the development of musical materials which would indicate the
direction for future evolution. It is these suggested attitudes rather than the
prevailing system that act as guidelines for musical experimentation.

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[10]Boulez, *"...Auprès et au loin," Notes of an Apprenticeship.* pp. 182-3. The italicized words in square brackets are the original terms. The word "constituents" is used elsewhere in *Notes of an Apprenticeship* to translate the word *formants* which, as we shall see in Chapter Six, has a special meaning for Boulez.

[11]Boulez, *On Music Today,* p. 29.

Future Indicative

In the second of his essays entitled *Nécessité pour une orientation esthétique,*[12] Boulez treats the subject of historical continuity in music, and traces his own psychological processes as a composer developing a new musical language. The first stage--the rejection of the past--is familiar.

> What I mean to say, more precisely, is that the exact vocation of a composer comes from the contact he has had with other composers; the necessity of invention establishes itself, inevitably, that is deleterious to wish to ignore... Whether such a primordial link is recognized as such, or not, nonetheless the composer will situate himself by opposing, violently or not... what has preceded him. In order to disengage his personality, he must undertake a real *tour de force,* during which he consumes, like a "reactor," the energy of the material which he finds at his disposal. Later, once he has taken possession of a certain domain, his attitude will no longer be subject to this kind of emotionalism: his reactions will become less crude, and less brutal, eliminating, in good measure, a certain number of passions; his vision will become more "serene," will have a more generally statistic basis.[13]

The composer is a reactor in passive and active senses. Actively, he reacts to traditions received from the past and passively, in the literal sense meant by Boulez, he is reacted upon by the elements of the musical material he is working with. The composer becomes the crucible out of which a new alloy is created. However, the passage from a volatile, reactive state to one

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[12]This article is the second part of another essay by the same name, published in *Points de repère* (translated in the English version (*Orientations*) as "Putting the Phantoms to Flight"). This second part of *Nécessité* is to be published in the 1988 issue of *Canadian Univeristy Music Review.* I wish to thank Dr. Jean-Jacques Nattiez of l'Université de Montréal for supplying me with a copy of the original typed manuscript of this article prior to its publication. All translations are my own.

[13]Boulez, *Nécessité d'une orientation esthétique,* pp. 25-6.

of stability such as is described in the quotation above involves a process of personal involvement absolutely vital to a successful outcome.

> ...all truth which has not been radically confronted by personal experience, all truth, briefly, which has not been lived--that is, fundamentally put to question with regards to itself, its risks and perils--this truth will remain exterior, and will have no consequence in either thought or expression.[14]

One might well read "principles of musical composition" for "truth" here, and thereby formulate a concrete summary of Boulez's approach to musical researches. Personal experience involves more than actively working with musical materials and concepts. An evaluation, based on self-questioning, is an important part of the process:

> One must... establish an accounting of the results of experience, evaluate the importance of this experience; only then will one be ready for the principal task: the evaluation will no longer be put to doubt in the absolute sense of an imaginary confrontation, but in agreement with one's own mental or emotional structures. Whether it concerns the language itself--morphological discoveries, syntactic researches, formal explorations-- the aesthetic project, from purely musical research to the junction with other means of expression, all will be submitted to a radical investigation, categorically refusing automatism of the validity in one's relations to the musical work as a historical entity. Doubt, as I conceive it, is, above all, a dissolution as complete as possible of automatism in relation to "others."[15]

Doubt is understood to be more than an intellectual exercise, the imaginary confrontation mentioned above. It is a part of one's personal experience, both with musical precedents and with one's experiments with sound materials; it is an expression of one's mental and emotional structures. Doubt is the means of avoiding automatism both in understanding musical tradition and in undertaking musical experiments. Boulez then describes his

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[14]Ibid., pp. 28-9.

[15]Ibid., p. 29.

own path as a composer, and particularly his attitude towards the problems

of total serialism in *Structures Ia:*

> ...I believe that my own progress is a reflection of a generation, and
> that it is not [just] my own doing; for it is found, with greater or
> lesser resemblances, as well as striking divergences, in a certain
> number of individuals who have become conscious of these same
> problems at approximately the same time, and with a very similar
> global spirit. We have inherited, then, a musical world within
> which there are sharp contradictions at a time where basic ques-
> tions of language are being posed with a particular urgency, and we
> have to determine, in a decided manner, the direction to come.[16]

Going further, Boulez applies characteristics to this sense of doubt. He

describes it as a perpetual condition, a continuous process of renewal:

> ...I would like to speak of constant doubt as an essential condition
> for the evolution of musical thought... All musicians wishing to
> "renew themselves" are aware of this, and in a practical way
> realize this permanent experience, even if it is not articulated.
> Any musician having crossed an important stage [in his
> development] needs to burn, so to speak, the residue of his work;
> thus he tests himself, and verifies that these possibilities [gleaned
> from his experiments] have remained intact...[17]

Then he portrays this doubt as a rational process applied to the various

aspects of musical composition:

> This doubt will be maintained rationally within the ensemble of
> relations it establishes with musical expression: the most strictly
> grammatical elements will be submitted to it as well as poetic
> aspiration...[18]

Doubt essentially becomes an aesthetic by which both the linguistic

and poetic aspects of music are to be controlled. Boulez thus suggests that an

orientation of self-questioning will lead the composer to greater success in

his experiments with new dimensions of music.

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[16]Ibid., p. 33.

[17]Ibid., p. 47.

[18]Ibid., p. 48.

3 Poetics

In developing his aesthetics of music, Boulez took his lead from precedents in poetry and literature. Foremost is the influence of the symbolist poet Stéphane Mallarmé, although also noteworthy is that of Henri Michaud, René Char, James Joyce and E.E. Cummings, among others. In the pioneering work of these authors and poets, Boulez found precedents for his own experiments and those of his contemporaries in music. which led him to formulate a new aesthetics of music.

The foundation of Boulez's structuralism is the re-invention of musical language. The authors mentioned above experimented with the existing linguistic structure, re-ordering the normal sequence of words and giving new meanings to words. Part of their experiments lay within the realm of linguistic logic, rather than in description or meaning. Following the comparison of language to music, Boulez was naturally attracted to this method of developing a system for the rigorous re-structuring of musical materials. For him, the principle that the demands of structure override those of meaning is especially true of music. where meaning is often imposed on the musical materials. This point of view is made clear in the following quotations:

> Music is an art that has no 'meaning' hence the primary
> importance of structures that are properly speaking linguistic,
> given the impossibility of the musical vocabulary assuming a
> simply communicative function.[1]

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[1] Pierre Boulez. "Aesthetics and the Fetishists," *Orientations*. p. 32.

> The specific strength of the composer lies in the non-significance' of music, its lack of 'meaning,' and we ourselves must not lose sight of the fact that it is the phenomenon of sound that is of importance: 'living' this order of human existence is the very essence of music. ...music cannot undertake the task of expounding rational ideas; it supports none of these, or alternatively, supports them all indiscriminately; but it goes against its own nature if it attempts concepts that are totally alien to it.[2]

James Joyce's revolutionary works called the nature of literary art into question. No longer was it seen as merely descriptive or expressive of human experience, but as a thing of and for itself. In the linguistic and temporal experiments of Joyce and others, Boulez found a precedent for his own work in music:

> ...My present mode of thought derives from my reflections on literature rather than on music... The fact is that I believe that some writers at the present time have gone much further than composers in the organization, the actual mental structure, of their works...
>
> A close examination of the structure of Joyce's two great novels will reveal the astonishing degree to which the novel has evolved. It is not only that the organization of the narrative has been revolutionized. The novel observes itself *qua* novel, as it were, reflects on itself and is aware that it is a novel--hence the logic and coherence of the writer's prodigious technique, perpetually on the alert and generating universes that themselves expand. In the same way music, as I see it, is not exclusively concerned with 'expression,' but must also be aware of itself and become the object of its own reflection.[3]

One purpose of this new approach is to destroy the tyranny of the linear construction of art, to allow for the possibility of expansion, reflection, and participation within the work of art itself. Boulez refers to this issue in the following quotation wherein he describes some of the limitations of the traditional structures of Western art:

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[2]Boulez, "Putting the Phantoms to Flight," *Orientations.* p. 81

[3]Boulez, " 'Sonate, que me veux tu' ," *Orientations,* p. 143.

> It must be our concern in future to follow the examples of
> Joyce and Mallarmé and to jettison the concept of a work as a
> simple journey starting with a departure and ending with an
> arrival... In this perspective a work is one, a single object of
> contemplation or delectation, which the listener finds in front of
> him and in relation to which he takes up his position. Such a work
> follows a single course, which can be reproduced identically and is
> unavoidably linked to such considerations as the speed at which it
> unfolds and the immediacy of its effectiveness. Finally, Western
> classical music is opposed to all active participation, and this
> sometimes makes it difficult to establish any really significant
> contact, even if actual boredom does not intervene between the
> musical object and the listener contemplating it. From beginning
> to end every marker is carefully emphasized, which virtually
> eliminates any element of surprise.[4]

Form, in music as in literature, should be free of pre-established

norms. This is the principle upon which Boulez based his research in musical

structure, and it is also the grounds for his criticism of Schoenberg, who still

used established norms of form while developing a new harmonic-melodic

language. In this realm, Boulez looked to the literary arts for his models:

> Form is becoming autonomous and tending towards an absolute
> character hitherto unknown: purely personal accident is now
> rejected as an intrusion. The great works of which I have been
> speaking--those of Mallarmé and Joyce--are the data for a new age
> in which texts are becoming, as it were, 'anonymous,' 'speaking for
> themselves without any author's voice.' If I had to name the motive
> underlying the work that I have been trying to describe, it would
> be the search for an 'anonymity' of this kind.[5]

In what sense is the word "absolute" meant above? Rather than a

pre-ordained structure, Boulez is seeking a generalized theory of organiza-

tion based on the nature of musical materials themselves. In this he also

reflects the work of the great literary innovators mentioned above, who

sought a purer language, free from the impositions of accepted use.

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[4]Ibid., pp. 144-5.

[5]Ibid., p. 154.

Mallarmé

Much has been written concerning the influence of the poetry of Stéphane Mallarmé on the music of Pierre Boulez. Later in this chapter, the link between these two men, as revealed by Celestin Deliège, Antoine Goléa and Boulez himself, will be summarized. Before that, however, a brief description of Mallarmé's aesthetics is in order.

The striking feature of Mallarmé's poetry is its apparent obscurity. Though the meaning of his texts seems remote by normal standards, his aim was not to obfuscate. He set out to imbue his poetry with as much implicit meaning as possible. It required an ideal reader, with perception and imagination, to extract this meaning from the condensed language. Words were symbols which, like the tip of the iceberg, revealed a fraction of their content. Placed in juxtaposition with other symbols, the significance of words became compounded to create an even more complex whole:

> Symbolism, where one object becomes so fused with the properties
> of the other that their contours melt one into the other, was a form
> that permitted greater artistic refinement on the part of the poet,
> and deeper creative insight on the part of the reader. It was a poet's
> poetry, and the reader was to have been a poet. Symbolism had the
> power of suggesting; it did not state any realities, subjective or
> objective...; it was founded upon exaggerated memories, registered
> and expressed by the artist who did not portray them, but implied
> them. In this wise, the symbols had a universal aspect, while the
> originalities and the prismatic refractions were individual.[6]

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[6]Hasye Cooperman, *The Aesthetics of Stéphane Mallarmé* (New York: 1933; reprint ed. New York: Russell & Russell, 1971), pp. 10-11.

There is an ironic dichotomy between the vagueness of the images

that arise in Mallarmé's poetry and the precision with which he chose his

words. Though he dealt in abstractions, he was trying to extract multiple

interpretations from the images he created, which called for a very effective

and efficient use of language:

> Stéphane Mallarmé wished not one of his allusions to be particular
> or concrete; he heaped abstractions upon abstractions, not because
> he wished to be vague and meaningless, but because he wished his
> symbols and images to be all-inclusive, absorbing and suggesting
> every possible allusion, bringing with them a definite revelation
> and a real meaning; like a crystal, which is brilliant, refractive,
> full of many prismatic colors and exposing many surfaces.[7]

Because of the concentrated attention Mallarmé gave his work, instead

of being undisciplined and effusive as its vagueness suggests, it was

meticulous in its use of language:

> The technique and the aesthetic of this poet discloses to what
> extent he knew the artifice of poetry, although he was essentially
> spontaneous and his original material subjective. His will forced
> him to analyze and to combine to an extent where the natural and
> the ordinary could not enter; and in this wise, seeking the essence
> of human reactions and will, he created that well-known obscurity
> which, upon first examination, seems so fresh, so unplanned, and
> to some, so helpless.[8]

The precision in his language reflects a striving for perfection, for an

absolute art form, in which each word, gesture, phrase is brought to a higher

plane of meaning. Mallarmé was trying to create a new language, not

simply by inventive variations of standard manipulating syntax and

grammar, but by giving new substance to the materials, the words, of the

language itself.

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[7]Ibid., p. 12.

[8]Ibid., p. 16.

> The evolution of Stéphane Mallarmé's technique and aesthetics
> describes his search of the absolute; for he was forever haunted by
> the feeling of not being able to express his notions (nuances of
> sentiment and of logic) in powerful and exact terms; he was forever
> groping toward that perfect form which would express the essence
> of spiritual life, just as the kernel is related to physical life.[9]

Thus, he sometimes altered the expected meaning of a word by placing it in an unusual context. His search for this other meaning led him to compare his art to music, specifically the music of Wagner, which he felt implied more than just the abstract ordering of sound, or the depiction through sound of familiar objects by non-verbal means.

> The abstract aesthetic and the technique of this artist serve to
> explain the obscurity of his writings. The unusual associations
> and the employment of rare terms were the result of a will to reach
> the absolute; by divesting all words, phrases and impressions of
> their commonplace associations (which to him were casual
> associations and not premeditated) and by imposing fresh and
> more perfect (absolute) meanings upon newly-combined words and
> phrases the poet achieved his goal.[10]

There is a two-fold import in Mallarmé's art: the precision of his technique, revolutionary in its approach to language; and the emotive content of his poetry, which was neither descriptive nor obvious. Cooperman describes it as a combination of two extremes: "lyric elements, which are emotional and personal; and objective elements, which are contemplated and impersonal."[11] Mallarmé's concern with imbuing the language with new and multiple meanings led him to give more importance to grammatical structure than to conventional meaning. Antoine Goléa emphasizes this aspect of Mallarmé's aesthetics in linking the symbolist poet to Boulez:

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[9] Ibid., p. 21.

[10] Ibid., p. 23.

[11] Ibid., p. 26.

> The language of Mallarmé is a kind of transsubstantiation of
> ordinary intelligible notions into eternal values, taking account, at
> the expense of all anecdotal and ephemeral content, of the human
> truth of permanent myths and universally valid symbols. This is
> the result of the most original, the most personal effort to recreate
> the world according to the laws of art, which is the goal of the
> ambition of all the great artists, of all times and in all domains. In
> this sense, it is ridiculous--as has become almost commonplace--
> to speak of the "obscurity" of Mallarmé's language, or of its total
> unintelligibility, its absurdity. It is evident that each of
> Mallarmé's verses "signifies" much more that any phrase of
> current speech using the same words, and much more as well than
> the verses of the best poets, founded on the same primitive
> linguistic material. The extreme concentration and the severity of
> the grammatical structures of Mallarmé's language have nothing to
> do with the "obscurity" proclaimed by superficial readers; they
> are indeed the opposite of all notions of obscurity. Simply, these
> structures--not only grammatical, but also formal--open to the
> realm of "another" clarity...[12]

It is in the realm of syntax that an analogy is made between
Mallarmé's poetry and musical composition, a point which is crucial to the
present considerations. Goléa quotes Jacques Scherer, the editor of the first
publication of Mallarmé's *Livre* on this subject:

> This important point having been made, on the reality of "content"
> and of "intelligibility" of many of Mallarmé's texts, I can now
> refer, with even greater force, to the predominance of the structure
> of language itself in the poetry of Mallarmé over the meaning of
> this language. Now, this structure is always elaborated according
> to the principles valid in music. But, as Jacques Scherer reminds
> us, if "the relations between Mallarméen poetry and music,
> signaled by the author himself, have held our attention for a long
> time... we have often misunderstood its nature. The notion
> according to which the meaning of words is sacrificed to a search
> for the harmonies of sounds originates with the poet's first
> detractors and is scarcely maintained today. The idea by which
> Mallarmé wants to allow himself *vis-à-vis* language the same
> freedom the composer has with the sounds of nature, and to play,
> by a method of abstracting the sensory universe, on the relations
> and not on the elements of concrete reality can suffice to account
> for the Mallarméen syntax..."[13]

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[12]Antoine Goléa, *Rencontres avec Pierre Boulez.* (Paris: 1958; reprint ed. Paris: Slatkine, 1982),
pp. 234-5. [All translations of this text are my own.]

[13]Ibid. p. 236.

The abstraction of Mallarmé's language was further enhanced by his innovations in form. The physical appearance of the words on the page is such that alternative readings can be made. This technique was expanded in Mallarmé's unpublished *Livre*, a massive project which preoccupied him for over a decade. Besides the incomplete text of *Livre*, Mallarmé left a jumble of notes referring to this work. Using these, Jacques Scherer was able in 1957 to produce, for the first time, a relatively accurate edition of *Livre*. One of the features of this work is the possible insertion of individual pages in different parts of the book so that in their new location, surrounded by new materials, they take on new meaning.

> In effect, Mallarmé envisaged giving each page of his *"Livre"* up to ten different "meanings," according to the places which this page, time and again, would occupy within the ensemble of the *"Livre."* "The structure of *'Livre'* by mobile pages," Jacques Scherer tells us, "brings new and immense possibilities to diversify meanings. Each page is, in its substance, a constant element; the paper of which it is made is not modified if one changes its place; but the words inscribed on this paper take new values in their new surroundings. The number and disposition of these changes of place, which that part of mathematics called combinatory analysis can study and predict, bring to the book the possibilities of movement, and thus of richness and breadth, which ordinary literature cannot know."[14]

Returning to the musical analogy, Scherer calls Mallarmé's *Livre* a form of polyphony, modelled on the symphony rather than on melody. The multiple meanings of not only words and phrases, but of entire pages in new contexts become a kind of counterpoint of different instruments. For the basis of this connection with music, however, one must return to the fundamental meaninglessness of that medium. The conventional connotations of

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[14]Ibid., pp. 237-8.

words were obstacles for Mallarmé, who wished, perhaps unrealistically, to have the same flexibility with words as the composer has with sounds.

> In reading these pages [of the "Livre"], and in rereading Mallarmé's most accomplished poems, one cannot stop oneself from thinking of the visionary madness in these musical aspirations of the poet. What the "spiteful and lazy" call the "obscurity" of Mallarmé is in reality the ultimate obstacle against which Mallarmé struck, against which he could not help but strike, and which is, precisely, the fact that *words have a meaning*. The more one rises in the hierarchy of readers of Mallarmé, the more one finds oneself in the presence of those who distance themselves, as much as possible, from the meaning of words so as to approach their essence. But it is clear that the total distancing of the meaning of words, and the total apprehension of their unique essence will for ever be impossible... From this moment, the poet would become useless and would have to transform himself into a composer of music.[15]

This recalls the statements by Boulez referred to above on the meaninglessness of music. Although Mallarmé based his speculations about music mostly on the works of Wagner, Boulez took these principles one step further in his music with the introduction of directed freedom, a subject dealt with in Chapter Seven of this thesis. It is this connection with Mallarmé that helps to distinguish Boulez's efforts with *choice* from the chance pieces of his contemporaries:

> The necessity of "choice" is thus imposed upon Mallarmé; he cannot act within the construction of such a literary monument but by a "directed freedom." That is exactly the difference one finds between Stockhausen's *Klavierstück XI* and Boulez's *Third Sonata*. The first permits all possibilities of combination by the simple will of the interpreter; and it is there that Boulez saw the weakness of the work which is no longer, according to him, a "composition," but simply the point of departure of combinations obtained by pure chance. On the contrary, the *Third Sonata* is founded on choice and on directed freedom; mysteriously in harmony with Mallarmé's speculations, it realizes in music that which Mallarmé only dreamed of realizing in literature.[16]

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[15]Ibid., p. 237.

[16]Ibid., p. 239.

Eventually symbolism, wherein the readers could follow meanings in a somewhat conventional sense, became "imagism" in which all content is merged and a sense of form is lost.

> Due to Stéphane Mallarmé's eternal conflict of content and form, the lines which he allowed his readers to trace (symbolism) became more and more vague; they were fused with connotations which in turn had become highly personal; his symbolism became imagism, where each object seemed to lose its very form, to become part of a dramatic moving and ethereal vision, ethereal because the music contained was faint and distant, thought never quite too vague.[17]

Mallarmé and Serialism

Boulez was not the first composer to be influenced by Mallarmé's poetry. The most famous precursor was Debussy whose musical interpretation of Mallarmé's *L'Après-midi d'une faune,* was poorly received by the poet.[18] Debussy and Ravel both set Mallarmé's words to music. Webern's encapsulated musical forms have caused authors, including Boulez, to link Webern's and Mallarmé's names together.

As Boulez points out, it is the destruction of pre-established form and the reconstruction of language, through logical and thorough means, in their respective arts, that connects Mallarmé to Debussy and Webern:

> There is indeed only Debussy whom one can compare with
> Webern--in their common tendency to destroy all formal

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[17]Cooperman, *The Aesthetics of Stéphane Mallarmé.* pp. 35-6.

[18]Célestin Dellège, "The Convergence of Two Poetic Systems" in *Pierre Boulez: A Symposium,* ed. William Glock (London: Eulenberg Books, 1986), p. 99. The French version of this article, originally written in 1977, is republished in Dellège's text *Invention musicale et idéologies,* (Paris: Christian Bourgois, 1986) under the title "Une conjonction Boulez-Mallarmé," pp. 139-170.

> organization pre-existing the work itself, in their common
> recourse to the beauty of sound for its own sake, in their common
> elliptical pulverization of the language. And if one can, in a
> certain sense, maintain--O Mallarmé--that Webern was obsessed
> with formal purity to the point of silence, it was an obsession that
> he carried to a degree of tension hitherto unknown in music...
>
> Webern's one, unique rhythmic innovation is this conception
> whereby sound and silence are linked in a precise organization
> directed toward the exhaustive exploitation of our powers of
> hearing. The tension of sound is enriched to the extent of a
> genuine respiration, comparable only with Mallarmé's contribution
> to poetry.[19]

In an article entitled *Mallarmé and Serialist Thought,*[20] Hans Rudolf

Zeller analyzes the connection between symbolist poetry and serialist music.

He tries to find concrete points of contact; in other words, he believes that

there exist similar kinds of solutions to technical problems of artistic creation

between the two. However, difficulties arise when comparing two disparate

media, as Zeller explains:

> The music conventionally known as 'serial,' with its determined
> struggle to evolve an absolute language, new principles of
> formation and a more suitable conception of the musical work, has
> indeed more in common with Mallarmé's outlook than has
> contemporary literature, which is essentially preoccupied with
> reportage. But it is in 'translating' Mallarmé's message that the
> most troublesome problems arise.[21]

One of the problems lies in the new relation between composer and

poet, which Zeller defines as follows:

> ...the composer of today is no longer interested only in the finished
> poetic product (as something that can be 'set'). He is just as
> interested in the poet's way of working, the system, the rules of
> play according to which the poet 'moves,' his instruments, his
> methods; in short, the principles of his *ars poetica.*[22]

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[19]Boulez, "The Threshold," *Die Reihe,* II (1959), p. 40.

[20]Hans Rudolf Zeller, "Mallarmé and Serialist Thought," *Die Reihe,* VI (1964), pp. 5-32

[21]Ibid., p. 5.

[22]Ibid., p. 6.

This calls for a comparison of the respective languages of post-War music and late 19th-century poetry and the changes they have undergone in their analogous eras. Zeller refers to the destruction of accepted norms as the "crisis in poetic language." He distinguishes between "communication-language" and "poetic-language." The latter is a subset of the former whence it takes meaning and transposes it to a new level. Mallarmé proposed a new meta-language which uses the sounds and symbols of prose language:

> Seen from the viewpoint of everyday language and official language (which are inescapably committed to communication and hence to the criterion of non-ambiguity) poetic language is in a state of crisis. It is no longer the superstructure of the prose language, its ultimate possible intensification (from which it can profit in its turn), but rather something completely different, a language *within* language, whose sentences can no more be transformed into other sentences in this language than they can be translated into any of the current foreign languages.[23]

The artist experimenting with the creation of the meta-language must break the communication-language down to its raw materials and look within them for a new structural design whose basis is more flexible, complex and intellectually demanding while keeping its poetic expression. The poet is thus driven to the study of phonetics while the composer turns to the study of acoustics. In both cases, they bypass the accepted structured language, which is only one practical formulation of the basic elements from which it is built, one which is too simplistic for contemporary art.

The themes which have been touched upon in the discussion above are common to the two schools linked in this article. Zeller searches for the starting point from which to make a more in-depth comparison:

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[23]Ibid., p. 8.

> The question is no longer whether there is, in general, sufficient
> grounds for an imaginary dialogue between the poet Stéphane
> Mallarmé and contemporary composers, but on what subject it starts
> up on its own, as it were, because it concerns both sides with equal
> intensity and forces us to compare the results of their deliberations.
> ...it was not until the complete works of Anton Webern were made
> available--the most significant expression of the desire to purify
> and renew the musical language--that the entrance to Mallarmé's
> store of themes, which was concealed within it, was revealed [24]

The distillation of a poetic-language to its fundamentals binds the work of these two men. It results in a new lyricism which is not merely introversion or emotionalism, but a new intellectual and spiritual order:

> It is no accident that the metaphors used again and again in
> [descriptions of] Mallarmé's forms, such as 'strings of pearls,'
> 'constellations,' 'crystalline structures,' 'diamonds,' etc., [as well
> as] 'mathematical formulae,' 'calculations,' etc., are equally
> applicable to Webern's. Taken together they all stand for one
> central concept: structure. To Mallarmé its ultimate elements,
> significant in themselves, were the twenty-six letters of the
> alphabet (or rather the number of phonemes in the French
> phonological system), to Webern they were the intervals that can
> be composed from the twelve notes of the tempered scale.[25]

It is interesting to note that the same terms have been frequently applied to the music of Edgard Varèse, as well as to that of Boulez. Nonetheless, Webern provides the first appearance of this phenomenon of reduction in the sphere of music.

In Webern's music, this reduction to fundamentals is expressed by his preference for three- or four-note cells as the smallest syntactic elements. In Mallarmé's prose and poetry the predominance of monosyllabic words reveals the same creative process at work. The larger structure constructed from these units--Mallarmé's sonnet--is described by the poet as a block, a

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[24] Ibid., p. 9.

[25] Ibid., p. 10.

crystal cube, and so on. Zeller points to a parallel in Webern: his frequent use of canon as a structure generated from motivic cells.

Another important principle shared by these two was that of the creative potential of the musical element in poetry. In their separate arts, each tried to achieve an amalgamation of word and sound which went beyond tradition. Looking at Webern's output of vocal works, Zeller remarks that the instrumentalizing of the voice breaks new ground in the treatment of text, foreshadowing Boulez's similar approach to the setting of poetry.[26] The sonorous qualities of the words rise in importance so that the text is now more closely linked to the music. Conversely, Mallarmé's recognition of this same aspect of words led him to seek a bond with music in his writing:

> For Webern the trans-structurization of the word, its transforma-
> tion into sonic relationships, was at the very center of his compo-
> sitional work (which demanded an incomparably heightened
> sensitivity towards the sounds of words). And it was Mallarmé's
> vision of a way of writing which would be in the spirit of music, his
> intuitive grasp of the fact that words and music originally belonged
> together which, from a certain period of his career, made his work
> take the form of the destruction (justified by its productiveness) of
> the theory of literature which had been accepted up to that time.[27]

The bond with music was more than just the sonorous quality of words. To Mallarmé, music epitomized the structural system he wished to apply to his poetic art:

> To him music was not a metaphor behind which lay concealed a sphere
> constantly held out as a lure by the poet but ultimately unattainable;
> it was, rather, an exact description of the constructive law which had
> to govern all prose and verse composition, in all their dimensions, and
> which distinguished his word-music from any other.[28]

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[26]Ibid., p. 11

[27]Ibid.

[28]Ibid.

Music's structural flexibility, what Zeller calls its semantic ambiguity, appealed to Mallarmé. Aspiring to this flexibility, he actually surpassed his musical contemporaries in the development of form, thus setting up the eventual convergence with post-war serialists. The example of this kind of music-interpreted poem put forward by Zeller is *Un coup de dés*, a work which also caught the eye of Boulez.

The structure of *Un coup de dés* is determined by its notation—the arrangement of words of the page. This represented a turning point in the history of literary art, anticipating similar procedures by twentieth century poets. In effect, the blank page was transformed into a stage. The completed work is both an instruction to the reader for a realization of the poem, and a spatial representation or "type-picture" (type in this context means the typography, the printed letters). The type-picture is a complex, working within four dimensions: visual, auditory, syntactical and semantic. Each has its range of expression and can be analyzed individually or in relation to one or more of the others. Zeller gives as an example Mallarmé's instructions to the narrator on tempo, register, and the use of silence.

This reduction to basic dimensions is also found in Boulez's conception of music as revealed in *On Music Today*. This will be discussed later in this thesis when musical morphology is dealt with in Chapter Four. In his Preface to *Un coup de dés*, Mallarmé describes the spatial arrangement as a means of distinguishing merging images. The visual space gives the poem temporal space as well, resulting in a flow of time which is not uniform, but bunched together or drawn out to accommodate the images of the poem.

> The paper intervenes every time an image, of itself, ceases or
> withdraws, accepting the succession of others and, since it is not a
> matter, as always, of regular sound-periods or lines of verse--
> rather, of prismatic subdivisions of the Idea, the moment they
> appear and their conjunction in some exact spiritual setting lasts,
> the texts asserts itself in variable positions...[29]

Mallarmé's *Livre* is a more complete realization of these concepts. As described above, *Livre* was a project that could never be complete, being an attempt to incorporate Mallarmé's entire world-view, his life's experience, into one work of art. Add to the dimensions already listed that of the arbitrary reordering of pages mentioned earlier, and the work takes on a life of its own. Zeller likens it to the Chinese book of oracles, the *I Ching*. In its absolute nature, it foreshadows Joyce's *Ulysses* and *Finnegans Wake*.

The similarity of this literary movable feast to the music of the post-war serialists is striking, despite the fact that the works of Stockhausen, Boulez and Pousseur which used this permutation principle involving the active participation of the performer in choosing and ordering the materials of the music were written before the first publication of *Livre* in 1956. An analogy can be made between the reader of Mallarmé's *Livre* and the performers of this type of post-war music.

As was mentioned above, Mallarmé wrote for an ideal reader open to the possibility of multitudinous understandings:

> ...his poetry stimulates him [i.e. the reader] to continue the
> unfinished creative act which takes place in it by a creative act of
> his own, which avoids a static conclusion just as the poem avoids
> it. The infinite potentiality within which this language moves
> extends to the reader only in so far as it incites him to an equally
> infinite potentiality of interpretation. It is not so much that the
> reader should solve the enigma as that he himself should enter into

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[29] Stéphane Mallarmé, *Preface* to *Un coup de dés*. *Mallarmé: the Poems*. Trans. by Keith Bosley. (Middlesex, England: Penguin Books, 1977), p. 255.

> the enigmatic state where he *feels* solutions, but does not draw
> them prematurely, and indeed may think of possible
> interpretations of the poem which may never have been in the
> poet's plan.[30]

In the case of *Livre,* Mallarmé envisaged staged readings in which alternative orderings would be presented. Towards this end, he formulated detailed plans and instructions of how performances were to be done under a variety of circumstances. In each instance, it would be controlled by an "operator" (ideally himself) and would be attended by an élite audience familiar with his work an capable of drawing interpretations from it.

A formation-process determined how *Livre* was to be presented. Mallarmé sought to incorporate every detail in these formation-processes; besides the displacement and quantity of text read, the method of performances, number of readers, and so forth, he was also concerned with the exact size of the audience, numbers of readings over an extended period of time, arrangement of chairs, even the prices of admission. The voluminous and detailed instructions for readings of *Livre* call to mind similar information given for interpretations of post-war music. Examples cited by Zeller, and also mentioned above, are Stockhausen's *Klavierstück XI* and Boulez's *Third Piano Sonata.* These instructions deal not only with performance practice, but most importantly with the notation of the work.

Because of its relative ambiguity, the form becomes the notation. As Zeller puts it, "questions of form become questions of notation." The notation is, in a sense, the composer's analysis of his own work revealing to the performer the logic of the inner workings of the music:

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[30]Zeller, p. 14.

> The actual *appearance* of the notes in the *Klavierstück XI* reveals the
> concept of a 'directionless time-field' which underlies its structure
> (in parallel fashion this is 'spatialized' in the *Third Piano Sonata* by
> means of the drawing of the central *formant* 'constellation'). What
> appears to be scattered over the page, without order or direction, must
> in fact contain the possibility of being coordinated, if one passes from
> the external manifestation of the composition to its 'internal' formal
> structure, and as a complex it must be provided with a rule if indeed
> its sonic realization is to be meaningfully accomplished.[31]

The bulk of Zeller's article is a mathematical working out of the

structural possibilities for a reading of Mallarmé's *Livre*. In his conclusions

he remarks again on the similar approaches of the symbolist poet and the

serialist composers. Most striking is the parallel emphasis in both instances

on the identification of the active participant (reader or performer) with the

work of art, and the permutation-principle that grew out of this concept.

Boulez and Mallarmé

The important elements that link Boulez and Mallarmé have already

been touched upon: the rational investigation of language, the reduction of

the structure of language to atomistic units, the multi-dimensionality of the

medium, and above all, the insertion of elements of choice to give multiple

interpretations of the work of art. These similarities notwithstanding, it

must also be noted that there are important *differences* in the aesthetics of

these two artistic creators.

This is brought out succinctly in an article by Célestin Deliège entitled

The Convergence of Two Poetic Systems.[32] Deliège first points to the

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[31] Ibid., p. 17.

[32] Célestin Deliège, "The Convergence of Two Poetic Systems," in *Pierre Boulez: A Symposium*, pp. 99-126.

difference of historical perspective. In the case of Mallarmé, his contribution to poetic language extended far beyond the scope of his own life. Boulez, on the other hand, acted in accord with forces put into play by Debussy, Webern and Messiaen. It was the evolutionary imperative of creating a new unified language which Boulez perceived and realized in his own work. In the end, however, Boulez and his generation failed to reach a consensus, and as the hope of a common language faded, Boulez became isolated. As Deliège put it: "...it is their individual will that best defines the observable relationship between the two creators."[33]

Another point of divergence concerns the motivating forces which led Mallarmé and Boulez to their respective paths. This can be seen as a difference in their times. Mallarmé's poetry is imbued with a romantic spiritualism not present in Boulez's music. Both were rational in their approach to art, but the underlying perception of it was more metaphysical for the poet than it was for the composer:

> It would indeed be a vain effort to look for a metaphysical basis to
> the Boulezian concept. The musician, unlike the poet, could not
> live in the mythical vision of a book reaching out to the world
> through the word entrusted with expressing it entirely. For the
> rest... how can one imagine a man of the twentieth century--and
> particularly Boulez--assuming an experience as intimate and as
> tragic as that of emptiness, which was the still mysterious chasm
> in which Mallarmé slumbered before finding himself? The crisis-
> situation that Boulez lived through around 1950 can be seen as the
> inverse phenomenon, where man triumphs through mature
> reflection and technique over resisting matter...[34]

[33]Ibid., p. 100.

[34]Ibid., pp. 103-4.

As the quotation above implies, the problems of art were different for Boulez and Mallarmé, though both found similar methods for resolving them.

Deliège does not focus solely on the differences. His goal is to reveal the nature of the artistic relationship between the two men. He points to similarities such as Boulez's search for an equivalent in music of Mallarmé's parentheses, and what he calls the "spreading out of phrase and period."[35] With regard to the mobility of materials employed by both men, Deliège emphasizes that this did not destroy the existing morphology of language (in Boulez's case, that of the twelve-tone system). The units of morphology were maintained in both cases; it was their ordering which was transformed.

For Deliège, the most important point of convergence is the common dialogue on structure. The formation of a new system for structuring their respective arts was the centerpiece of the work of both Mallarmé and Boulez. Behind the focus on form, however, is a concern for content. Both men worked to breathe new meaning into their arts through the re-definition of structure. Deliège sums up this point as follows:

> ...the central and most tangible points in the convergence we are trying to demonstrate have the structure of the work as a reference, but... in both cases, structure was only a means, a springboard to renovate the content of the message in the most profound way possible.[36]

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[35]Ibid., p. 100. For Boulez, "phrase" means a larger structure than is usually understood by the word. This will be explored later in the thesis.

[36]Ibid., p. 103.

4 Morphology

The Series as Hierarchy

When considering the concept of twelve-tone row or series, one thinks
first of Schoenberg's notion of a precise ordering of the twelve pitch-classes.
This normative definition of series is expressed in the following quotation
from Schoenberg's essay "Composition with Twelve-Tones (I):"

> After many unsuccessful attempts during a period of
> approximately twelve years, I laid the foundations for a new
> procedure in musical construction which seemed fitted to replace
> those structural differentiations provided formerly by tonal
> harmonies.
>   I called this procedure *Method of Composing with Twelve Tones
> Which are Related Only with One Another.*
>   This method consists primarily of the constant and exclusive
> use of a set of twelve different tones. This means, of course, that
> no tone is repeated within the series and that it uses all twelve
> tones of the chromatic scale, though in a different order.[1]

This citation points out an important feature of the series: its fixed
nature, both in the ordering of the pitches and in the fact its statements are
complete: they include all twelve pitches. Despite manipulation through
transposition, inversion and retrograde, the series still retains its integrity.
Going beyond these considerations, Boulez focuses on a second order of
organization, that within the series itself. Evidence of this kind of internal
organization is found most readily in the series of the twelve-tone works of
the Second Viennese School, especially those of Webern.

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[1] Arnold Schoenberg, "Composition with Twelve Tones (I)," *Style and Idea*, trans. Leo Black, ed.
Leonard Stein. (London: Faber & Faber, 1975; reprint ed. Univ. of California Press, 1984), p. 218.

Taking this kind of internal organization as a starting point, Boulez and the later serialist composers expanded the concept of the series as a compositional tool. For Boulez, the intervallic content of the series, not the repetition of the twelve pitches in their fixed order, was the morphological basis of music. In the composition of serial music, the intervallic cell superseded the twelve-note series as the morphological unit of organization.

Another aspect of serial composition, the application of the concept of series to other musical components, such as rhythm and dynamics, also had its precedents. In this circumstance, the series becomes a controlling formula which links the different musical components--pitch, dynamics, rhythm, timbre. Starting from a seminal principle--an intervallic cell, or the organization of the series around an axis, for example--a broader sense of structure is generated that applies itself to one or more dimensions of musical materials. Boulez advanced the notion of the series as a generative process, much more general and sweeping in its scope than the fixed-order definition given above:

> The series is--in very general terms--the germ of a developing
> hierarchy based on certain psycho-physiological acoustical
> properties, and endowed with a greater or lesser selectivity, with a
> view to organizing a FINITE ensemble of creative possibilities
> connected by predominant affinities, in relation to a given
> character; this ensemble of possibilities is deduced from an initial
> series by a FUNCTIONAL generative process...[2]

This definition of series focuses on its function as a structure-creating device. The series is a collection of elements containing its own internal structure, its own morphology. This internal structure may be reflected at

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[2]Boulez, *On Music Today*, p. 35.

higher levels of organization to create an ensemble of possibilities. The

series, as understood by Boulez, begins with a principle expressed in a

pattern of pitches or durations--the psycho-physiological acoustical

properties of music. This principle is the basis for hierarchy, not only at the

fundamental level of musical morphology, but at larger structural levels,

whether local or global, controlling smaller phrases, or the entire scope of the

work. By defining this generative musical formula, the composer also

creates a framework of possibilities, within which he has a greater or lesser

flexibility in structuring the musical materials at his disposal:

> ...all that is needed to set up this hierarchy is a necessary and
> sufficient premise which will ensure the total cohesion of the
> whole and the relationships between its successive parts. This
> premise is necessary, because the ensemble of possibilities is
> *finite* when it observes a controlled hierarchy; it is sufficient
> since it excludes *all* other possibilities. If the hierarchization of
> one of the given aspects of the sound-entity is determined by this
> necessary and sufficient premise, the other phenomena are free to
> *integrate* themselves or, simply, to *co-exist* with it; in other
> words the principle is one of interaction or of interdependence of
> the various sound-components...[3]

The last sentence of this citation points the way to total serialism, the

co-ordination of the various *musical components* (referred to as psycho-

physiological acoustical properties above) in a generalized principle. The

controlling principle may or may not be uniformly applied.

Boulez's *Structures Ia* is often cited as an example where a series is

used as a single, binding principle pre-determining all of the parameters of

music. The direct correlation between pitch, duration and dynamic through

the series seems to obviate any creative role for the composer--a pointed

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[3]Ibid., p. 36.

criticism levelled against Boulez himself. In his comments on this work

within the context of his compositional development, Boulez asserts that his

aim was indeed to take serial composition to an extreme of formal rigidity,

and then, from that point, to try to formulate means of re-introducing

personal invention within the new idiom created by serialism:

> In *Structures* you can follow the process of re-introducing
> personal invention; it is very clear, though not perhaps to everyone
> because I later deliberately muddled things by not printing the
> pieces in chronological order, so as to give an anti-evolutionary
> impression of the whole. So the first piece is purely automatic; the
> second already introduces a certain regularity... Despite the
> conception of the basic material, which is still very inflexible, there
> is already that contrast, which to my mind is necessary to composi-
> tion, between the will to make something out of the material and what
> the material itself suggests to one. In short, I gradually moved from
> the point where the material suggested itself to me until the
> situation was reversed: at the end of the second piece it was in fact I
> who was suggesting to the material that we make something together.[4]

The series does not merely serve as a substitute for the tonal system,

as implied by Schoenberg's quote above, but also serves to generate motivic

material, a procedure found among the works of the Second Viennese School,

particularly those of Webern. However, the series is not necessarily limited

to a motivic/thematic role. Indeed, a duality between motivic and non-

motivic material can be exploited as a structuring device. In discussing his

Second Piano Sonata with Célestin Deliège, Boulez explains how the transfer-

ence from motivic to non-motivic organization is linked with a switch from

the pitch/interval dimension to the duration/rhythmic dimension of music:

> What attracted me in the manipulation of the twelve notes at
> that period was the idea of giving them a functional significance, a
> meaning as motifs and themes in relation to certain functions that
> they were to fulfill in the work.

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[4]Boulez, *Conversations with Célestin Deliège*, p. 56.

> This can be seen very easily in the first movement of my
> Second Sonata: series of intervals are associated with certain
> motifs and recur later; this series of notes is divided into a certain
> number of motifs which supply the material for the entire first
> movement in particular. I was also interested in a form of
> expression that would establish a contrast between a style based
> on thematic motifs and an athematic one; in other words, I think of
> the theme as an accumulation of possibilities, but at the same time
> for the development sections of this sonata movement I wanted
> gradually to dissolve the intervallic cells, to draw attention more
> to the rhythmic elaboration than to the intervals, whose function
> now is secondary. Interest should increase or diminish in relation
> to the actual structure of the motifs and of the intervals. The very
> strong sharply-outlined thematic structures of the opening
> gradually dissolve in a development that is completely amorphous
> from this point of view, until they gradually return. The whole of
> the first movement is made up of this contrast between very
> precise motifs and their dissolution into imprecise intervals.[5]

When Boulez speaks of combining the sound components, he raises the possibility of either submitting each of them to the same rigorous formula of control or giving each of them greater autonomy so that they interact more freely with each other. Because the duality of *fixed* versus *mobile* applications of the series is present throughout Boulez's musical aesthetics, it can be considered to be one of the most important concepts in his thinking.

The combination of *musical components* may vary in its degree of complexity. Certainly it is not limited to an act of simple summation of the various parts, as is made evident in the following quotation:

> This interaction or inter-dependence does not function by means of
> arithmetical addition, but as a vectorial compound, each vector having,
> from the nature of its material, its own structural properties. Thus
> there can be either a principal (or primordial) organization, with
> secondary (or supplementary) organizations, or a global organization
> which takes account of the various categories. Between these two ex-
> tremes are the various levels of predominance of certain organizations
> in relation to others, in other words, a dialectic with a vast field of
> action between liberty and obligation (between free and strict writing).[6]

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[5]Ibid., p. 40.

[6]Boulez, *On Music Today*, p. 36.

The important distinction made above between arithmetic addition
and vectorial compound points to a more complex notion of organization than
what is usually understood as serialism. The series is more than a one-to-
one correlation of pitch to duration to dynamic; it can in itself contain several
hierarchies, even levels of hierarchies, or can be combined with other,
independent series which may or may not correlate:

> ...one should not understand by "constituents" [*composantes*]
> unilateral factors (rhythm, melody, harmony) being *joined together*
> in a monstrous, unreal addition; one should understand, rather,
> vectorial constituents which, in being added together vectorially,
> lead to a result of which the direction is different, though it is
> defined by the constituents.[7]

Thus the rigidity of the serialism of *Structures Ia* (which in this light should
be understood as an historical anomaly) is countermanded. One is presented
here with a multitude of possibilities within the realm of serial organization.
Fortunately, Boulez himself has provided a road-map of series organization
in his book *On Music Today.*

The Morphological Principles of the Series

The laws presented by Boulez governing the pitch-series are based on
a set of morphological principles which apply to all of the sound components
of music. However, because the sound components vary in their functions
of musical organization, these four principles, presented on the next page, do
not all work in the same manner. Boulez first makes a distinction between

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[7]Boulez, *"Auprès et au loin...,"* *Notes of an Apprenticeship.* p. 190.

the different components of music--pitch, duration, amplitude and timbre--
in their *functional* role. The former pair have priority over the latter in
their importance, as is explained in the following quotation.

> Pitch and duration seem to me to form the basis of a compositional
> dialectic, while intensity and timbre belong to secondary categories...
> This distinction is... established according... to the strength of
> integration or coordination. Compare, for example, a succession of
> diverse timbres upon the same pitch and, conversely, a succession of
> diverse pitches linked by a single timbre, that is to say, interchange
> the two organizations so as to reverse their specific characters: uni-
> quity and multiplicity. The first case will give the impression of a
> kind of *analysis* of one component [*composante*] by another, of pitch
> by timbre; in the second case, the timbre is certainly not to be thus
> *analyzed* by the succession of different pitches, since the homogene-
> ity of timbre will impose itself beyond certain internal fluctuations.
> The uniquity of pitch *integrates* the multiplicity of timbres; the
> uniquity of timbres *coordinates* the multiplicity of pitches.[8]

Although this distinction is made in the relative importance of the
different musical components, Boulez wishes to describe each of them by
means of a similar model, a network of possibilities made up of four
principles described below:

> For each component, whatever it may be, we will try to
> establish a network of possibilities which are divisible into the
> four following categories of value and density, grouped in pairs
> 1. *Absolute value* within a defining interval, or module; each
> value will occur only once, within this module, a value being de-
> fined in relation to some unit of division of the space in question.
> 2. *Relative value*, that is to say, value considered as the
> absolute value reproduced by addition to multiplies of the module,
> from 1 to *n* times: each absolute value will have from 1 to *n*
> corresponding relative values;
> 3. *Fixed density of generation:* each original X will
> correspond to a Y of the same type and the same weight, the index
> of density being established as a fixed value between 1 and *n*;
> 4. *Mobile density of generation:* each X will correspond, by
> transformation, to a Y, of different type and weight.

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[8]Boulez, *On Music Today*, pp. 37-8. Note that the word *composante* was translated in *Notes of an
Apprenticeship* as "constituent," whereas here it is "component." Because "constituent" is later
used as a translation of the French term *formant*, I will use the word component for *composante*.

> This general definition can be explained by applying it, for
> example, to the system of pitches. Taking the pair: *absolute value*
> with the octave as module and the semitone as unit of division [and]
> *fixed density of generation*, with the index 1, the classical series
> of twelve sounds will be obtained.[9]

Following the application of these principles to pitch, twelve semi-

tones within the octave is the result of a *fixed density of generation* applied

to an *absolute value*. The octave is the defining interval or module and the

semitone is the unit of equivalence with an index of twelve. Including any

tessitura or register results in a grid of *relative values* added to the system.

Finally, if the members of the system are subjected to some

transformation--combination for example--following a regular or irregular

pattern, this will result in "a series of complexes of *mobile density*." The

system of twelve semitones to the octave (*fixed density of generation*

applied to an *absolute value*) can be organized into a series of chords by a

formula either consistent or not consistent with the generated system. These

chords represent a *mobile generation of density*; they do not consist of

equivalent units in the same way as the twelve semitones within the octave.

Further, the application of these four categories--absolute, relative,

fixed and mobile--is not limited to such defined objects as pitches. They can

also pertain to *fields* of musical components. For example, dynamics or

amplitude is one musical component which lends itself more readily to the

concept of field than to a division into fixed gradations such as with pitch or

duration. Traditionally Western music culture tends to define a change in

dynamic as a segment along the continuum of amplitude rather than passing

from one specific pre-set point of amplitude to another.

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[9]Ibid., p. 38.

The Morphology of Duration, Dynamics, Timbre and Space

Having established these four principles for the pitch component of
music, Boulez applies them to duration, timbre and dynamics. He begins
with the idea of tempo, which can be conceived as fixed or mobile. Mobile
tempo can be directed or non-directed, depending on whether it passes
between two fixed standards (resulting in *accelerando* or *ritardando*), or
whether it is undefined according to any precise measuring (i.e. *rubato*). As
well, it can pass from fixed to mobile and vice versa.

A hierarchy of tempo may be utilized in the service of establishing
form. Boulez refers to the range of tempo possibilities as the *chronometric
field.* Mobile tempi may be organized in an abstract (which I take to mean
pre-determined) hierarchy, or in an accidental hierarchy influenced by such
uncontrollable factors as acoustical properties of the hall, the qualities of the
performance, and so on. The chart below summarizes the range of
possibilities of tempo organization:

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Fixed tempo    Fixed standard
Mobile tempo   1.  Directed; from fixed standard to fixed standard
                   accelerando/ritardando and combinations thereof
                   Border-line: from fixed to non-fixed standard and vice versa
               2.  Non-directed; floating standard
                   (a) Defined chronometric field
                       abstract hierarchy
                       accidental hierarchy
                   (b) Non-defined chronometric field [10]
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[10]Ibid., p. 52.

Turning now to duration, Boulez maintains that the four principles
stated above can be equally applied to this musical component. The absolute
value can be understood in terms of a small unit (e.g. sixteenth note) which
is then multiplied or of a large unit (e.g. whole note) which is then divided.
The former method will produce a regular pulse, whereas the latter will
produce multiple pulses depending on the factor of division. In other words,
a whole note divided into three, four or five equal parts will render different
pulses whereas a sixteenth note multiplied three, four or five times will still
generate the same pulse.

The relative values of duration are multiples (or divisions) of the
absolute value. The density of generation with regard to duration is
threefold: it can be *fixed, mobile and non-evolutionary*, or *mobile and
evolutionary*. A fixed density of generation means that the multiples are
arrived at through a simple proportional relationship, i.e. 2:1, 3:1 and so on.
A series of relative durational values are all multiplied or divided by the
same factor. A mobile and non-evolutionary density of generation occurs
when a series of relative durational values is altered by adding or subtract-
ing a fixed duration to (or from) each value. A mobile and evolutionary
density of generation occurs when a series of relative values is altered by a
non-proportional and non-arithmetic factor. For instance, adding a dot to a
series of durations implies adding different durational values to each note (a
sixteenth to an eighth, a quarter to a half, and so on). Figure 2 below[11] gives
examples for each of these types of durational generation.

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[11] Ibid., p. 54.

FIGURE 2: GENERATION OF DURATIONS

	♪.	♪	♪	3	4	2	
×3	♪.♪.	♪.	♪.	9	12	6	equal proportions
÷3	♪	♪	♪	1($\frac{3}{3}$)	$\frac{4}{3}$	$\frac{2}{3}$	
−1	♪	♪.	♪	2	3	1	proportions regularly — augmented / diminished
+1	♪	♪♪	♪.	4	5	3	
adding dot	♪..	♪.	♪.	$\frac{7}{2}$	$\frac{12}{2}$	$\frac{6}{2}$	irregular proportions

The top row is the original series of relative durational values. The absolute value is the sixteenth-note and the series is expressed numerically to the right of the notated figures. The second and third rows are examples of *fixed generations of density* by multiplication and division. The fourth and fifth rows are examples of *mobile and non-evolutionary generation* by addition and subtraction. The sixth row is an example of *mobile and evolutionary generation* by adding a dot to each factor of the series. The terms non-evolutionary and evolutionary focus attention on the mutability of the mathematical procedure applied to the alteration of the relative values (or members of the durational series).

When a series of durations has been generated so that it fills in a large unit of absolute value, this is called a *block of duration*. Like the pitched series, these duration blocks can be symmetric, asymmetric or both, depending on the use of either simple or complex proportions in generating

the durational series. In order to demonstrate this point graphically, Boulez compares each type of duration block with a geometric figure.[12]

The natural corollary of this method, as with the pitched series, is the proliferation of the means used to this point in creating larger durational structures of great complexity and flexibility. In this context the duration blocks themselves can become units (fixed or mobile) of generation:

> All the methods of distribution within a duration block may be extended and applied to complexes of complexes, where each distributed element will no longer be a single value, but an ensemble; vast structures can then be formed, obeying the same principles of organization in their constitution as in their disposition. The basic elements of these complexes of complexes will be either duration blocks, described above, or else whole series or divisions of series; interaction of these various methods of organization can be extremely fertile, and will create an inexhaustible variety of objects--in the same way as in the field of pitch.[13]

When these proportional complexes include *tempo*, the result is *time bubbles*, wherein the proportions of macro-structures can be defined. These complexes would contain information relevant to all and any of the levels of organization of duration, from the single durational block to the entire work.

Boulez also presents his theories of the serial organization of duration in two articles: "Proposals"[14] and "Eventually...".[15] In the former he applies the duality of *fixity* and *mobility* to rhythm and analyzes his *Sonatina for Flute and Piano* as an example of this.[16] In the latter he describes the

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[12]Ibid., Examples 17a-g on page 56.

[13]Ibid., p. 58.

[14]Boulez, "Proposals," *Notes of an Apprenticeship*, pp. 61-71.

[15]Boulez, "Eventually...." *Notes of an Apprenticeship*, pp. 146-82.

[16]Boulez, "Proposals," pp. 67-8.

hierarchization of duration in the same terms as those found in *On Music Today*. A section of "Eventually..." is devoted to the construction of morphological cells using the techniques described above in Figure 2.[17] Following this is a discussion of the *relative values* of durations, referred to in this context as a "registration of durations."[18] The article also treats in lesser detail the serial organization of pitch and timbre.

The serial generation of durations had its origin in the works of Olivier Messiaen, particularly *Modes de valeurs et d'intensités, Neumes rythmiques*. Boulez's debt to his teacher, eloquently expressed in a tribute to Messiaen on his fiftieth birthday,[19] is clearest in the matter of rhythmic serialism. However there is some difference in the way Messiaen and Boulez approached serialized durations. This is explored by Peter F. Stacey in his text *Boulez and the Modern Concept*.[20] Boulez summarized this difference in the following quotation:

> As you know, he [Messiaen] often makes use of rhythms drawn from either Greek or Indian music, and to my way of thinking that poses a problem. It is very difficult to introduce fragments of another civilisation into a work. This is what I believe now but I also believed it then; we have to invent our own rhythmic vocabulary in accordance with our own norms.[21]

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[17]Boulez, "Eventually," pp. 157-64.

[18]Ibid., pp. 165-6.

[19]Boulez, "Olivier Messiaen," *Orientations*, pp. 404-420.

[20]Peter F. Stacey, *Boulez and the Modern Concept* (Lincoln, Nebraska: University of Nebraska Press, 1987), pp. 16-18.

[21]Boulez, *Conversations with Célestin Deliège*, p. 13.

The organization of dynamics follows the same principles for both acoustic and electronic music. Because dynamics can be controlled mechanically in electronic music its measurement is precise, whereas in acoustic music there is an implicit margin of error in how closely the performance matches the composer's written instructions. The range of organization, therefore can vary from absolute precision to a relative interpretation of dynamics. Boulez specifies two categories of organization, *point-dynamics* and *line-dynamics*. Simply put, the first term represents fixed levels of volume whereas the second depicts change in amplitude, i.e. *crescendi, descrescendi,* or various combinations of these. Another term Boulez uses for a change in amplitude is a *dynamic glissando*[22]

The interaction of amplitude with pitch and duration can be simple or complex depending on the relation between these sound components. As stated earlier, a single timbre applied to a multitude of pitches *co-ordinates* those pitches through the uniquity of its sound, whereas a single pitch applied to a multitude of timbres *integrates* them. The unifying power of a single timbre is understood at a more subliminal level in Western music than is the unifying power of a single pitch. Conversely the organization of the multitude of pitches within a single work is usually more accessible at an intellectual level than the organization of timbres.

Similarly, a single dynamic can control an ensemble of pitches. This is a relation between dynamic and pitch of simple to ensemble. If one dynamic is applied to an ensemble of pitch and duration, then the relation can be one

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[22]The concept of "glissando" is also applied to tempo (accelerando, ritardando).

of simple to an ensemble of ensembles, depending on the complexity of the organization of pitch and duration. More frequently, one will find a complex of dynamics applied to ensembles, or ensembles of ensembles.

As with dynamics, a distinction is made between acoustically produced and electronically produced timbres. The former are understood as fixed qualities which undergo limited alterations. The latter can be infinitely graded over a large spectrum of possibilities. There are two families of timbral organization, depending on the degree and quality of change of timbre. These are described in the following quotation:

> 1. *Non-evolutionary* or, at least, *of limited and homogeneous evolution* (the same timbre or same group of timbres);
> 2. *Evolutionary and non-homogeneous:*
>
> (a) Proceeding by *disjunct intervals*, so to speak (passing from one instrument to another, from one homogeneous group to another, from one non-homogeneous complex to another, where the weight of the new timbres is greater than that of the timbres common to the two; passing from an instrument to any group, from a homogeneous to a non-homogeneous group);
>
> (b) Proceeding by *conjunct intervals* (passing from one non-homogeneous complex to another, where the weight of the new timbres is less or equal to that of the timbres common to the two; passing from a timbre to a modification of the same timbre).[23]

By this terminology, Boulez links these two categories of timbral organization to the evolutionary and non-evolutionary categories of durational organization. In the present case evolutionary and non-homogeneous are interchangeable terms, as are non-evolutionary and homogeneous. Timbre is a coordinating (as opposed to integrating) element of form. As such it relates to pitch and duration, the integrating components of music, in much the same way as dynamics, as is described in the following:

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[23]Boulez, *On Music Today*, p. 65.

> Timbre has a very special role: It frequently articulates pitch and
> dynamics, at the intersection of these two dimensions; it may also
> articulate pitch and duration and, more rarely, dynamics and
> duration. As with dynamics, its relations with the other
> structures will be established not only from element to element,
> but from one element to an ensemble of elements...[24]

The final component is the index of distribution, the physical space
which the sound sources, whether acoustic instruments or loud speakers,
occupy. This is not to be confused with musical space, a different concept
dealt with later in this chapter. Boulez recognizes the potential influence of
space on the other musical components--pitch, duration, dynamics and
timbre--leading to subtle and complex relationships on the order discussed
above[25]. He proposes a two-fold organization of space: fixed and mobile.
These terms, already used for pitch, tempo and duration, are easily
transferred to space. They are also referred to as static and dynamic relief.

Mobile distribution is achieved through conjunct or disjunct
movement, a concept linked to the *overlapping* of sounds. As an example of
conjunct and disjunct movement, Boulez gives two chords, identical in pitch,
duration, dynamic and timbre, but located at different places. The second
begins after the first, which dies away to reveal the second. This is conjunct.
The sense of distance between the sound sources weakens the longer the
overlapping of sounds lasts. The sense of distance is heightened as the
overlapping time-interval is shortened. Disjunct movement occurs when a
silence separates the two chords.

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[24]Ibid., pp. 65-6.

[25]This interest in this "fifth dimension" of music continues to the present time. A recent article
co-authored by Boulez and Andrew Gerzo entitled "Computers in Music," *Scientific American* 258,
no. 4 (April, 1988), deals in part with the "spatialization" of sound.

Fixed distribution, simply refers to a state where the spacing of sound sources is permanently fixed. Fixed and mobile distributions are symmetric, partially symmetric or asymmetric in nature. Space, as a musical component, acts on the others in much the same way as do timbre and dynamics.

By defining the sound components in terms of morphological qualities, Boulez gives the universe of musical materials a structuralist clarity. The accepted notions and associations are stripped away to reveal basic forces and properties. Having reduced the materials of music to their essence, Boulez then builds *new* structures, using characteristics inherent in sound, space and time. He summarizes as follows:

> Thus the sound phenomenon is seen in a quite unaccustomed light;
> we have studied it as a true *phenomenon* whose functions are
> reciprocally enveloping and enveloped, being integrated in the
> production, organization an distribution of infinitesimal
> structures, as in the generation, coordination and disposition of
> overall structures. The extension of this method leads to equally
> radical perspectives on the concept of form.[26]

The Morphology of the Twelve-Note Pitch Series

Passing from a general understanding of the series as a hierarchy imposed on a sound-element, Boulez turns to an examination of the possible forms of hierarchy which can be applied to the twelve-note pitch series through possible internal structures. The first distinction is between symmetrical and asymmetrical structures. A series is symmetrical when it can be broken down into what he calls *isomorphic figures*. These are cells

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[26]Boulez, *On Music Today*, p. 70.

within the series which can be identified with each other through the usual processes of transposition, inversion, retrograde, and retrograde inversion.

A series is *totally symmetric* when all its elements (i.e. the 12 pitch-classes) can be organized into isomorphic figures. In this case the number of isomorphic figures would be a positive integer. Examples of *totally symmetric series* given by Boulez are those in Webern's Concerto for Nine Instruments, Opus 28 and the String Quartet, Opus 24 and Berg's *Lyric Suite.* These examples are analyzed in Appendix B, Figures 9 to 11, pages 125-6.

Partially symmetric series include isomorphic figures which may overlap within the series itself or in other forms of the series. However, unlike the completely symmetric series, these isomorphic figures do not include all twelve pitch classes. The symmetry in this kind of series may be *manifest* or *concealed.* Examples given by Boulez are from the *Lyric Suite* (*manifest partial symmetry*) and from his own *Third Piano Sonata* (*partially concealed symmetry*). These examples are analyzed in Appendix B, Figure 12, pages 127-8 and Appendix B, Figure 13, pages 129-30 respectively.

Finally, there are what Boulez calls *totally asymmetric series.* These occur where a limited number of elements is used in a series. The larger the number of elements in a series, the greater the possibility of isomorphic figures. To summarize, there are three kinds of serial structures:

- totally symmetrical
- partially symmetrical and asymmetrical
    manifest isomorphic figures
    concealed isomorphic figures
- totally asymmetrical.

The internal structure of a series has implications beyond itself. The first order of influence is in the choice of particular forms of the series (i.e. transpositions, inversions, retrogrades and their combinations). Forms of the row at certain transpositions will manifest a direct relation (i.e. intervallic identity, or invariance) with one or more isomorphic figures in the original series. These forms of the series are called *privileged* by Boulez:

> In every serial system, there is a network of series which are privileged in relation to an original series; when the original is changed, the network is changed correspondingly; each series is thus part of a privileged network, which has a certain number of identical (and no longer merely isomorphic) figures in common.[27]

In the case of a totally symmetric series, the number of privileged transpositions will equal the number of isomorphic figures in the series. Using Webern's Opus 24 as an example, Boulez observes that, besides the original series, there are three other transpositions (P-0, R-6 and RI-7)[28] which duplicate the four isomorphic figures of the original series.

In the case of partially symmetric series, each isomorphic figure will appear in as many privileged series as there are total isomorphic figures in the original series. For example, in the series for Berg's *Lyric Suite* (Figure 12), there are four isomorphic figures. Each of these figures appears four times for a total of sixteen appearances. Taking into account multiple appearances of isomorphic figures within a single series (including all four in

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[27]Ibid., p. 77.

[28]It is interesting to note that Boulez gives only the Prime and Inverted forms of these series in his example on page 78 of *On Music Today* (i.e. P-6 and I-7 instead of R-6 and RI-7). By doing this he neglects the concurrence between the retrograde forms of the series and the prime form of the exact pitch order within the isomorphic figures.

the prime form) there is a network of ten privileged forms of the series.[29]

Even an asymmetric series can produce isomorphic figures through the combination of its various non-isomorphic cells. If a series is divided into five unassociated parts, isomorphic objects can be created by multiplying the series by each of its parts. This means attaching cell "a" to itself, then to cell "b," and so on, yielding the format in Figure 3:

FIGURE 3: 'MULTIPLICATION' OF ISOMORPHIC CELLS

	a	b	c	d	e
a	aa	ab	ac	ad	ae
b	ba	bb	bc	bd	be
c	ca	cb	cc	cd	ce
d	da	db	dc	dd	de
e	ea	eb	ec	ed	ee

As can be seen from this chart, a certain symmetry pertains between various combinations of non-isomorphic objects, creating isometric ones (shown by the lines connecting them). The only "pure" asymmetric objects are those which double themselves: "aa," "bb," and so on.

Finally, with regard to symmetry in the series, Boulez introduces the concepts of *limited* and *defective* series. These terms apply to smaller units within the twelve-tone series. The notion of series is not limited to an ordering of the twelve distinct pitch-classes. Any grouping of pitches can be

[29]Boulez claims that there are thirteen series within the network: three for each isomorphic figure, and the prime. He does not take into account the appearance of more than one figure in a series (other than the prime). Granted, one could simply give the retrograde form of a series that had already been accounted for in order to reach a figure of thirteen.

treated as a series. Indeed, there can be series within series. A *limited series* is an isomorphic figure taken from a totally symmetrical series. The example given by Boulez is the four note figure from Webern's Opus 28: the B-A-C-H motive (Figure 10).

A *defective series* is achieved through applying a mechanical procedure to the original series. In Figure 4, sections of the twelve-tone series are transposed by a tritone in order to decrease the ambitus of the series from a major seventh to a perfect fourth. The ambit is noted by the stemmed intervals at the end of each form of the series depicted above. Defective series "A" transposes pitch-order numbers 4 through 9 down a tritone to achieve an ambit from D to G. Defective series "B" transposes pitch-order numbers 1, 2, 3 and 10, 11, 12 up a tritone to achieve an ambit from G# to D#.[30]

FIGURE 4: 'DEFECTIVE' SERIES

The series in its prime form, with total ambit of a major seventh (D to C#).

Defective series "A", with middle section transposed down a tritone. (Ambit D to G.)

Defective series "B", with end sections transposed up a tritone. (Ambit G# to C#.)

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[30]In the example given in the text (*On Music Today*, p. 82) the last note of defective series "B" is incorrectly transposed to B-natural instead of C-natural.

The original twelve-note series is partially symmetric based on two isomorphic figures: E♭-F-D and A-C-A♭. The first figure occurs six times, in transposition or inversion, while the second is found three times, within this single series. The defective transposition divides the series into two 6-note chords consisting of the middle six pitches versus the two groups of three pitches which begin and end the series. The latter two groups are manifestations of the first isomorphic figure. The defective transposition achieves a reduction in the total pitch space (from a major seventh to a perfect fourth), allowing the repetition (and thus emphasis) of certain pitches, and maintains the integrity of the isomorphic figures of the original series.

The use of limited and defective series interrupts the continuity of the series while keeping its isomorphic structure. The composer can exploit certain qualities of the series, or simply emphasize a certain range of the chromatic scale, as in the case above. It should be emphasized that the series, in its original form and in its derivatives, follows a formula which creates limits and restraints on the musical material. The creation of boundaries is one of the main purposes of the series:

> In concluding this theoretical study of the series, however, I
> must stress one very important point: the series is not an
> arbitrary generative element, since it is based on definite and
> important properties of an ensemble of sounds. As soon as one
> series is chosen in preference to another, by virtue of its more or
> less selective capacities for musical organization, the entity
> defined by the original series likewise precludes the arbitrary,
> since all inferences from it are necessarily linked to a selection
> based on the realities of sound. Neither will the composer himself
> make arbitrary use of the individual series in the resultant
> ensemble: he makes a choice, a fresh selection, from among those
> series presenting a greater or lesser number of outstanding
> properties or common relationships.[31]

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[31] Boulez, *On Music Today*, pp. 82-3.

The Concept of Musical Space

The previous section dealt with space as the index of distribution of
sound sources; in other words, geometric space was considered a musical
component on the same order as pitch, duration, amplitude and timbre. The
concept of *musical space* is of a different order. Whereas the musical
components discussed above are perceptual phenomena, the musical space is
that which they occupy. It can be compared to Suzanne Langer's concept of
virtual time in music. To Langer virtual time is analogous to virtual space in
the plastic arts:

> Music unfolds in a virtual time created by sound, a dynamic
> flow given directly and, as a rule, purely to the ear. This virtual
> time, which is an image not of clock-time, but of lived time, is the
> primary illusion of music. In it melodies move and harmonies
> grow and rhythms prevail, with the logic of an organic living
> structure. Virtual time is to music what virtual space is to plastic
> art: its very stuff, organized by the tonal forms that create it.[32]

Unlike Langer's virtual time, Boulez's musical space is part of the
structurable phenomena of music. It is real, not illusory. One might describe
it as the negative, passive element of music, opposed to its positive, active
element. Musical space is also applied to the sound components, and thus
has its own morphology. The traditional view of musical space is fixed,
proportional, absolute. Boulez challenges us to view musical space in a new
way, as something potentially variable, flexible and irrational:

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[32]Suzanne Langer, *Problems of Art*, (New York: Scribner's Sons, 1957), p. 41.

> It seems to me that one of the most urgent objectives of present-day
> musical thought is the conception and realization of a *relativity* of
> the various musical spaces in use. Western civilization has
> brought polyphony to a high degree of perfection; to this end, a
> simplification, a 'standardization' of intervals respecting general
> 'norms' has been imposed. However, the time has obviously come to
> explore variable spaces, spaces of mobile definition capable of
> evolving (by mutation or progressive transformation) during the
> course of a work.[33]

Musical space works on several levels, from the morphological to the

syntactical to that of overall structure:

> On the one hand this variability of musical space is associated
> with the complexity and density of the internal structure, the
> interlinking, distribution or superposition of the sound
> phenomena [syntactical level]... It is associated, on the other hand,
> with the general tempo governing the pace at which the structures
> are expounded [global level]... Finally it is associated with the
> proportional relationships between intervals [morphological
> level]... (These remarks are valid for all organizations: duration,
> dynamics and timbres, as well as pitch.)[34]

The variability of musical space obviates the concept of a continuum.

Space can be understood in terms of continuity and discontinuity, depending

on whether it is divided by equal, proportional intervals or unequal,

irregular intervals. As space is partitioned into smaller, regular units, the

perception of a smooth continuum is possible:

> The continuum is manifested by the possibility of *partitioning*
> space according to certain laws; the dialectic between continuity
> and discontinuity thus involves the concept of partition; I will go
> so far as to say the continuum *is* this possibility, for it contains
> both the continuous and the discontinuous; partition, in fact,
> simply changes the aspect of the continuum.[35]

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[33]Boulez, *On Music Today*, pp. 83-4.

[34]Ibid., p. 84.

[35]Ibid., p. 85.

To illustrate these concepts, Boulez gives the example of temperament, and the division of a standard interval (i.e. the octave) into fixed units. A regular division of the frequency-space results in a repeated, ordered partition, whereas an irregular division yields a freer, unordered partition of the frequency-space. A regular division will *striate* the space, that is, mark it with perceivable points of reference. With an irregular, unordered division, the effect will be that of a *smooth* space, in which the ear cannot differentiate points of reference, or even perceive the unit intervals.

The way in which smooth or striated space is partitioned determines what Boulez calls its micro-structural properties. In other words, the qualities of smooth or striated space are morphological in nature. The distinction between smooth and striated space can become blurred if, for example, a smooth space contains a fairly large number of equal or regular intervals. In this case the smooth space can be perceived as partially striated. In fact, as with other pairings of opposites discussed above. Boulez presents the duality of smooth versus striated as two extremes on a spectrum of possibilities. A work can encompass both extremes, as well as any of the innumerable possibilities that lie between them.

The module, or large-scale interval, which defines the space, and by which the smaller units are also defined is called the *focus* by Boulez. It is also variable. In the realm of pitch, the focus determining the frequency-space has always been based on the proportion 2:1, in other words, the octave. The early serialists, though they re-organized the intervening space, merely accepted this traditional focus without considering other possibilities. Avoiding the octave as a predominating interval (a practice advocated by

Schoenberg) is achieved if the octave is *not* the focus of frequency-space. The octave is automatically be to excluded as a possibility in the frequency-space if a smaller interval is used as the focus. This discussion of module (or focus) leads to the dual concepts of *straight* and *curved* space.

Straight space is the proportional division of the continuum by any pre-determined interval up to an octave. This fixed interval is extended through the frequency spectrum to give registral equivalence. In *curved* space the focus varies, regularly or irregularly. Regular variation of the focus produces a *focalized* curved space, while irregular variation produces a *non-focalized* curved space. In focalized space, the placement of the focus will cause that space to be partially symmetric, totally symmetric or unidirectional. When the focus is located between the extremes of the defined spectrum the result is partial symmetry, when at the center, it is total symmetry, and when at either extreme, it is unidirectionality.

Whether the focus is variable or not, its partition into units--the density of generation--may be fixed or variable. A fixed generation produces *regular space*, while a mobile generation produces *irregular space*. These four terms--straight, curved, regular, irregular--apply specifically to *striated* space. Being results of unifying mathematical processes, they would not have any real affect on *smooth* space. However, it can be said that they link striated and smooth space by presenting progressive stages between these two concepts. The most ordered space is straight, regular, striated space, then follows curved, regular space, and so on.

Smooth space, not being as precisely organized as striated space, is described in more general terms. If there is a fairly equal distribution of

intervals in a smooth space so that there is no possible reference to any imagined focus, then this smooth space is non-directed. A smooth space can have some pseudo-focuses because of the irregular distribution of intervals causing the appearances of denser constricted areas within the total spectrum. All the possibilities are summarized in the following chart:

I. *Homogeneous spaces* (i.e. either striated or smooth)
    A. Striated spaces: 1. Defined partition, fixed or variable:
                     a) Fixed module: straight spaces
                     b) Variable module: curved spaces
              2. Fixed or variable module (focus):
                     a) Fixed defined partition: regular spaces
                     b) Variable defined partition: irregular spaces
             Focalized: One focus/several focuses
             Non-focalized
    B. Smooth spaces: Undefined partition; no module (focus)
                     Distribution of intervals:
                         Equal: non-directed space
                         Unequal: directed space—pseudo-focus(es)
II. *Non-homogeneous spaces*
    Combination of smooth and striated spaces: Alternation/Superposition[36]

The Musical Space of Duration, Timbre, Amplitude and Space

In defining the various attributes of musical space, Boulez uses the pitch sound component for his examples. The same terminology of musical space used for the musical component of pitch is now applied to the realm of duration. He presents two categories of musical time: *pulsed time* and *amorphous time*. The correspondences between pulsed time and striated space, and amorphous time and smooth space are made apparent in the following quotation:

_____

[36]Ibid., pp. 87-88.

> In *pulsed* time, the structures of duration will be related to chrono-
> metric time as landmarks, or, one might say, systematically placed
> regular or irregular beacons; these constitute a pulsation, either of
> the smallest unit (the smallest common multiple of all the values
> used), or of a simple multiple of this (two or three times its value)...
> *Amorphous* time is only related to chronometric time in a global
> sense; durations, whether with defined proportions (not values) or
> having no indication of proportion, appear in a field of time.[37]

As with pitched space, time may be either *homogeneous* (i.e. exclusively pulsed or amorphous), or *non-homogeneous* (alternating between pulsed and amorphous, or the superimposition of pulsed and amorphous times).

Pulsation is to duration what temperament is to pitch: the regular partition which results in striated space. Thus pulsed time is striated time. As with striated space, striated time may be regular or irregular, fixed or variable. Concepts of speed, acceleration and deceleration are relevant only to pulsed time. As the manifestation of smooth space in duration, amorphous time can be differentiated only in terms of its relative statistical density.

The realm of duration contains an additional element which further complicates it. This additional element--tempo--was treated separately in the study of the morphological qualities of duration. Tempo imposes itself on durational space as another qualifier, another element to factor in to the equation. Boulez recognizes tempo as one of two such elements, the other being electronic procedures. The intervention of electronic means is a relatively fixed process, while the intervention of tempo, being in the realm of control of the interpreter, is relatively variable.

Further, the terminology of musical space may be applied to duration: *straight time* is a partitioning of durational space which has a fixed module,

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[37]Ibid., p. 88.

or focus, though the partitioning (i.e. the pulsation which divides the focus into intervals of time) may vary. *Curved time* involves a changing module. *Regular time* occurs where the partition remains fixed, while *irregular time* is defined by a changing partition. Curved or irregular time can be focalized or non-focalized depending on whether the focus is varied regularly or irregularly.

Smooth time, like smooth space, has no apparent module or partition, and is thus not accessible to aural comprehension except by chance. When smooth space has a momentarily regular division, it is deemed to be *directional;* otherwise it is *non-directional.* The difference between smooth and striated time is the fundamental dichotomy of time in music:

> ...in smooth time, time is filled without counting; in striated time, time
> is filled by counting. These two relationships seem to me of prime
> importance in the theoretical and practical evaluation of temporal
> structures; they are the fundamental laws of time in music.[38]

The concepts of continuum and partition are not so easily applicable to timbre, amplitude and geometric space. In the case of timbre, the traditional view does not uphold the idea of continuum. The different instrumental timbres are understood as distinct, fixed nodes--points on a scale which is not calibrated as are pitch and duration. The problem of dynamics is the exact opposite: it is traditionally perceived as a continuum whose surface is broken by reference points only in a relatively imprecise manner.

The normative conception of timbre is of partition without continuum and that of dynamics is of continuum without partition. Because in each case one of the two concepts vital to Boulez's theorem of musical space is under-

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[38]Ibid., p. 94.

developed (continuum in timbre, partition in dynamics), a morphological

analysis of these two musical components will be less precise than for pitch

and duration. This reflects the division of these musical components into

two groups of differing priority, as discussed above. Boulez also notes that

timbre is a complex phenomenon, combining elements of pitch, duration and

amplitude, and that this complexity is not addressed in instrumental timbre.

Taking these limitations into account, Boulez proposes the following

organizations of timbre and dynamics:

> Concerning timbre, the module can be a given succession of
> timbres or groups of timbres, forming a period; by analogy, the
> partition will be each element or group of elements of which this
> period is constituted; the focus will thus be defined as a single
> family, composed of similar timbres. With the help of this
> adaptation, the broad categories of striated and smooth space are
> applicable to timbre... With regard to amplitude, a simple
> dimension, the table can remain unaltered, but, as already
> indicated, everything will take place in a restricted ambit...[39]

Boulez suggests that the organization of space would be defined, like

timbre, as groupings of instruments, the distances between groups, and so

on. He also deals with the timbral, dynamic and spatial possibilities of

electronic music. Due to its flexibility, electronic music allows a broader,

more detailed calibration of musical space applied to timbre, amplitude and

physical space.

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[39]Ibid., p. 96.

5 Syntax

Unified Versus Differentiated Structure

In addressing the issue of musical syntax, the next, higher level of organization above morphology, Boulez first poses a fundamental question: Can a single series control all components of a work of music? Recalling the fact that the serial structures of different musical components are combined in a work to form a vectorial (not an additive) complex,[1] he proposes two possibilities of vectorial organization. A principal organization with secondary organizations is referred to as *differentiated* whereas a global organization is referred described as *unified.* These two kinds of organization are used in varying degrees to control all aspects of the music.

The weakness of a unified organization is that it is too mechanical. The uniformity of organization which results is contrary to the spirit of diversity and experimentation which so strongly colored the post-War epoch. Indeed, the tendency of Schoenberg and his followers to structure their twelve-tone works around a single series is seen by Boulez as a great limitation placed on their creative abilities. This procedure, raised to the level of a tacit law, is called by Boulez the *uniquity of the basic series.*

Although Webern adhered to this principle, he surmounted it by concentrating on the special characteristics (or *isomorphic figures*) within

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[1]Discussed on pages 42-3 of Chapter 4.

the basic series. This enabled him to expand the use of the series through the manipulation of these motivic cells. The example given by Boulez is Webern's *Second Cantata:*

> Webern, the proportions of whose works were always somewhat limited, obeyed the same law: the uniquity of the basic series. Nevertheless, as his *Second Cantata* so strikingly demonstrates, he strove more and more to base each section of a work on specific characteristics, to the exclusion of all other possibilities contained in the series. His selective organization of *limited serial ensembles* depends on true serial functions, that is to say, on privileged regions and the relationships consequent upon them; this selection is also based on the linking functions of privileged regions found at the extremes of the series.[2]

Berg broke away from the tyranny of the basic series by using multiple series in such works as *Wozzeck*, the *Lyric Suite*, and *Lulu:*

> Berg, for his part, clearly understood the advantages of not limiting himself to the use of a single series, even though its various forms might be selected and grouped into limited ensembles... In the third movement of the *Lyric Suite*, the series of the first movement acquires a different personality by means of an exchange within the order of the notes; this personality is again transformed in the fifth movement, as a result of two additional exchanges.[3]

It should be noted here that, although Berg used more than one series in each of these works, the series are related morphologically to each other.

The concept of the uniquity of the basic series becomes even more untenable when considering the possibility of serial complexes embracing more than one musical component. Boulez emphasizes the fact that such a global organization is not something which can be perceived by the listener:

> Taking into account the true complexity of perception, one cannot say that a single organization will respond better to its needs than multiple organizations; this single organization will, perhaps, be a

[2]Boulez, *On Music Today*, p. 100.

[3]Ibid., pp. 100-1.

> more intellectually attractive hypothesis, although tastes vary, but
> it would be vain to justify it otherwise.[4]

Boulez summarizes the various kinds of syntactic organization of the

composers of the Second Viennese School as follows:

> --Uniquity of the serial hierarchy; fixed typology and character-
> ology (Schoenberg).
> --Uniquity of the series; selectivity due to the internal structural
> characteristics (Webern).
> --(One or more) multiform series of varying typology and charac-
> terology (Berg).[5]

The word *selectivity* in the second category of syntactic organization

refers to the special qualities of the series which Webern exploited above

others. This selectivity becomes, in itself, an organizing factor, linking the

privileged elements of the series. In this case the series itself can be thought

of as a mediating level of organization between these sub-sets and the larger

structures in Webern's music. The third category of syntactic organization of

series (Berg) invites more complex relations. The multiple series will have

different internal organizations. However they will be linked through

structural parallelisms--overlapping of sections, or similarities in intervallic

content, and so on. Whereas Schoenberg maintains the integrity of the single

series as the basis for syntactic organization, Webern *divides* it, looking

within for syntactic material, while Berg *multiplies* it, using different series

which are, to a greater or lesser extent, linked structurally.

Having examined unified organization, Boulez turns to the differen-

tiated syntactic organization, which he calls *global and local structuration.*

The reappearance of the word *global* in this phrase may lead to some

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[4]Ibid., pp. 102-3.

[5]Ibid., p. 103.

confusion because of its previous use in reference to unified organization. In fact, the phrase *global and local structuration* is another way of saying *principal and secondary organization,* the phrase first used to designate what is referred to here as differentiated organization. It simply implies that the musical components are linked not through one basic series as was the case in unified organization, but through the use of different (albeit usually morphologically related) series.

Within the differentiated plan, the three types of serial organization outlined above may be applied to the relationships between the various musical components. The role of a single basic series, or *referential hierarchy,* is at the morphological level in giving the musical components structure. However, once that role is accomplished, the same basic series should not be used at the syntactic level. The structuring of the components through the basic series results in objects which themselves are building blocks for the next level of organization. That syntactic level should allow the composer greater freedom of selection among the morphological objects created by the series:

> ...this basic series will enable us to formulate objects, which, in their turn, can be the basis of serial generation. Thus, to each original object will correspond a specific development organized according to its own intrinsic qualities... This 'deployment' of local structures has supplanted thematic development, and hence is of supreme importance. It is a question of practising a selective operation, concerning only the one structure directly involved. Thus, a specific development, organically linked to the larger basic structure, is continually being created. In this way, a justified freedom is achieved, the essential decisions being left to the momentary initiative of the composer. His imagination is free to work on the concrete object which arises in the course of composition, and to do this in terms of the object itself.[6]

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[6]Ibid., pp. 104-5.

The creation of *objects* or *constituted elements* involves the

interaction of the musical components at a lower (i.e. morphological) level of

organization. However, the more complete the interaction, and the greater

the number of components involved, the more complex the resulting

structure will be. Boulez uses as an analogy the geometric axiom that a point

is the intersection of two lines, a line is the intersection of two planes and a

plane the intersection of two volumes. Conversely, a volume contains an

infinite number of planes, a plane an infinite number of lines, and so on. He

uses this analogy to describe the difference between *strict* and *free*

composition. At one extreme (strict writing), all the components converge on

one point of identification; at the other (free writing) there is no

correspondence at all between the various sound components:

> When a structure coincides with all others at a given point, this
> point is *unique* and thus *binding;* the more the field of encounter
> is enlarged, the more numerous the possibilities and the more
> various the solutions: by means of this expedient the polyvalency
> of the structures can be re-established. More explicitly, if at each
> point all the components are renewed, we will obtain only *binding*
> and absolutely defined points: this is the extreme of strict
> writing... A progressive loosening of the vice-like grip of strict
> writing will finally lead to complete freedom--freedom, of course,
> within general structural principles.[7]

The duality of strictness versus freedom is the crux of Boulez's

compositional thinking. Only one aspect of it is touched upon here, within

the context of syntactic organization. However, Boulez does point out that

these two seeming opposites eventually lead to the same aesthetic of

probability. One could say that the dichotomy exists not between strictness

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[7]Ibid., pp. 105-6.

and freedom, but between measured control. balanced in the middle of the spectrum, and the two extremes epitomized by strictness and freedom. It is the difference between *inadvertence* and *automatism* at either extreme and *choice* in the middle. Either of the two extremes results in the abdication of control of the musical materials. The dichotomy of strictness and freedom, understood within this context, is described as follows:

> Let it be clear that rigor and automatism in the meeting of
> structures lead to the same aesthetic result as freedom and choice.
> This leads us directly to the use of polyvalent forms and to the
> intervention of probability... it is mentioned here in order to show
> that it is based in morphology itself and therefore is not an alien
> property that is grafted on along the way... The play of structures
> implicitly suggests a scale of relationships going from the chance
> of automatism to the chance of choice...[8]

This same dichotomy of strict versus free composition has already been cited above in Boulez's discussion of the hierarchization of the pitched series (see page 40). This fundamental principle remains true whether speaking of the morphological or the syntactic level of musical organization.

Criteria of Definition and Selection

In the introduction to his chapter on musical syntax, Boulez establishes that this level of musical organization deals with the *extrinsic* qualities of the series, whereas musical morphology deals with its *intrinsic* qualities. There are two kinds of extrinsic qualities which can be applied to the series in order to create syntactic structures:

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[8]Ibid., p. 106. Not included in this quotation is a reference to a chapter "devoted to aesthetics and poetics" in which the problem of probability is discussed. Although that chapter of *On Music Today* was never written. the article "Aléa" in *Notes of an Apprenticeship* fulfills its function.

> ...It should be noted that series are organized between themselves
> according to their extrinsic characters; these are of two sorts,
> depending on criteria which we call criteria of definition or of
> selection, and criteria of combination or of arrangement.[9]

By his use of a double term, Boulez seeks to point out that the process referred to here has two stages: one of definition and one of selection. The structural units are first defined and selected, raising them above the level of morphology. The process is completed through the combination and arrangements of these units at the syntactic level.

The poles within which the criteria of definition and selection may fall are the same as those applied to the morphological level of musical organization: repose or fixity versus mobility or change. Recall that, of the four principles of morphological organization (see page 45), two were *fixed* and *mobile* densities of generation. Thus it can be seen that the same principles of organization used to define the range of possibilities for each of the musical components at the morphological level are also applied to the *constituted elements* formed from the musical components at the syntactic level. The role of absolute and relative values (the two remaining structural principles) at the syntactic level is discussed below.

The morphological units--referred to in this context as *elementary organisms*--may be uniformly fixed or mobile (i.e. homogeneous), or a combination of both types (i.e. non-homogeneous). Similarly the syntactic units may be homogeneous or non-homogeneous. Furthermore, the combination of homogeneous and non-homogeneous organizations at both the morphological and syntactic level is possible.

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[9]Ibid., p. 99

If a morphological unit (or *elementary organism*) is fixed, and the criterion of selection applied to it at the syntactic level is also fixed, then the result is a homogeneous organization at both levels. Similarly a fixed criterion of selection used to group a series of fixed morphological phenomena together also yields a homogeneous organization. However, when both fixed and mobile qualities are present at either or both levels, the result is a non-homogeneous organization:

> Fixity or change play their part in the various stages of morphology or of syntax, and are not obligatorily homogeneous... The criteria of selection are first applied to an elementary organism, or to a specific ensemble of elementary organisms already constituted; but they can be applied equally well to the very functions of constitution. In the first case, the selection groups together constituted organisms of the same nature and is therefore homogeneous--even more so when it only applies to a single organism; this will not be the case when the functions of constitution are governed by fixity or change, because fixity and change can be made to concern different functions: the selection will be non-homogeneous, in other words, half fixed and half mobile.[10]

By including a transposition of the original series in the creation of chords, the composer enlarges the *field of fixity*, giving himself wider choice of materials while still maintaining a fairly rigid parameter. The *field of fixity*--in some ways analogous to *musical space* at the morphological level-- has a possible range from the extremity of complete fixedness (for example, strict repetition of the basic form of the series), to complete openness. In the latter situation, the boundaries of the field are expanded beyond any perceivable limitations, and the field is, in a sense, no longer a field.

Between these two extremes the field will range from a fixed to a mobile criterion of selection. Variety in the former will be created by
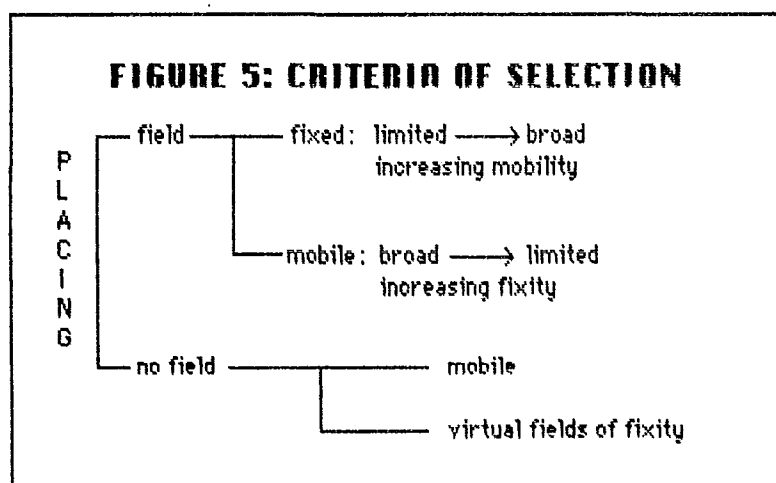
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[10]Ibid., p. 107

introducing greater degrees of mobility, and in the latter by greater degrees
of fixity. The various kinds of fields are described in the quotation below. A
larger field of fixity introduces new factors of selection at the syntactic level.

> Clearly, the larger the field of fixity, the greater the mobility,
> since the possibility of permutating selected elements will in-
> crease. The field can also be conceived as mobile: selection within
> it will be mobile, but it can, however, tend towards to fixity...
> Finally, in the extreme case of mobility, there will be no field at
> all, and the the choice will fall indiscriminately on this or that
> structure; only variations in the frequency of the return of given
> elements will occur, and these will create virtual fields of fixity.[11]

Figure 5 below[12] graphically represents the various possibilities in the
selection of fields. Where there is a perceptible field, it may be fixed or
mobile. A fixed field will tend to expand from limited elements to broader
elements; a mobile field will tend to do the reverse. The result in the former
case is increasing mobility; in the latter it is increasing fixity.

FIGURE 5: CRITERIA OF SELECTION

PLACING

field — fixed: limited ——> broad
increasing mobility

mobile: broad ——> limited
increasing fixity

no field ————— mobile

virtual fields of fixity

[11]Ibid., p. 108.

[12]Figure 5 is derived from Table 1 on page 109 of *On Music Today*.

The term *placing,* a translation of *mise en place,* refers to the application of fixed or mobile criteria of selection to one or more morphological units. The term *no field* represents ultimate mobility, where the lack of structural limits results in the non-perception of a field. Boulez notes that these criteria can also work at higher levels of organization:

> These observations apply to the internal structure of the series, but the criteria of selection may apply equally well to the presentation, or external structure; they will determine to speak, the *modes of description* of a series.[13]

The categorization of the criteria of selection at both the morphological and syntactic levels is necessarily more complex. This may involve multiple techniques of organization applied to several musical components. Boulez distinguishes between the operations of the criteria of selection at a simpler level (i.e. the morphological, or internal) and more complex levels (i.e. syntactic, or external) by calling the application of these criteria *placing* in the first instance and *production* in the second. The categorization of the production at both internal and external levels is given below in Figure 6.[14]

In the following quotation Boulez distinguishes between these two functions while demonstrating how they cover the entire range of structural possibilities between the extremes of fixity and mobility:
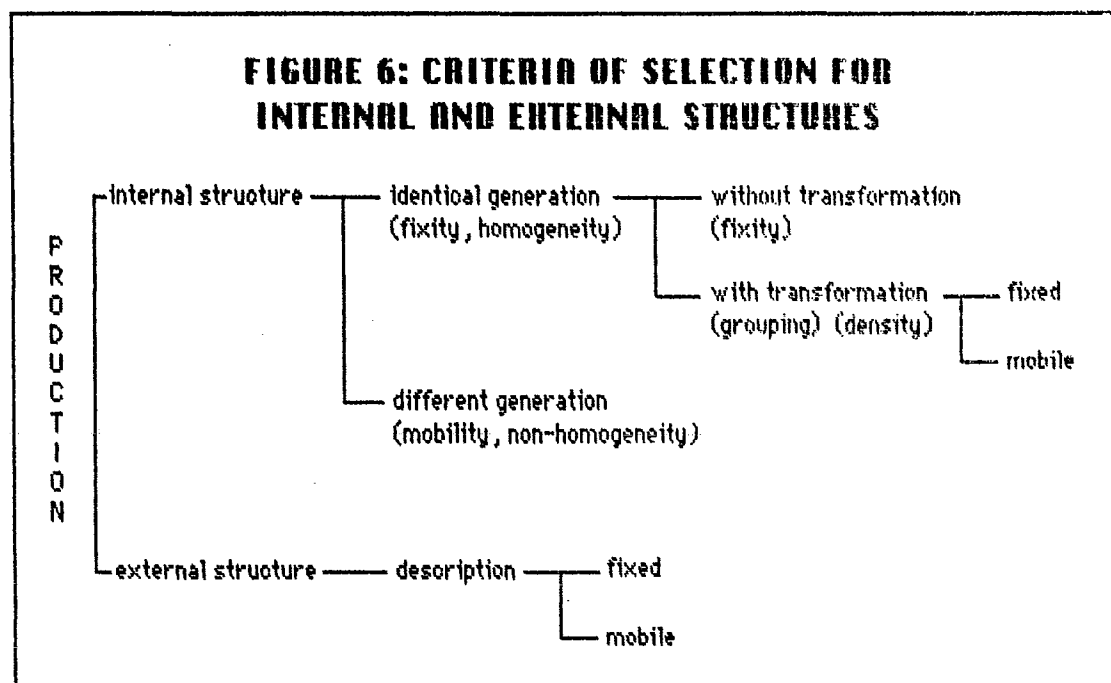
> Each table [i.e. Figures 5 and 6] represents a clearly deter-
> mined function: the *placing* operates on constituted ensembles,
> and indicates their order of employment, independently of the
> characteristics of the series itself or of its derivatives; the
> *production,* on the other hand, concerns their internal and
> external structure. These two sets of operations define all the
> trajectories which lead from fixity to mobility. A study of this

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[13]Ibid., p. 109.

[14]Figure 6 is a reproduction of Table 2 on page 110 of *On Music Today.*

table will show that they are innumerable; the imagination is almost at a loss, and finds it difficult to take in all the possibilities offered by this aspect of serial structure--possibilities which the imagination must nevertheless learn to control.[15]

FIGURE 6: CRITERIA OF SELECTION FOR INTERNAL AND EXTERNAL STRUCTURES

```
P      ┌─internal structure ──── identical generation ──┬── without transformation
R      │                         (fixity, homogeneity)  │   (fixity)
O      │                                                 │
D      │                                                 └── with transformation ──── fixed
U      │                                                     (grouping) (density)   │
C      │                                                                            └── mobile
T      │                         ┌── different generation
I      │                         └── (mobility, non-homogeneity)
O      │
N      └─external structure ──── description ──┬── fixed
                                               └── mobile
```

An analogy can be made between the terms *definition* and *selection* used to describe the qualities of syntactic structuring, and the two terms: *placing* and *production*. Definition and placing concern the internal structure of the series, whereas selection and production concern the internal *and* external qualities of the series. The example that Boulez supplies of syntactic organization is analyzed in Appendix B, Figure 14, pages 131-5.

Returning now to the application of the four principles of organization at the syntactic level, the factors of absolute and relative values are now added in to Boulez's chart of the criteria of definition and selection. The field of possibilities between fixity and mobility is enriched by factoring in

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[15]Ibid., pp. 110-11.

relative values, for example *tessitura* in the realm of pitch. Two new terms

are introduced here—*index of fixity* and *field of fixity*—explained below:

> The *index of fixity* is the ratio between the number of fixed frequen-
> cies (i.e. *fixed density of generation*) and that of mobile or semi-
> mobile frequencies (i.e. *mobile density of generation*)... The field of
> fixity may be explained thus: when the fixity is concerned with the
> same absolute pitches (or values) (whatever the index), the field will
> be null; it will be enlarged progressively as fixity is displaced and
> attains a greater number of absolute pitches (values) different from
> those preceding it; the field will be extended to its maximum when
> the displacement of fixity *paralyses*' entirely new elements.[16]

Fixed frequencies are pitches that are fixed at a specific register or

tessitura. Conversely *mobile frequencies* are pitches that change register

from one appearance to the next. It is unclear what "semi-mobile"

frequencies may be, however this term may apply to other musical

components than pitch. The greater the occurrence of mobile frequencies,

the larger the field of fixity becomes. I understand the word *paralyses* to

mean "renders powerless." I believe his statement on the maximum

displacement of fixity refers to the fact that when an extreme of range is

introduced in music, the ear can no longer distinguish differences in pitch.

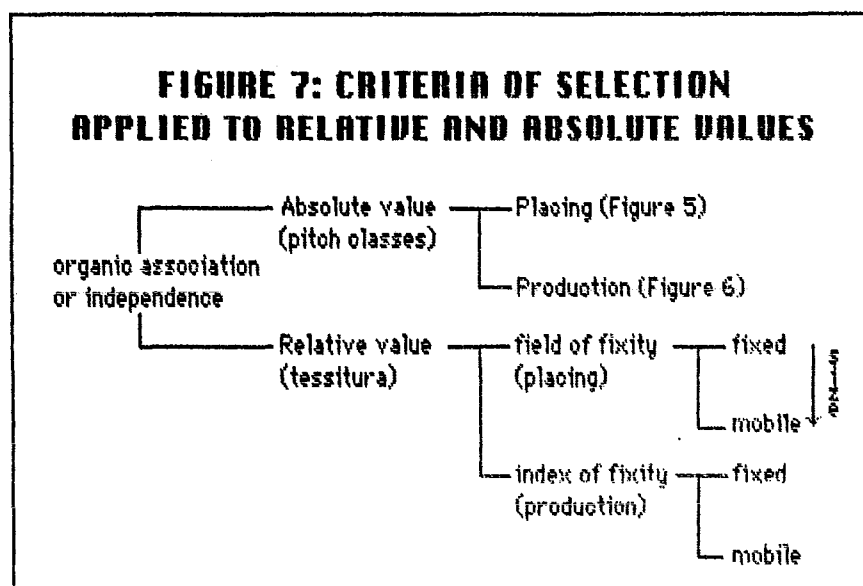Therefore, new pitches introduced will not necessarily be heard as such.

Finally, the organization of relative values may or may not be directly

linked to that of absolute values. When linked, *tessitura* has an *organic*

relationship to absolute pitch; when independent it tends to contradict or

erase the serial functions applied to absolute pitch. Figure 7 below[17]

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[16]Ibid., p. 111. The example to which these concepts are applied in this quotation is the realm of
pitch. Therefore references made to this specific musical component (i.e. 'frequencies' and 'pitches')
are followed by the more general term used earlier in describing the four principles of organization
at the morphological level.

[17]Figure 7 is derived from Table 3 on p. 111 of *On Music Today.*

summarizes the relationship between the relative and absolute values of a
musical component applied at the syntactic level of organization. The
syntactic organization of relative values in Boulez's musical example is
analyzed in Appendix B, Figure 15, pages 136-39.

FIGURE 7: CRITERIA OF SELECTION APPLIED TO RELATIVE AND ABSOLUTE VALUES

organic association or independence
— Absolute value (pitch classes) —
  — Placing (Figure 5)
  — Production (Figure 6)
— Relative value (tessitura) —
  — field of fixity (placing) —
    — fixed
    — mobile
  — index of fixity (production) —
    — fixed
    — mobile

Criteria of Combination and Arrangement

The second grouping of criteria is that of combination and arrange-
ment, which Boulez calls the "syntactic organization of the language."[18]
These are the criteria for grouping together the structural objects that have
been defined and selected for the creation of syntactic structures. These
syntactic structures are typically known as monody, polyphony, homophony
and heterophony. It should be emphasized that these terms are not limited
to their predetermined meanings, but are to be understood in terms of the

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[18]Ibid., p. 115.

categories created by Boulez's criteria of combination and selection.

Two properties associated with the criteria of combination and arrangement are called *horizontal/diagonal/vertical,* and *individual/ collective.* These properties are applied to syntactic constructs rather than more simple morphological elements. The resulting syntactic structures may be simple levels of monody or polyphony, or they may be complexes involving polyphonies of polyphonies, etc. The two properties of the criteria of combination are described in the following quotation:

> First, we will consider the *dimension* in which the events are produced. This dimension evolves from the horizontal to the vertical, with an intermediary, diagonal stage... Secondly, this classification will be founded on the *individual* or *collective* application of the structures. Using these two terms, all the combinatory phenomena of composition can be classified, on the level of elementary structures.[19]

Combining the horizontal with the individual yields monody while combining the horizontal with the collective yields homophony. Simple melody, or monody, is the horizontal unfolding of an individual syntactic structure. Homophony is an extension of monody. Boulez describes it as "the direct transformation-by-density of monody."[20] In its most simple state homophony exists as a succession of vertical simultaneities. There are a multitude of variations on this structure, such as arpeggiation of the lower voices, rhythmic variation, and so on. The more independent the lower voices become the more homophony resembles polyphony. In Boulez's definition, homophony is not simply harmony, but has its own inherent

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[19]Ibid., p. 116.

[20]Ibid.

structure, which may be fixed or variable.

When discussing the nature of polyphony, Boulez deals with two aspects: the *arrangement* and *distribution* of syntactic structures. He defines polyphony as follows:

> ...the concept of polyphony is distinguished... by the *responsibility* which it implies from one structure to another. Polyphony is based, in my opinion, on a fitting together of structures, which amounts to the use of 'counterpoint' and 'harmony,' provided that the sense generally implied by these words is extended; or again, on a distribution such as can be related neither to harmony nor to counterpoint.[21]

To understand this point one must distinguish between *free* and *strict counterpoint* (the horizontal dimension of polyphony). The former need only "comply with certain general norms"[22] dictated by the elements common to the collective syntactic structures. It is a case of the individual structure relating to the collective structures. In strict counterpoint, there will be more exact correspondences between an initial structure and those which follow. This is what Boulez means by the "responsibility" of counterpoint. The relationship will be between individual structures, or families of structures. In the vertical dimension, Boulez distinguishes between functional and non-functional harmony, and defines these vertical groupings by their relation to the series:

> If it depends directly on the figures implied by the series, harmony will be functional and will embrace the collectivity of vertical relationship; when it is not functional and is subject to such accidents as grouping, each relationship or group of relationships will obey individual criteria.[23]

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[21] Ibid., p. 118.

[22] Ibid.

[23] Ibid.

Functional harmonies are those vertical collections that relate to the morphological qualities of the series, while non-functional harmonies are those which appear "accidentally" or else have an independent organization. The dimension of polyphony is *diagonal.* Syntactic structures may themselves be vertical and horizontal, but in polyphony, they may relate to each other obliquely, creating the so-called diagonal dimension. Figure 8 below[24] gives a summary of the various syntactic structures as defined by the criteria of combination and arrangement.

FIGURE 8: CRITERIA OF COMBINATION AND ARRANGEMENT		
monody	horizontal	individual
homophony	horizontal	collective

polyphony
(a) arrangement
    free counterpoint
    strict counterpoint
 	
    functional harmony
    non-functional harm.
 	
(b) distribution
	
	horizontal
	horizontal
	
	vertical
	vertical
	
	diagonal
		
		individual ⟶ collective
		individual ⟷ individual
		
		collective
		individual
		
		individual/collective ⟶ individual/collective

heterophony	horizontal ↓ diagonal ↓ vertical	collective ⟵ individual

The third syntactic structure, heterophony, involves all criteria of combination, ranging from horizontal through diagonal to vertical, and including both individual and collective structures. Boulez first describes it as "the superposition on a primary structure of a modified *aspect* of the

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[24]Figure 8 is based on Table 4 on p. 119 of *On Music Today.*

same structure."[25] By this division between primary and secondary, it resembles the differentiated structure discussed earlier in this chapter. There is a detailed discussion of the generation of heterophonic structures in the last section of *On Music Today*, including analysis of several musical examples.[26] However, the present discussion is limited to the definition of terms used by Boulez in describing heterophony.

The term *heterophony* implies an indiscriminate combination of different syntactic structures. However, some distinction is made between primary and secondary structures within heterophony, resulting in organization. These different levels of organization may be linked by common elements. Boulez gives a second definition of heterophony:

> Before entering into detail, heterophony must be precisely defined;
> it is a structural distribution of identical pitches, differentiated
> by divergent temporal co-ordinates, manifested by distinct
> intensities and timbres; as a result, the concept of heterophony will
> be extended from the monodic to the polyphonic level.[27]

Syntactic structures, created through the criteria of selection and definition (i.e. through the processes of *placing* and *production*) are multiplied and dispersed to create form. However, they are identified through the use of common pitches. It would seem that heterophonic identification is also possible through musical components other than pitch.

Boulez states that although heterophony is rarely found in Western music, examples may found in the music of the Far East. He refers to the

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[25]Ibid., p. 117.

[26]See pages 121-9.

[27]Ibid., p. 121.

combination of a highly ornamented instrumental line and a more restrained vocal line.[28] He compares heterophony to a construction of layers of glass superimposed upon one another, each with a variation of a basic pattern.

The association between the individual constructs is not concurrent, but staggered, in the same way as polyphony. Heterophony in its complexity embraces both monodic and polyphonic structures, implying a greater flexibility of syntactic objects. In order to describe heterophony more completely, Boulez gives its qualities of placing and production. These involve four qualities which are, listed from the general to the particular, *Nature, Existence, Number* and *Dependence:*

> 1. *Nature:* heterophony will be *ornamental,* when it brings essential incidents into play; *structural,* when it obeys a true variation of structure...
> 2. *Existence:* heterophony will be *obligatory,* if, in every case, it must be played; *optional,* if there is the alternative of either omitting or playing it.
> 3. *Number:* heterophony will be single, double, triple, etc., according to whether one, two, three, etc., parallel structures are superimposed.
> 4. *Dependence:* heterophony will be *attached,* that is to say fixed to the antecedent, at an unchangeable determined point, whether it be a pitch (or a complex of pitches), or a rest; *floating,* when its departure or arrival takes place at a given interval-- within a time field...[29]

The first two qualities pertain to the differentiated nature of heterophony. A primary structure will be *structural* and *obligatory.* A secondary structure will be *ornamental* and *optional.* The meaning of *number* is obvious. *Dependence* is related to the duality of fixity/mobility within a time-field. A structure will be *attached* if it is fixed to its

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[28]Ibid., p. 117-8.

[29]Ibid., p. 121.

antecedent (not necessarily a primary structure), or *floating* if it is mobile, beginning and/or ending within a pre-determined durational interval. The properties of production in heterophony are the relative and absolute qualities of pitch, duration, timbre and dynamics. They are listed as follows:

> a.1. *Absolute pitches*--the 'eidetically' defined sounds;
> a.2. *Relative pitches*--the sounds placed in actual registers;
> b.1. *Duration-rhythms*--the static value of the durations, and of their relations;
> b.2 *Tempo-rhythm*--the kinetic placing of these relations:
> c. *Timbre*--the instrument or group of instruments by means of which the heterophony is realized (non-instrumentally speaking; the relationship between formal characteristics and 'formants');
> d.1. *General intensity*--the relationship of the external dynamic structures;
> d.2. *Dynamic profile*--the evolution of the internal structures of amplitude.[30]

For each musical component except timbre, the absolute and relative values are given. These are described in detail, and examples of heterophony are given. In summarizing heterophonic structure, Boulez lays special importance on distinguishing between the two processes of placing and production. It is the distinction between the external and internal properties of a musical structure:

> The important point is to distinguish clearly the two sorts of criteria which apply to every technique of development--*placing* and *production*. Placing is, to a certain extent, the exterior envelope which covers the existence, nature, density and dependence of the organisms; production is related to the actual generative process, to the intrinsic characteristics of the structures. This double operation is of prime importance; its neglect leads to incomplete characterization, to non-sense.[31]

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[30]Ibid., p. 122. The translators of *On Music Today* define 'eidetical' as "exhibiting likeness: of, relating to, having the character of essences, forms, images.

[31]Ibid., p. 129.

The criteria of combination, which deal with the external aspect of musical structure, have two dualisms: the concepts of horizontal-vertical (with diagonal as an intermediate stage), and individual-collective. The criteria of selection, which deal with both the internal and external, have one basic dualism: fixity and mobility (also expressed as absolute and relative).

In his text *On Music Today*, Boulez completes his study of musical syntax, but does not complete the edifice of his aesthetics. One more stage remains: musical form, which Boulez has considered in several essays. This stage of musical organization will be discussed in the next chapter.

6 Form

Formants: The Sum of Criteria

The text of *On Music Today* was originally created for a series of
lectures given by Boulez at Darmstadt in the late 1950s. As was mentioned
in the preceding chapter, this series was not presented in its complete form
in *On Music Today.* The remaining lectures, reproduced in the first section of
Orientations, completed Boulez's stucturalist theories of music. One of these
essays, entitled *Form,*[1] represents the third and final stage of musical
organization referred to at the conclusion of *On Music Today.* This text,
along with other sources, forms the basis of discussion for the present
chapter.

In his description of musical form--the third level of organization--
Boulez employs terms the same as or similar to those found in his discussion
of morphology and syntax. Instead of the duality of fixity versus mobility,
there is a duality between the *static* and the *dynamic.* The two pairs of
terms signify the same thing, and are applicable to musical structure at any
of the three levels. However, a new dialectic is introduced at the level of
form: a distinction between *quality* and *quantity* of musical events.

Static structure has a relatively fixed quantity and quality of events
whereas *dynamic* structure is characterized by mobility in the number and

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[1] Boulez, "Form," *Orientations,* pp. 90-6. This essay was first given as a lecture at Darmstadt in
1960, three years before *On Music Today* was published.

kind of musical events it contains. Quantitatively, static structure has a constant density whereas dynamic structure has a mobile density, referring to morphological principles of organization. Qualitatively, static structure has fixed criteria of selection whereas dynamic structure has changing criteria of selection, referring to syntactic principles of organization. Thus, it can be seen that the formal level of musical structure is the culmination of the processes used at the other levels.

Among the various categories and characteristics of static and dynamic structure, Boulez lists the absence of selective criteria as a form of static structure. Remembering his discussion of syntax in *On Music Today*, the absence of criteria of selection was characteristic not of fixed structure, but of the extreme of *mobility* (i.e. dynamic structure). It produced the phenomenon of *no field* described above on page 77. This dichotomy can be explained easily when one remembers that both extremes of fixity and mobility yield the same result, whether it is called automatism or pure chance, the lack of any criteria of selection and definition. The chart below lists the qualities and quantities of static and dynamic structure:

```
QUALITY
Static  1    constant criteria of selection (referring to the
             restricted automatism of relationships)
        2    absence of selective criteria (tending to a total
             automatism of relationships)
Dynamic:     changing criteria of selection (moving towards a total
             exclusion of the automatism or relationships)
This gives rise, according to circumstances, to:
QUANTITY
Static:      fixed density of events: weak to strong
Dynamic:     mobile density of events: strong to weak[2]
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[2] Ibid., p. 92.

The expression *criteria of selection* was first employed in *On Music Today* with reference to the organization of morphological elements. It was then considered relevant to the *internal* organization of syntactic structures. In the article *Form*, the criteria of selection have a role to play at the highest level of musical organization. At the syntactic level, their function was defined as *placing* and *production;* at the morphological level, it is described in *Form* as *initiation* and *distribution*, compared with the terms *definition* and *selection* used in *On Music Today.*

At the formal level, these same criteria of selection are used to connect syntactic objects, incorporating them into the overall structure. The *external* process which produced syntactic objects is now an *internal* process, linking these objects at the formal level. Similarly, the distribution of morphological objects leads to the formation of syntactic structures. The sum total of these criteria of selection, from the morphological, syntactic and formal levels, is called the *formant* of the work of music. Boulez has taken this term from the realm of acoustics. He uses the phenomenon of formants as an analogy for musical structure in the broadest sense of the word:

> The timbre of a sound results chiefly from the distribution of its harmonics; these harmonics are distributed in groups that are more or less important because of their relationships to the fundamental tone in intensity and pitch. One calls these the "constituents" [*formants*] of a timbre. Can not one envisage the "constituents" of a work? Related, certainly, to the organization of the sound-universe native to the work, but not depending upon it at all? Nothing would less resemble a "theme," for a theme consists of particularities already integrated. However, the "constituents"--particularities not integrated--would be responsible for the work's physiognomy, for its unique character.[3]

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[3]Boulez, "Today's Searchings," *Notes of an Apprenticeship*. p. 24.

Just as the formants are the totality of the elements which give the timbre of a human voice its particular physiognomy, so the formants of a musical work are the totality of the processes through which it is organized, giving each work its characteristic and unique shape in sound.

Because the music of the second half of the twentieth century does not rely on pre-determined formats of organization as in the past, the determination of the formant--the total criteria of selection--of a piece of music is all the more important if the hearer is to be able to hear its shape. At the level of form, the formant *is* the network of relations between syntactic objects (called *local structures* in the article *Form*). Each syntactic object will have its own register, or relative position *vis-a-vis* other local events, and its own density, depending on the kind and quantity of internal objects it contains. A serial hierarchy will be applied to the syntactic structures in order to arrive at an overall form in the same way as it is used to formulate morphological objects and connect them into syntactic objects.

Thus, the same principles used to formulate both morphological and syntactic objects are now employed on the larger scale of form. The nature of the process used at all three levels of organization is exactly the same, but the actual application of the criteria of selection will not necessarily be the same from one level to the next. This interactive system is summarized by Boulez in the following quotation:

> ...in order to determine the overall form, the same mode of *thinking* (though not the same *modes of application*) will prevail throughout the passage, from the morphological microstructure to the rhetorical macrostructure. In the following order we find:
> criteria of placing of the local structures within the overall structure...
> criteria of producing the local structures...
> criteria of disposing the internal structures...
> criteria of originating the elements of these internal structures...

> By means of this scheme *everything* is possible within a coherent
> system of formal logic, and everything is originated consistently --
> from closed forms, totally determined, to open forms and total
> indeterminacy.[4]

The order of organization given above descends from the large to the

small. Form is the result of *placing* syntactic (or local) structures. At the

level of syntax, the local structures are *produced* from morphological (or

internal) objects. The external relations of these internal objects are the

result of applying the criteria of *disposing*, referred to as *distributing* in the

quotation above from page 92 of *Form*. The internal make-up of the

morphological structures is determined by the criteria of *originating*, which

are referred to as *initiation* in the *Form* article, and as *criteria of definition*

within the context of *On Music Today*.

The concept of the *formant* is the logical extension of the principles of

musical organization presented in *On Music Today* at the level of

morphology and syntax. The totality of Boulez's system of musical

organization has the merit of logical integrity and of comprehensiveness.

Because he speaks in the most general of terms, he is able to consider all the

possibilities within the realms of free and strict composition.

The term *formant* can also be understood as a distinct movement of a

musical composition. The example referred to frequently is the five

formants or movements of Boulez's *Third Piano Sonata*. This work is

examined in Appendix C, Figures 16 to 18, pages 140-8 as an example of the

concept of formant, referring chiefly to Boulez's writings, and also to articles

and texts by other authors.

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[4]Ibid., p. 94.

Contrasting with the concept of *formant* is the *developant*. These two terms are related in much the same way as *fixity* and *mobility*. In the following quotation, Boulez describes this inter-relationship.

> There are two words that I use a lot: 'formant' and 'developant.'
> According to my concept of the formant, the form is understood as
> a specific fixed structure, which is, however, movable as a whole;
> thus the formant in itself is fixed, and as an entity it allows no
> intrusion into its homogeneous structure, but its place within a
> work may vary. Developants, on the other hand, are the interfer-
> ences that may occur between musical ideas which are not homoge-
> neous and which can cause discrepancies between the different
> phases of development. The published formants, moreover, are
> very homogeneous in their configuration: there is not great
> disparity between their component parts [*composantes*]; whereas
> in other things that I have written, where you find what I call
> 'developants,' there is a deliberate lack of homogeneity.[5]

The fixity of the formants--the series of movements of a musical work--is set off by the developants. It is as if the developants were deliberate tears in the fabric of the formants, spaces which allow the entry of chance events. In the following quotation, allusion is made again to the notion of the developant, although the term is not actually used. However, the characteristics of the developant as defined above are outlined. The reference to parentheses and italics recalls the influence of Mallarmé's symbolist aesthetics:

> A musical work is made up of a series of separate movements: each
> of them is homogeneous in both structure and tempo; it is a closed
> circuit (a characteristic of Occidental musical thought)...
>   For the moment, I merely want to suggest a musical work in
> which this separation into homogeneous movements will be aban-
> doned in favor of nonhomogeneous distribution of developments
> [*développements*, not *développants*]. Let us reclaim for music the
> right to parentheses and italics...; a notion of discontinuous time,
> thanks to structures that will be bound together rather than

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[5]Boulez, *Conversations with Célestin Deliège*, pp. 81-2. The term "developant" is taken directly from the French *développant*.

> remaining divided and airtight; finally, a sort of development in
> which the closed circuit will not be the only solution envisaged.[6]

Although the term developments is used here instead of developants,

the object both words describe has the same characteristics: nonhomogeneity

contrasted against homogeneous movements, or formants.

The interaction of formants and developants is controlled by a *general

phrase* (French: *le phrasé*). The literal translation of the French word is

phrasing, referring to an interpreter's ability to imbue structure through

subtlety of expression and technique. Within the context of formal

organization, Boulez uses it to mean a general principle by which the major

sections of a work, both fixed and mobile, are related. The role of the phrase

is most evident with the introduction of chance into the overall structure of a

work. The quotation below, taken from the article *Aléa,* describes the

importance of the phrase within this context:

> If we want to integrate chance into the notion of structure
> itself in a directed ensemble, then we must... introduce such
> notions as that of defined or undefined structure, amorphous or
> directional structure, divergent or convergent structure.
> Undeniably, this development of chance in composition will create
> a much more clearly differentiated universe [of form] than we had
> before and will mark a sharper development of a renewed
> perception of form. In a directed ensemble, these various
> structures will have to be controlled obligatorily by a general
> "phrase," [*phrasé*]... in order to obviate total loss of the global
> sense of form as well as to avoid giving way to improvisation with
> no necessity but that of free will.[7]

Moving from the elemental level of morphology to the broader level of

form, the increasing complexity and possible range of choices in the organi-

zation of music results in a terminology which is increasingly more general

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[6]Boulez, "Today's Searchings." *Notes of an Apprenticeship,* pp. 25-6.

[7]Boulez, "*Aléa*," *Notes of an Apprenticeship,* p. 44.

in its attempt to cover all the possibilities. The words needed to signify these broad concepts at the level of form are lacking in the English language. Therefore, terms like *formant, developant,* and *phrase* are taken directly from the French.

A distinction can be made between formant and developant on the one side, and phrase on the other. The formants and developants of a work are the formal objects--both homogeneous and non-homogeneous (fixed and mobile). They are terms which refer to the *internal* organization of formal objects. The phrase, on the other hand, is the principle or series of principles through which these formal structures are organized. It refers, therefore, to the *external* organization of formal structures. This implies that the phrase is a level of structural organization higher than that of form. However, the concept of the phrase is so general and all-embracing that it differs very little in meaning from that of form. This distinction between internal and external structuring is described in the following quotation:

> ...one must have recourse to a new notion of development--develop-
> ment as being essentially discontinuous. but of a foreseeable and
> foreseen discontinuity: as a result, one must necessarily introduce
> "formatives" [*formants*] into a work and the indispensable "phrase"
> [*phrasé*] into the interrelation of structures of varying nature.
>   In such a form, one will conceive points of junction, platforms
> of bifurcations, types of mobile elements susceptible in an
> arbitrary fashion to adaptation... to the eligible fixed structure...
> Finally... certain structures will be juxtaposable or super-
> imposable totally or in part...[8]

If the development of musical materials in a work is "discontinuous", that is, subject to some degree of variation, the larger overriding principles of formant and phrase are used to bring formal coherence to the music.

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[8]Ibid., p. 45

Thus, the concept of the phrase, the interrelation of fixed and mobile forms,

comes into play as a result of the insertion of chance elements into music. It

leads directly into the subject of Chapter Seven: choice as an element of

musical composition.[9]

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[9]As was mentioned above, an examination of how the concepts of *formant. developant* and *phrase* are applied to Boulez's *Third Piano Sonata* is found in Appendix C. Figures 16 to 18, pages 140-8.

7 Aléa

Automatism versus Inadvertence

The notion of chance has already entered into this discussion of musical structure. It is inexorably tied to such concepts as *mobility* and *non-homogeneity,* because wherever chance exists, so does change. Having recognized the presence of chance as a force in musical structure, Boulez attempts to define and control it in his works. His thoughts on the nature and function of chance in music are expressed in the article *Aléa.*[1] This chapter is an attempt to present Boulez's thoughts and specifically to differentiate between choice and chance. These concepts will be applied in Appendix C to a work by Boulez that employs the chance method: *Éclat.*[2]

Following his method of dividing a subject into binary opposites, Boulez understands chance in terms of two extremes--*automatism* and *inadvertence.* Between them lies the medium of *choice,* or *controlled chance.* An examination of these concepts reveals a gradation from *inadvertence* or pure chance, through *choice* to the other end of the spectrum, *automatism.*

Inadvertence refers to the process whereby the end result of the composition--i.e. the music itself--is arrived at through happenstance,

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[1]Pierre Boulez, "Aléa" in *Notes of an Apprenticeship.* Trans. by Herbert Weinstock. (New York: Alfred A. Knopf), 1968, pp. 35-51.

[2]Boulez, *Éclat,* (London: Universal Editions, 1965). This is one of Boulez's "works-in-progress." It was expanded in 1971 to become *Éclat-Multiples.*

through a series of random operations. Thus the composer abandons responsibility for his own creation. Boulez summarizes his viewpoint of *inadvertence* in the following quotation:

> The most elementary form of the transmutation of chance is located in the addition of a philosophy dyed with Orientalism and masking a fundamental weakness in the technique of composition...; I should willingly qualify that experience--if it is one--in which the individual, not feeling responsible for his work, simply throws himself into a puerile magic out of unavowed weakness, out of confusion, for temporary assuagements--I should willingly qualify that experience as chance by inadvertence.[3]

Despite the use of methods of probability in the music of inadvertence, the result is music without perceivable structure. This is the basis of Boulez's critique, for without structure, there is no interest. For Boulez, inadvertence artistic creation is not possible without structure:

> Inadvertence is droll to begin with, but it very quickly becomes boring, the more quickly because it is condemned never to renew itself.[4]

At the other end of the scale is chance by *automatism*, a complex, pre-determined system which regulates each musical component--pitch, dynamic, duration, timbre--so completely that the work is composed before a note is written. The music is created not through the immediate will of the composer, but is one step removed through a pre-ordained system. The system which determines the music is so rigid that it does not allow any sense of interpretation. The music becomes completely stagnant, and thus inhibits the function of the artist: to create. He elaborates further:

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[3]Boulez, "Aléa" in *Notes of an Apprenticeship*, p. 35.

[4]Ibid., p. 36.

> Composition desires to reach for the most nearly perfect,the
> smoothest, the most untouchable objectivity. And by what means?
> Schematization takes the place of invention; the imagination--
> ancillary--strains to give birth to a complex mechanism that is
> then charged with engendering microscopic and macroscopic
> structures until the exhaustion of possible combinations has
> indicated the end of the work...[5]

If *automatism* is the extreme of objectivity, then *inadvertence* is its

opposite, the extreme of *subjectivity*. In this case the onus is taken away

from the compositional process and placed on the performer, who decides at

random what material to play and how to play it. The difference is that

between complete stricture and complete anarchy. Boulez has this to say

about what he calls automatism:

> Did one complain of lack of subjectivity? One is going to have it in
> every structure, in every note; that ferociously dislocated, dismem-
> bered, dispersed subjectivity--it is going to force us to take a part,
> *hypocrite auditeur*, to be as subjective as the composer. As for the
> interpreter, it is up to him to transmit to you the demon's assaults...
> Notation will become sufficiently--but subtly--imprecise, to allow
> the passage through its mesh--a diagram of a hypothesis--of the
> interpreter's instantaneous and changing reflection. One *could*
> prolong this silence, one *could* suspend this sound, one *could*
> accelerate, one *could*... at every moment...; in short, one has chosen
> henceforth to be meticulous in imprecision.[6]

In summarizing these two extremes, which he calls fetishisms, Boulez

makes the point that they both lead to a rejection of *choice*. To Boulez,

choice is nothing less than the final responsibility of the composer:

> Do you see whither we are tending? Always to a rejection of
> choice. The first conception [*automatism*] was purely mechanistic,
> automatic, fetishistic; the second [*inadvertence*] is fetishistic again,
> but delivers one from choice, not by numbers, but by means of the
> interpreter. One transfers one's [i.e. the composer's] choosing to that

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[5]Ibid., pp. 36-7.

[6]Ibid., p. 37.

of the interpreter. Thus one is wrapped under cover, camouflaged...
What a relief! The hour of choice is postponed again...[7]

The important relation between choice and chance is not just a
concern of composers of Boulez's generation, but stretches back in musical
history. Boulez elaborates as follows:

> ...classically, composition is the result of constant choice...
> Inside of certain networks of probabilities. It is to be led--from
> solution to solution--to choose... In the meantime, outside that
> elaboration, chance still, and always, intervenes... My own
> experience has been that it is impossible to foresee all the
> meanderings and virtualities contained in the material supplying
> the point of departure. However much genius may exist in the
> premonitory vision, in that glance of estimation--of expertise--in
> the beginning it seems to me that composing will be deprived of its
> most eminent virtue: surprise.[8]

Musical systems (or networks of probabilities) evolve and grow. It is
within these systems the composer makes his choices (and, as was seen
above, systems that allow no choice are worthless). Chance has a role to
play, willy-nilly, in the choices that the composer makes. In certain
situations the choice is passed on to the performer. Thus chance--in the
form of choice--brings the performer, and in extension the listener, into the
circle of creation with the composer. Boulez sees chance as a musical
component, to be harnessed in the same way as pitch, duration, dynamic and
timbre. "Why not tame this potential," he says, "and force it to an account of
itself, an accounting?"[9]

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[7]Ibid., p. 38.

[8]Ibid., pp. 39-40.

[9]Ibid., p. 40.

Chance and Structure

If chance is to be incorporated into one's pre-compositional thinking,
its relation to time must be considered. As the musical materials develop,
they allow chance to intervene at different times, and on different levels of
composition. Within a more-or-less determined time framework, a certain
probability is allowed. Boulez calls this "combining a sort of structural
'forming' with instantaneous improvisation," and expands on this as follows:

> Evidently, it relates to a different sort of listening, and that in an
> open cycle, whereas we consider the elaborated work as a closed
> cycle of possibilities.[10]

The elaborated work is what Occidental culture is used to: a work with
pre-established parameters, allowing only a minimal amount of variation.
Boulez wants to admit the possibility of change from one performance to
another, and he gives Hindu music as an example.

With the increase of chance comes a greater creative role for the
performer; it is what Boulez calls "giving the executant a certain freedom"
and represents the first step in liberating the heretofore rigid structures of
music. He conceives of this freedom as a sort of generalized *rubato*
extended to other musical components. Boulez gives some examples of the
effect of *choice* on time at the morphological level. By the introduction of
new pitches into an established succession of sounds, there will be change in
tempo resulting in the impression of non-homogeneous time. The

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[10]Ibid., p. 41.

adjustment of tempo can also be applied to syntactic objects formed by the concatenation of relative and absolute values of pitch and rhythm.

In these examples, the morphological and syntactic structures are fixed, while the tempo is mobile. Thus, the possibilities of chance are limited. They extend the performer's powers of interpretation only so far. Boulez calls this *controlled chance*--another way of saying choice. An interplay is created between the two dimensions of the text: the fixed score, and the freedom of the interpreter. Having bestowed this new sense of liberty upon the performer, Boulez then adds a word of caution: this liberty should be directed and controlled. It is a question of pragmatism, of creating music that will work both in itself and for the interpreter.

Boulez locates himself between the extremes of inadvertence and automatism. He admits that his theories of chance within choice lean towards automatism, but it is a controlled automatism described as follows:

> ...this automatism should not be extended to all of creative thought, but it can take part as a particularly efficacious means at a given moment in the elaboration of the work.[11]

However, one can apply controlled automatism to more than one musical dimension concurrently. Differentiation between degrees of probability will then depend on the number of musical dimensions involved. A configuration brings several dimensions together (i.e. a certain dynamic with a certain duration), a specific register is applied, and so on.

As the degree of indeterminacy increases with the concatenation of musical dimensions, there is necessarily a decrease in the degree of choice

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[11] Ibid., p. 43.

and an increase in the degree of chance in determining the actual musical
events. As more musical dimensions are subjected to this process of
probability, the executant has, in effect, fewer options: if he makes a choice
of dynamics, then this will have a bearing on duration, tempo, register, and
so on. In this way, the flux between choice and chance can be controlled.

> Such manipulation of these ensembles [i.e. of the various musical
> components] demands a total absence of choice in the putting into
> play, the choice being insinuated to the degree to which the
> probabilities multiply. One thus reaches this phenomenon: the
> less one chooses, the more the unique chance depends upon the
> coefficient of chance implied by the composer's subjectivity.[12]

A mathematical expression of this principle might be that as chance
increases with the number of musical dimensions in which it partakes, so
conversely choice decreases.

The implications for musical structure are obvious. A new form of
differentiation is now available between relatively "defined and undefined
structure, amorphous or directional structure, divergent or convergent
structure."[13] A degree of organization is still implied in creating this
distinction between fixed and unfixed music. Boulez suggests that the
general phrase, which defines the background structure of a work, will also
control the degree of chance operating within different *developants* or
sections. He states that this is necessary in order to avoid the total loss of
structural organization associated with anarchic improvisation--in other
words, *inadvertence* in its most extreme form.

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[12]Ibid., p. 44.

[13]Ibid.

A New Concept of Form

In the article *Aléa* Boulez explains the move towards the use of *chance* in modern music. It is, first and foremost, a way of evading the time-honored, but also time-worn concepts of fixed or pre-established structure in music. Rather than seeking a linear shape, he seeks out...:

> ...a sort of labyrinth of several circles... a complexity that will be moving, renewed, specifically characteristic of the music played, *interpreted*, as opposed to the fixed, unrenewable complexity of the machine.[14]

Chance and unfixed structure are musical ideas which reinforce each other; the presence of one implies the presence of the other. A common analogy Boulez has used in describing this kind of formal structure is that of a maze of city streets:

> I have often compared a work with the street-map of a town; you don't change the map, you perceive the town as it is, but there are different ways of going through it, different ways of visiting. I find this comparison extremely suggestive. The work is like a town or a labyrinth. A town is often a labyrinth too: when you visit it you choose your own direction and your own route; but it is obvious that to get to know the town you need an accurate map and knowledge of the traffic regulations.[15]

The idea of *unfixed structure*, or *discontinuous form*, introduces a new notion of musical development. The path of musical development is no longer defined by the predictable working out of musical materials, but by the interplay of chance, which Boulez calls a foreseeable discontinuity. By

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[14]Ibid., p. 39.

[15]Boulez. *Conversations with Célestin Deliège*. p. 81.

this he means that the degree of chance, or choice, that will be put in play is determined beforehand. The outcome itself, in terms of the actual sound that is heard, is not predictable, but the means by which it is realized are already known. Boulez sees choice operating on various structural levels, creating points of juncture which form a loosely-knit structure.

The overall plan which determines where and how, and to what degree, chance is to be used is part of the general phrase, and the patterns of chance which are imposed upon it are parts of the formants, translated here as "formatives." The structure is determined by movement between developants, which are defined or undefined in certain characteristics, and which create a dichotomy between two structural families:

> One will go from the undefined to the defined, from the amorphous
> to the directional, from the divergent to the convergent, according
> to the greater or lesser degree of automatism allowed to the factors
> in the development... thus one goes from free play to the strictest
> choice...[16]

Choice is a new addition to the compositional repertoire. It has as much range and variety as pitch, duration, dynamic, or timbre, and it is controlled in the same way as the other musical components: through a serial format which creates a hierarchy in the way choice is to be used. The next step beyond defining this new component of musical composition at the morphological level is to combine it with the other components at the syntactic level. Because the element of chance is not regular or symmetrical, when it is combined with pitch, duration, and other musical parameters the result is nonhomogeneous musical space.

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[16]Boulez, *"Aléa,"* p. 46.

Thus as new, non-symmetrical terms of reference for the traditional musical dimensions are discovered, not only is a new concept of form made available, but that new concept of form is more thoroughly integrated by a common reference to the non-symmetrical nature of the element of chance. An analysis of choice operations in Boulez's chamber work *Éclat* is found in Appendix C, Figure 19, pages 148-53.

8 Conclusions

A return to the *raison d'être* of Boulez's project of a logical explication of musical genesis concludes this thesis. Although the concepts which animate his theories of musical structure may be borrowed from the structuralist school of literary criticism, it was never Boulez's intention to simply describe music in terms used for literature. This is true despite his interest, aptly demonstrated in such articles as "Sound, Word, Synthesis"[1] and "Poetry--Center and Absence--Music,"[2] in the interplay of text and music. As was pointed out in Chapter Three, the main influence of Mallarmé and others was the technique of their art, not its content.

Boulez's primary concern is to examine music in its own right:

> I believe that music warrants its own individual field of study and must not be submitted to mere arrangements of fundamentally alien methods of thought, which have in fact proved a dangerous threat to the freedom of musical thought... I recognize that contact with other disciplines can be extremely fruitful, in introducing a different order of vision and providing us with glimpses of what we should never have dreamed... But influences of this kind can be only by analogy rather than by any literal application, which has no foundation in fact... There are certain discoveries, philosophic and scientific, that have first to be transposed before their significance is fully realized, and this transposition cannot be effected by any mere juxtaposition or parallel application.[3]

Specifically, the attempt to apply the principles of spoken language to musical language is seen by Boulez to be fallacious. This reinforces the view

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[1]Boulez, *Orientations*, pp. 177-182.

[2]Ibid., pp. 182-198.

[3]Boulez, "Putting the Phantoms to Flight," *Orientations*, p. 75.

that music, in itself, has no meaning in the way language does. However, analogies can be made between the structure of music and speech so that terms like morphology and syntax can be applied. The parallel relation between the two sound media is emphasized in the following quotation:

> There is in fact no way in which music can claim the same
> exact semantic function as the spoken language; it has its own
> semantics firmly rooted in its own basic structures and obeying
> specific laws, so that the sense communicated is parallel to, rather
> than identical with, the sense communicated by words.[4]

It has been shown that the presentation of Boulez's theories in *On Music Today* was completed in the article "Form." However, there remains one last installment in the sequence of lectures given at Darmstadt. This is the essay entitled "Towards a Conclusion" which was published as an article in *Orientations*.[5] In this short essay, Boulez presents his reasons for developing such an aesthetic of musical structure:

> ...I have really tried to find a deductive method that will enable me
> to explain and to account for my actions as a composer, and I have
> not been content to draw up catalogues of samples or simply to
> describe how I set about composing any one of my works. This has
> led me to demand of my listeners a considerable amount of abstract
> reflection on the categories and classification of the different
> problems that have arisen, and I admit that this has not always
> been easy. But why, I asked myself, should we musicians not be as
> mentally agile and rigorous as other intellectuals?[6]

Once again the theme of intellectual rigor comes to the fore. Although he gives the irrational side of creativity its due, Boulez always emphasizes the need for logical reasoning in working out one's compositional technique.

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[4]Boulez, "Poetry--Center and Absence--Music," *Orientations.* p. 189.

[5]Boulez, "Towards a Conclusion," *Orientations*, pp. 97-99.

[6]Ibid., p. 97.

The aim of this thesis has been to present the logical unfolding of Boulez's structuralist aesthetics of music while dealing with problems of terminology and translation. Boulez remains consistent in the words he uses and the meanings he applies to them, but there arise problems when one attempts to translate them. One solution seems to be the route taken by Martin Cooper in *Orientations.* Important terms are kept in the original French so as to underscore their special meaning. A similar tactic is to create words derived from the French. The term *developant* is an example of this method. Appendix A, immediately following this chapter, is a summary of important terms found in this thesis.

Boulez's deductive system is as much a didactic and analytic tool as it is an explanation of his own compositional method. As a teacher he sees the understanding of musical grammar as a fundamental part of a musical education; and not the musical grammar of the past, but that of the present:

> Musical grammar should primarily be taught in its present-day form as regards both morphology and syntax. But there is a point in knowing precisely how this grammar arose in the first place, how it has evolved and what are its future potentialities. What I insist on is that grammar should be taught in its present form.[7]

As to analysis, Boulez's main concern is that it should avoid the "numerical fetishism" of which he is so critical. Analysis should not be reduced to a mathematical equation. His method seeks to expose inherent levels of structure and their inter-relationships. It is intended for twentieth-century music, and so concentrates on modern compositional techniques. The stress, however, is on the structural scheme as it reveals

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[7]Boulez, "The Teacher s Task," *Orientations,* p. 120.

itself through the musical materials themselves, not through some pre-determined system of rules and regulations. The intellectual means of analysis should not become the goal. He summarizes his attitude on this subject in the following quotation:

> If we are to avoid that reef [of "numerological" analysis], we must practice analysis in such a way that the work will appear not as a distributive balance sheet, but in relation to deduced structures. And if, for that purpose, one has need of numbers and letters, that is a last resort in the sense that it risks--with the advantage of practical ease in designation--the peril of taking these symbols to be the object of the study... The results of one's intuition are really perceived through study of the morphological structures, to begin with; then one enlarges that first plane to encompass the whole structure; then, studying the mode of the generation of these various planes of the structure, their inter-relationships--that is, in gradually generalizing step by step--one may come to describe what, properly speaking, makes up the course of the work.[8]

Thus the inherent structure of the music takes pride of place, and a special mention is made of the workings of the analyst's intuitive faculties.

The second important issue examined in this thesis is the question of *chance* and *controlled chance* or *choice*. Boulez recognizes the dominant role that chance plays in the musical universe because that universe, contrary to previously established views, is a *relative* one whose elements are determined by their changing relations with each other, not by some absolute norm. Indeed, such norms are absolute only in the minds of those who adhere to them. Boulez's thoughts on controlled chance are summarized in the following quotation:

> Such 'chance' is not a mere gambling with the objects concerned; were it no more than that, it would be pathetic and childish. It is concerned rather with the relationship between time and the

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[8]Boulez, "...*Auprès et au loin,*" *Notes of an Apprenticeship,* pp. 192-3.

> individual moment, recognized and utilized as such. A work
> thought of as a circuit, neither closed nor resolved, needs a
> corresponding non-homogeneous time that can expand or condense;
> pitches determined in a mobile manner, and a relative concept of
> internal structure, including dynamics and timbre. Each
> performance will thus represent a single, specific option, neither
> better nor worse than any other.[9]

As an integral element of the musical sphere, one should be able to subject chance to the same kind of control as any of the other musical components. From this principle arises the concept of controlled chance or choice. As can seen in the analysis of *Éclat* in Appendix C, it is possible to create a hierarchy of choice depending on the degree and type of choice used and to which musical components it is applied. The result is musical structuring based as much on choice as on pitch, duration, dynamic and timbre, perhaps even more so, considering the pervasiveness of chance in music.

Anne Trenkamp's article on *Constellation-miroir* reiterates this principle of choice as a structuring device. Her analysis deals with both morphological and formal levels of musical organization. In her conclusions she makes the point that the use of choice, instead of obfuscating musical form, actually strengthens it. As well, she notes that Boulez makes special use of timbre and intensity--the *coordinating* components of music. The result is musical structure with a new emphasis. In fact, Boulez is exploiting materials that had been relegated to secondary importance in the formulation of musical structure. Recalling Boulez's distinction between *integrating* and *coordinating* components, he himself recognized the fact that some musical elements have a greater capacity for structuring than others. These points are summed up by Trenkamp:

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[9]Boulez, "Sound, Word, Synthesis." *Orientations*, pp. 178-9.

> The conclusion is inescapable that 'Constellation-miroir' is
> composed within a strong structural framework. Aleatoric
> procedures do not weaken the structure, especially at the highest
> formal levels. The term 'open form' has no relevance here, unless it
> is re-defined as referring to a composition whose structure is
> determined primarily by elements usually given secondary status.
> This is a piece whose form is articulated by what are generally
> considered the lesser materials of music: texture and timbre (in the
> sense of range, spacing and specially devised effects for the piano).
>   This is the essence of Boulez's search for a type of controlled
> chance, or *aléa*. In the past, while reaching for new means of
> organization, he relied only on musical elements to which past
> history assigned certain expectations: pitch focus, symmetry,
> rhythmic periodicity and so forth. If these elements were to serve
> as both the newly organized elements and the organizational basis
> of the composition, it was possible for chance to combine these
> elements and purposes in such a way that unintentional
> distortions appeared. The solution was twofold: first, to recognize
> chance as an adversary and plan every point at which it might
> enter; and second, to base the musical structure on a non-
> expectational element, such as texture.[10]

Trenkamp seems to suggest that texture, as a "non-expectational

element," lends itself more to choice operations than do other elements.

Perhaps this is due more to the historical onus placed on pitch and duration

as organizers of musical structure than on their inherent qualities.

Imitating the open structure of his compositions, Boulez's aesthetic

system is also open-ended. He has consistently explored different areas of

his musical universe, but he is the first to admit that this research remains

incomplete. He has however, given the impetus for on-going researches, as

he states in the following quotation:

> ...the more I go on, the more I try to unify certain aspects of
> invention. All the works I write are basically different facets of
> one central work, of one central concept. In any case I cannot
> easily detach myself from a particular musical universe: once I
> have set it in motion it has a tendency to become independent and
> to grow. Unfortunately, circumstances sometimes prevent me from

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[10]Trenkamp, "The Concept of '*Aléa*' in Boulez's *Constellation-Miroir*," *Music and Letters*, Vol. LVII, no. 1 (Jan. 1976), p. 10.

> expanding it sufficiently, and this is why there are still
> 'expanding universes' that have not reached a completed state.[11]

The musical universe is forever expanding, and presents infinite possibilities. It is the responsibility of musical scholars and composers to integrate these innovations into a coherent system for the purpose of better comprehending the newly unleashed musical forces.

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[11]Boulez, *Conversations with Célestin Deliège.* p. 50.

Appendix A: Summary of Terms and Concepts

In the Summary of Terms and Concepts, the English form of each entry is given, followed where appropriate by the same term in the original French in square brackets. The entries are listed in order of their appearance in the thesis. This is done so that groups of terms related to each other can be listed close together for better comprehension. For the convenience of the reader an alphabetic glossary of the same terms follows the summary.

Component: [fr: *composante*, also translated as constituent]: one of five basic elements of music which form the basis of organization -- pitch, duration, dynamics, timbre and space. I propose in this thesis that *choice* be considered a sixth component.

Series: a structural hierarchy imposed on a musical component.

Fixity: one side of the basic duality of Boulez's aesthetic of music. It refers to the relative absence of change.

Mobility: the other side of the basic duality of Boulez's aesthetic of music. It refers to the relative presence of change.

Morphology: the primordial level of musical organization. Here series are applied to the basic musical components.

Four Principles of Serial Organization at the Morphological Level:
1) the absolute value of a component is the interval which will be divided into units, also referred to as the *focus* or *module*.
2) the relative value of a component is a multiple of the absolute value. For example, with pitch if the module is the octave, the relative value is multiples of the octave (i.e. register).
3) fixed density of generation is the division of the module into a fixed number of units. With pitch, it is for example the division of the octave into twelve semi-tones.
4) mobile density of generation allows for a changing division of the module.

Serial Organization of Tempo:

    1) chronometric field of tempos: the range of possibilities for the serial organization of tempo. A defined (or fixed) chronometric field may have an abstract or accidental hierarchy. An undefined chronometric field is mobile.

    2) the density of generation for tempo may be fixed or mobile. Mobile tempo may be directed or non-directed.

Serial Organization of Duration:

    1) the generation of duration may be fixed (multiplication of units), mobile and non-evolutionary (addition and subtraction of units), or mobile and evolutionary (alteration through non-proportional, non-arithmetical means).

    2) block of duration: a series of durations which fills an absolute value or module of duration.

    3) time bubbles: the combination of serial organizations of tempo and duration.

Serial Organization of Dynamics:

    1) line-dynamics: fixity of dynamics.

    2) point-dynamics, or dynamic glissando: mobility of dynamics.

Serial Organization of Timbre:

    1) timbres of limited and homogeneous evolution, or non-evolutionary timbres: timbres whose content is relatively fixed.

    2) evolutionary and non-homogeneous timbres: mobility of timbres. This mobility may be conjunct (moving from one homogeneous group to another), or disjunct (moving between non-homogeneous groups).

Serial Organization of Space:

    1) space, or the index of distribution: the physical lay-out of sound sources. This may be fixed or mobile.

Serial Organization of Pitch:

    1) isomorphic figures: intervallic cells within a series. The combination of these figures results in isomorphic objects.

    2) totally symmetric series: a series all of whose members are organized into isomorphic figures.

    3) partially symmetric series: contains isomorphic figures overlapping within the series itself or with other forms of the series. When the isomorphic figures are not interrupted by intervening pitches, then this is manifest partial symmetry. If a series must be rotated, or manipulated in some way to reveal the isomorphic figures, then this is partially concealed symmetry.

4) totally assymmetric series: the absence of isomorphic figures.
5) privileged forms of the series: those forms of the series which contain the same isomorphic figures found in the prime.
6) limited series: an isomorphic figure taken from a totally symmetrical series. (e.g. the B-A-C-H motive.)
7) defective series: transposition of a section of the series resulting in a reduced ambit and the repetition of pitches.

Musical Space: that which is occupied by musical components. It is also subject to hierarchical organization. The four principles of serial organization also apply to musical space.

1) continuum: the field within which the limits of musical space are defined.
2) partition: the dividing up of the continuum of musical space.
3a) striated space: the regular or fixed partitioning of the continuum so that there is a perceptible ordering of musical space. For example, the concept of regular, pulsed meter.
3b) smooth space: absence of regular partitioning of the continuum so that there is no perceptible ordering of musical space.
4a) straight space: the proportional division of the continuum by a fixed focus or absolute value.
4b) curved space: the irregular division of the continuum of a mobile focus. A focalized curved space occurs when there is regular, predictable variation of the focus; non-focalized curved space involves irregular variation of the focus.
5a) regular space: a fixed density of generation within either straight or curved space. Applicable only to striated space.
5b) irregular space: a mobile density of generation within straight or curved spaces. Applicable only to striated space.
6a) homogeneous space: The exclusive use of either striated or smooth space.
6b) non-homogeneous space: The alternative or combined use of striated and smooth space.

Musical Space Applied to Duration:

1a) pulsed time: concept of straited space applied to duration.
1b) amorphous time: smooth space applied to duration.
Amorphous time is directed if there is a temporary, accidental regular pulsation, otherwise it is non-directed
The concepts of straight, curved, regular, irregular, homogeneous and non-homogeneous space are also applied to time.

Syntax: a level of musical structure higher than morphology.
It involves the organization of morphological objects or units.
Morphological Unit or Elementary Organism: structure formed by the
application of the principle of series to musical components.
These form the basis of syntactic objects
Syntactic Objects or Constituted Elements: the organization of
morphological units.
Syntactic Structures: the organization of syntactic objects.

> **1a)** unified syntactic structure: organized through one global
serial principle.
> **1b)** differentiated syntactic structure: organized through more
than one series.
> **2)** uniquity of the basic series: the principle of organizing
various structural levels through one series alone.
> **3a)** strict composition: a greater degree of interaction among
morphological objects, syntactic objects and syntactic structures.
> **3b)** free composition: a lesser degree of interaction among
morphological objects, syntactic objects and syntactic structures.

Criteria of Selection and Definition: the means by which morphological
objects are formed and grouped into syntactic objects.

> **1a)** intrinsic (or internal) qualities: concerning the formulation
of structural objects, whether morphological or syntactic.
> **1b)** extrinsic (or external) qualities: concerning the combina-
tion of syntactic objects. Also called the modes of description.
> **2a)** field of fixity: the range between the extremes of fixity and
mobility within which syntactic objects may be placed.
The field will be either relatively fixed or mobile.
> **2b)** no field: a field of ultimate mobility, where the lack of
organizational limits results in the non-perception of a field

Placing [Fr: *mise en place*]: the application of fixed or mobile criteria of
selection to one or more morphological units (i.e. internally).
Production: the application of fixed or mobile criteria of selection to
syntactic objects (i.e. externally).
Syntactic Organization Applied to Relative Values

> **1)** index of Fixity: ratio between fixed and mobile frequencies.
> **2a)** fixed frequencies: divisions of the module at a fixed
interval and relative value. (fixed pitch(es), fixed register(s)).
> **2b)** mobile frequencies: divisions of the module at a fixed
interval, but with a changing relative value. (fixed pitch(es),
mobile register(s)).

3a) organic relationship: organization linking absolute and relative values at the syntactic level.

3b) independent relationship: no link between absolute and relative values at the syntactic level.

4a) positive relationship: registral mobility of secondary forms of the series versus registral fixity of prime form.

4b) negative relationship: registral mobility of prime form of the series versus registral fixity of secondary forms.

Criteria of Combination and Arrangement: the means by which syntactic objects are formed and grouped into syntactic structures.

1a) horizontal dimension: the horizontal arrangement of elemental objects, otherwise known as melody.

1b) vertical dimension: the vertical arrangement of elemental objects, otherwise known as harmony. Harmony is functional or non-functional depending on whether it follows a serial organization or occurs by happenstance.

1c) diagonal dimension: the overlapping of elemental structures so as to include both horizontal and vertical dimensions.

2a) individual application of structures: the presence of a sole sequence of elemental objects (a melody, or series of chords).

2b) collective application of structures: the combination of more than one sequences of elemental objects.

3a) monody: a syntactic structure of horizontal dimension and individual application.

3b) homophony: a syntactic structure of vertical dimension and individual application.

3c) polyphony: a syntactic structure of horizontal dimension and collective application, with the possibility of function or non-functional harmony, also known as counterpoint. Strict counterpoint is a close correspondence between the collective structures and a precedent individual structure. Free counterpoint has a more mobile organization.

3d) heterophony: a complex syntactic structure involving the possible combination of all dimensions and applications defined above. Different syntactic structures within heterophony may be differentiated by contrasting dimensions and applications creating "families" of complexes. There are four qualities of heterophony which are 1) nature: ornamental, structural; 2) existence: obligatory, optional; 3) number: single, double, etc.; and 4) dependence: attached, floating.

Form: the highest level of musical organization. Syntactic structures are combined to create form. Form is understood in terms of the quality and quantity of its musical events.

    1a) static form: characterized by the relatively fixed quantity and quality of musical events.

    1b) dynamic form: characterized by the relatively mobile quantity and quality of musical events.

Formant: [Fr.: *formant,* translated as "constituent" and "formative."] The organizational principle of a form: the sum total of the criteria of selection, from the morphological, syntactic and formal levels. Substitutes for the traditional term "movement."

Criteria of Disposing or Distributing: another term for Criteria of Combination and Arrangement.

Criteria of Originating or Initation: another term for Criteria of Selection and Definition.

Developant: [Fr: *développant.*] a formal structure characterized by a relatively mobile Production and Placing. Applies to the structures within formants that arise due to the workings of choice.

Development: [Fr.: *développement.*] a sub-section of a formant, above the level of syntax. It is relatively fixed compared to a developant.

Phrase, or General Phrase: [Fr: *phrasé,* lit.: "phrasing."] an over-riding principle which organizes the formants of a work.

Inadvertence: the extreme of pure, unstructured chance. Random music.

Automatism: the extreme of totally structured music. Total serialism.

Aléa, Choice, Controlled Chance: terms signifying the serial organization of chance operations. The middle ground between inadvertence and automatism.

Unfixed Structure, Discontinuous Form: the result of the application of choice to form, leading to a conception of form which is non-directional, not goal-oriented.

Glossary

Absolute Value of a Component: the interval which will be divided into units, also referred to as the *focus* or *module*. One of the four principles of serial organization at the morphological level.

Aléa, Choice, Controlled Chance: terms signifying the serial organization of chance operations. The middle ground between inadvertence and automatism.

Amorphous Time: smooth space applied to duration. Amorphous time is directed if there is a temporary, accidental regular pulsation, otherwise it is non-directed.

Automatism: the extreme of totally structured music. Total serialism.

Block of Duration: a series of durations which fills an absolute value or module of duration.

Chronometric Field of Tempos: the range of possibilities for the serial organization of tempo.

Collective Application of Structures: the combination of more than one sequence of elemental objects.

Continuum: the field within which the limits of musical space are defined.

Component: one of five basic elements of music which form the basis of organization--pitch, duration, dynamics, timbre and space.

Criteria of Combination and Arrangement: the means by which syntactic objects are formed and grouped into syntactic structures.

Criteria of Disposing or Distributing: another term for Criteria of Combination and Arrangement.

Criteria of Originating or Initation: another term for Criteria of Selection and Definition.

Criteria of Selection and Definition: the means by which morphological objects are formed and grouped into syntactic objects.

Curved Space: the irregular division of the continuum of a mobile focus. A focalized curved space occurs when there is regular, predictable variation of the focus; non-focalized curved space involves irregular variation of the focus.

Defective Series: transposition of a section of the series resulting in a reduced ambit and the repetition of pitches.

Developant: a formal structure characterized by a relatively mobile production and placing. Applies to the structures within formants that arise due to the workings of choice.

Development: a sub-section of a formant, above the level of syntax. It is relatively fixed compared to a developant.

Diagonal Dimension: the overlapping of elemental structures so as to include both horizontal and vertical dimensions.

Differentiated Syntactic Structure: organization achieved through more than one series.

Dynamic Form: characterized by the relatively mobile quantity and quality of musical events.

Extrinsic (or External) Qualities: concerning the combination of syntactic objects. Also called the modes of description.

Field of Fixity: the range between the extremes of fixity and mobility within which syntactic objects may be placed. The field will be either relatively fixed or mobile.

Fixed Density of Generation: the division of the module into a fixed number of units. For pitch, it is for example the division of the octave into twelve semi-tones. One of the four principles of serial organization at the morphological level.

Fixed Frequencies: divisions of the module at a fixed interval and relative value. (fixed pitch(es), fixed register(s)).

Fixity: one side of the basic duality of Boulez's aesthetic of music. It refers to the relative absence of change.

Form: the highest level of musical organization. Syntactic structures are combined to create form. Form is understood in terms of the quality and quantity of its musical events.

Formant: the organizational principle of a form; the sum total of the criteria of selection, from the morphological, syntactic and formal levels.

Free Composition: a lesser degree of interaction among morphological objects, syntactic objects and syntactic structures.

Heterophony: a complex syntactic structure involving the possible combination of all dimensions and applications. Syntactic structures within heterophony may be differentiated by contrasting dimensions and applications creating "families" of complexes.

Homogeneous Space: the exclusive use of either striated or smooth space.

Homophony: a syntactic structure of vertical dimension and individual application.

Horizontal Dimension: the horizontal arrangement of elemental objects, otherwise known as melody.

Inadvertence: the extreme of pure, unstructured chance. Random music.

Independent Relationship: the absence of a link between absolute and
relative values at the syntactic level.

Index of Fixity: the ratio between fixed and mobile frequencies.

Individual Application of Structures: the presence of a sole sequence of
elemental objects (a melody, or series of chords).

Intrinsic (or Internal) Qualities: concerning the formulation of
structural objects, whether morphological or syntactic.

Irregular Space: a mobile density of generation within straight or curved
spaces. Applicable only to striated space.

Isomorphic Figures: intervallic cells within a series. The combination of
these figures results in isomorphic objects.

Limited Series: an isomorphic figure taken from a totally symmetrical
series. (e.g. the B-A-C-H motive.)

Line-Dynamics: the fixed organization of dynamics. See Serial Organization
of Dynamics in Summary

Mobile Density of Generation: allows for a changing division of the
module. One of the four principles of serial organization at the
morphological level.

Mobile Frequencies: divisions of the module at a fixed interval, but with a
changing relative value. (fixed pitch(es), mobile register(s)).

Mobility: one side of the basic duality of Boulez's aesthetic of music.
It refers to the relative presence of change.

Monody: a syntactic structure of horizontal dimension and individual
application.

Morphological Unit or Elementary Organism: structure formed by the
application of the principle of series to musical components.

Morphology: the primordial level of musical organization. Here series are
applied to the basic musical components.

Musical Space: that which is occupied by musical components. It is also
subject to hierarchical organization. The four principles of serial
organization also apply to musical space.

Negative Relationship: registral mobility of prime form of the series
versus registral fixity of secondary forms.

No Field: a field of ultimate mobility, where the lack of organizational
limits results in the non-perception of a field.

Non-Homogeneous Space: the alternative or combined use of striated and
smooth space.

Organic Relationship: an organization linking absolute and relative values
at the syntactic level.

Partially Symmetric Series: contains isomorphic figures over-lapping within the series itself or with other forms of the series. When the isomorphic figures are not interrupted by intervening pitches, then this is manifest partial symmetry. If a series must be rotated, or manipulated in some way to reveal the isomorphic figures, then this is partially concealed symmetry.

Partition: the dividing of the continuum of musical space.

Phrase, or General Phrase: an over-riding principle which organizes the formants of a work.

Placing: the application of fixed or mobile criteria of selection to one or more morphological units (i.e. internally).

Point-Dynamics, or Dynamic Glissando: the mobile organization of dynamics. See Serial Organization of Dynamics in Summary.

Polyphony: a syntactic structure of horizontal dimension and collective application, with the possibility of functional or non-functional harmony, also known as counterpoint. Strict counterpoint is a close correspondance between the collective structures and a precedent individual structure. Free counterpoint has a more mobile organization.

Positive Relationship: registral mobility of secondary forms of the series versus registral fixity of prime form.

Privileged Forms of the Series: those forms of the series which contain the same isomorphic figures found in the prime.

Production: the application of fixed or mobile criteria of selection to syntactic objects (i.e. externally).

Pulsed Time: the concept of striated space applied to duration.

Regular Space: a fixed density of generation within either straight or curved space. Applicable only to striated space.

Relative Value of a Component: a multiple of the absolute value. For example, with pitch if the module is the octave, the relative value is multiples of the octave (i.e. register).

Series: a structural hierarchy imposed on a musical component.

Smooth Space: absence of regular partitioning of the continuum so that there is no perceptible ordering of musical space.

Space, or the index of distribution: the physical lay-out of sound sources, not to be confused with musical space. Space may be fixed or mobile.

Static Form: characterized by the relatively fixed quantity and quality of musical events.

Straight Space: the proportional division of the continuum by a fixed focus or absolute value.

Striated Space: the regular or fixed partitioning of the continuum so that there is a perceptible ordering of musical space. For example, the concept of regular, pulsed meter.

Strict Composition: a greater degree of interaction among morphological objects, syntactic objects and syntactic structures.

Syntactic Objects or Constituted Elements: the organization of morphological units.

Syntactic Structures: the organization of syntactic objects.

Syntax: a level of musical structure higher than morphology. It involves the organization of morphological objects or units.

Timbres of Limited and Homogeneous Evolution, or Non-Evolutionary Timbres: timbres whose content is relatively fixed.

Timbres of Evolutionary and Non-Homogeneous Generation: the mobility of timbres. This mobility may be conjunct (moving from one homogeneous group to another), or disjunct (moving between non-homogeneous groups).

Time Bubbles: the combination of serial organizations of both tempo and duration.

Totally Assymmetric Series: the absence of isomorphic figures.

Totally Symmetric Series: a series all of whose members are organized into isomorphic figures.

Unfixed Structure, Discontinuous Form: the result of the application of choice to form, leading to a conception of form which is non-directional, not goal-oriented.

Unified Syntactic Structure: the organization of music through one global serial principle.

Uniquity of the Basic Series: the principle of organizing various structural levels through one series alone.

Vertical Dimension: the vertical arrangement of elemental objects, otherwise known as harmony. Harmony is functional or non-functional depending on whether it follows a serial organization or occurs by happenstance.

Appendix B: Analytical Examples

Figures 9, 10 and 11: Symmetric Series

Figures 9 and 10 on page 126 present the series of the two Webern works, first as they appear in Walter Kolneder's book *Anton Webern,*[1] and then in Boulez's text *On Music Today.* Whereas Kolneder shows the series in their normal orders, Boulez's geometric configuration ignores this, emphasizing instead the cellular constituents of the series. One would not be able to discern the normal order of the complete series through Boulez's diagrams. Instead, he presents the basic set, a 3 or 4-note motive, and graphically arranges the various isomorphic figures in terms of their structural proximity to the basic set. The symmetry of the initial series of Berg's *Lyric Suite* (Figure 11, page 126), lies in the disposition of complementary intervals around the central axis of the tritone. The nature of this symmetry, which structures the entire row around a central axis, is different from that of the Webern examples, where the focus is on a motivic cell.

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[1] Walter Kolneder, *Anton Webern: An Introduction to His Works,* trans. Humphrey Searle. (Berkeley: Univ. of California Press, 1968).

FIGURE 9:

Webern, Opus 24: Basic Series

Basic set   Retrograde Inversion   Retrograde   Inversion

Webern, Opus 24: Basic Series
as shown in Boulez's
On Music Today
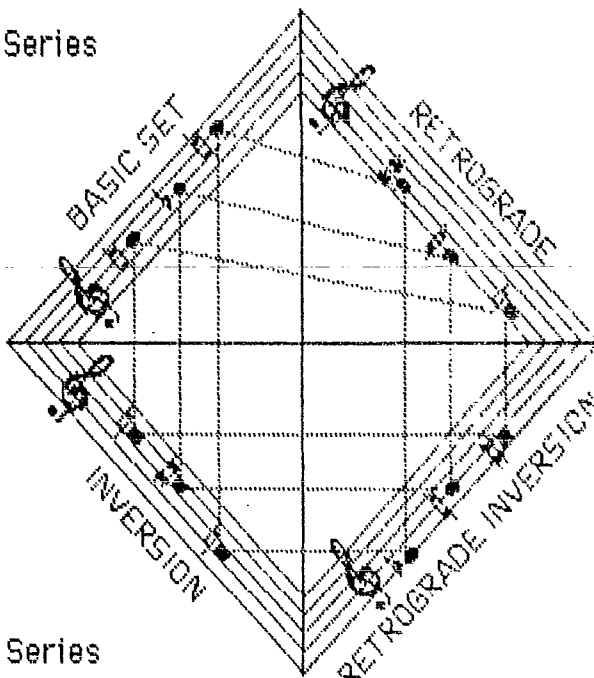
FIGURE 10:

Webern, Opus 28: Basic Series

Basic set   Inversion   Transposition

Webern, Opus 28: Basic Series
as shown in Boulez's
On Music Today
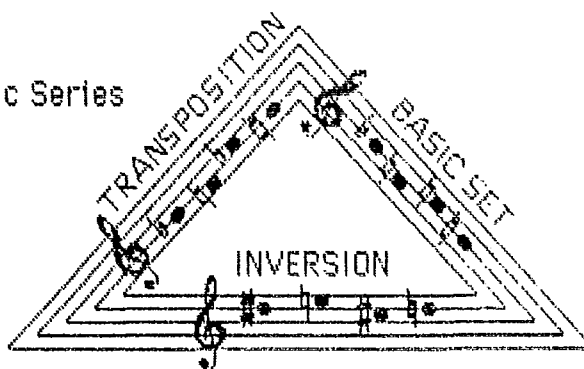
FIGURE 11:

Berg: Lyric Suite

Figure 12: Manifest Partial Symmetry

Figure 12 is Boulez's example of manifest partial symmetry. In the analysis below, set theory[2] is applied to the *isomorphic figures* designated by Boulez in order to emphasize their cohesiveness. Motivic cells will be assigned set theoretic labels: set 4-5, set 4-6 and so on. As well, six-digit numbers called *interval vectors*, which display the interval content of the set, will be used. Each number stands for an interval-type, starting from minor second on the left and increasing in half-steps to tritone on the right. Each numeral represents the number of each interval-type present in the set. For example the interval vector 111111 indicates that there is one of each of the interval types, from semi-tone to tritone. The interval vectors are used to point out similarities between sets.

In the *Allegro misterioso* of the *Lyric Suite*, isomorphic figure "a" in Figure 12 consists of the first four pitches of the series. Isomorphic figure "b" consisting of pitches 4 to 7 is "a" transposed up a major 2nd and with the pitches re-ordered. Similarly "c" and "d" are transpositions of the "a" and its inversion. An isomorphic figure is identified by the precise pitch classes used (a = B♭, A, F and B), and by the intervallic relations between these pitches. The order of pitches is of no importance in this context. Cell "a" is set 4-5. The appearance of each of the isomorphic figures is shown in various forms of the series. In each case the members of the isomorphic figures are continuous, that is, they are not interrupted by other pitches.

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[2]For a more complete explanation of set theory, see Allan Forte's *The Structure of Atonal Music*, (New Haven: Yale University Press, 1973).

FIGURE 12:

Berg: Lyric Suite; Allegro misterioso

Legend:
BS = Basic Set
+ P4 = up Perfect 4th
+ M2 = up Major 2nd

P-5, P-7 = Prime-5, 7
I-5, I-7 = Inversion-5, 7
1 2 = series order nos.
a, b, c, d = forms of BS

Figure 13: Partially Concealed Symmetry

The series of the *Trope* movement of the *Third Piano Sonata* has isomorphic figures that are not evident on the surface. Boulez shows how the cells, labelled a, b, c and d, combine to create other structures. Cell "a" is set 4-6, with an interval vector of 210021; it contains two semitones and two perfect fourths. The single whole tone and tritone serve as connectors between these featured intervals. Cell "b" when combined with cell "d" also yields set 4-6, in an inverted form. These two groups ("a" and "b/d") are isomorphically joined, though in the case of "b/d" the members of the set are not adjacent to each other. Cell "c" is set 4-10, with an interval vector of 122010. As in set 4-6, two intervals occur twice (whole tones and minor thirds), and two others occur once (semi-tone and perfect fourth) as connectors. The connectors of cell b/d are the featured intervals of cell "c." Each set can be transposed or inverted only twelve different ways.

Thus there are two isomorphic figures which are linked through intervallic content. The limited number of possible transpositions and inversions means that there will be more recurrences of the different fragments in various forms of the series, as is shown in Figure 13. Dividing the series into its constituent parts, Boulez rotates it by moving each section of the series to the end (changing the order from a-b-c-d to b-c-d-a, and in the case of retrogrades d-c-b-a to c-b-a-d). Cells "a," "b/d" and "c" are divisible in themselves in that the featured intervals are interrupted by connector intervals. Cell "b/d" is itself divided by the interjection of cell "c" between cell "b" and cell "d."

FIGURE 13:
Boulez: Third Piano Sonata; Trope

Legend: a, b, c, d = isomorphic figures
P-3, P-6 = Prime-3, 6
RI-10, 6 = Retrograde Inversion-10, 6

Prime form of Series

P-6

1st Rotation of Prime

P-6

2nd Rotation of Prime

P-9

3rd Rotation of Prime

P-3

Figure 14: Examples of Syntactic Organization

Figure 14 is an analysis of the example of syntactic organization given by Boulez. The first instance is a straight-forward presentation of a twelve-note series (Example 1). Pitch-class numbers are shown above each member of the series. There is a serial correspondence between duration and pitch. the duration is calculated by multiplying the pitch-class number by one-sixteenth. As a result, each pitch class will have a particular duration assigned to it. This is noted by the row of durational values to the left of the Graph 1 of Figure 14. This kind of *mise en place* or *placing* between musical components is of the most primitive nature.

The field created is both *fixed* and *homogeneous*; the degree of flexibility is severely limited. The only liberty Boulez has taken is in breaking up the series into one, two and three-note melodic fragments and juxtaposing these vertically. It is noteworthy that the resultant harmonic combinations emphasize major and minor seconds.

The *field of fixity* is slightly enlarged in Example 2. where a transposition of the series (P-6) is introduced. The same durational correspondence still holds; it is not adjusted to accommodate the transposition. The division of the series into segments operates in much the same manner and with similar results.

In Example 3 a homogeneous *production* is used to generate harmony. A series of parallel chords is created by adding forms of the series a major seventh above and below the prime. This not only results in a harmonic symmetry (albeit rather rigid), it also reflects a morphological property of

the series itself; the presence of chromatic fragments. This was alluded to in Example 1 and 2 by the vertical juxtaposition of semi-tones and major sevenths. The opening chord of Example 3 initiates the horizontal presentation of P-0, P-1 and P-11. Vertically, it is the opening triad of P-1. The subsequent chords are the opening triads of P-11, P-0 and so on. The boxed figures in the upper staff of Example 3 are the pitch class numbers of the members of the parallel chords.

Example 4 displays a more complex (i.e. mobile) production of syntactic organization. Five different chords are formed through the parallel layering of two, three and four-note fragments from the complementary forms of the series. By *complementary* I mean that each form of the series is equidistant from the prime. These complementary series are notated below by the pitch-class numbers of their first members as follows. 1/11, 2/10, 3/9 and so on. The only two complementary forms not paired in this example are P-0 and P-6. They form an axis around which a symmetrical syntactic structure is built.

Graph 1 shows how this is done. The sequence of chords is marked in bold letters above the prime form of the series. Chord A' is formed in exactly the same way as was the first chord of Example 3. At the second chord (Chord A), three transpositions (P-5, P-6 and P-7) of the series are added and continue for three more chords. This is displayed in Graph 1 by the boxed figures. In Chord A', the two added series (1/11) form an intervallic symmetry around the prime. In Chord A, two other complementary forms (5/7) are added along with the prime's own complementary. P-6.

This process of adding fragments from complementary forms of the series continues until the the prime form of the series is exhausted. At Chord B the complementary pairs 2/10, 3/9 and 5/7 are added to the prime; at Chord B' only 5/7 is added; and at Chord C, 1/11 and 2/10. The only form of the series that is presented in its entirety is the prime (P-0). Forms 4/8 do not appear at all. The boxed figures in Graph 1 visually demonstrate the symmetric pattern of presentation of the sections of the complementary pairs of the series. This pattern is symmetric around the axis P-0/P-6. It should also be noted that when a new form of the series enters, it always does so at the pitch *order* currently being sounded by the prime form of the row. For example, when forms 5, 6 and 7 enter at the second chord of the phrase, they do so on their *second* pitch orders.

Graph 2 summarizes which of the complementary forms of the series are employed in generating the different chords. Chords A' and B' are subsets of Chords A and B respectively. The only unmatched pair is P-0/P-6, which thereby form the axis of symmetry.

The intervallic composition of both the vertical chords, and the horizontal segments of the series used in their creation, will show some striking properties derived from morphological characteristics of the series itself. There are two segments of the series which, if placed vertically, form fragments of the chromatic scale: pitch order nos. 11-12-1-2-3 and nos. 7-8-9. This is one *privileged* feature of the series. The other is the presence of two perfect fourths (between pitch order nos. 3 and 4, and nos. 9 and 10). These characteristics are reflected in the chords as follows: Chords A, A' and C feature fragments of the chromatic scale (displaced by register), while

chords B and B' feature perfect fourths and major seconds. (The inversion of a major second, a minor seventh, is itself the result of two consecutive fourths). The partition of the prime series into melodic segments of one, two and three notes is the same as that used in Example 1.

A set-theoretic analysis of the various chords and series fragments (Graph 3), shows the preponderance of the privileged intervals. Chords A, A' and C, when placed in their *normal order* are sets 3-1, 5-1 and 6-7 respectively. Each of these sets contains fragments of at least three notes of the chromatic scale (underlined). Similarly the two largest series-segments (1/11 and 5/7 at seven notes each) used in forming these chords yield sets (7-6 and 7-9 respectively) which each have five-note chromatic fragments. The sets derived from the chords and segments associated with the B Group of chords do not feature the perfect fourth as prominently. However, the two largest sets--7-6 for 5/7 and 7-35 for Chord B--both contain a large number of perfect fourths (4 and 6 respectively). Hidden within the density of the chord pattern, the melodic partition of the prime form of the series remains unfixed from that of Example 1, even with regard to register. In Example 4 the notated chords are labeled in bold-faced lettering.

FIGURE 14: EXAMPLES OF SYNTACTIC ORGANIZATION

Example 1: Prime form of series

Example 2: Transposition at the tritone

Example 3: Fixed production of syntactic form

Example 4: Mobile production of syntactic form

Graph 1: Serial generation of chords

	A'	A	A	A		B	B	B'	B'	C	C	C
♩.	0	10	11	6		9	7	4	5	3	8	2	1
♪	1	11	0	7		10	8	5	6	4	9	3	2
♪	2	0	1	8		11	9	6	7	5	10	4	3
♪.	3	1	2	9		0	10	7	8	6	11	5	4
♩	4	2	3	10		1	11	8	9	7	0	6	5
♩♪	5	3	4	11		2	0	9	10	8	1	7	6
♩.	6	4	5	0		3	1	10	11	9	2	8	7
♩..	7	5	6	1		4	2	11	0	10	3	9	8
♩	8	6	7	2		5	3	0	1	11	4	10	9
♩♪	9	7	8	3		6	4	1	2	0	5	11	10
♩♪	10	8	9	4		7	5	2	3	1	6	0	11
♩♪	11	9	10	5		8	6	3	4	2	7	1	0

Graph 2: Forms of series used to generate chords

0	= all
1/11	= A', A, C
2/10	= B, C
3/9	= B
4/8	= nil
5/7	= A, B, B'
6	= A

Graph 3: Set properties of chords/series segments

A, C Chords

P-6	= 3-4	(0, 1, 5)
A'	= 3-1	(0, 1, 2)
C	= 5-1	(0, 1, 2, 3, 4)
2/10	= 5-19	(0, 1, 3, 6, 7)
A	= 6-7	(0, 1, 2, 6, 7, 8)
5/7	= 7-6	(0, 1, 2, 3, 4, 7, 8)
1/11	= 7-9	(0, 1, 2, 3, 4, 6, 8)

B Chords

3/9	= m3	(0, 3)
B'	= 3-9	(0, 2, 7)
2/10	= 5-19	(0, 1, 3, 6, 7)
5/7	= 7-6	(0, 1, 2, 3, 4, 7, 8)
B	= 7-35	(0, 1, 3, 5, 6, 8, 10)

Figure 15: Syntactic Organization of Relative/Absolute Values

The absolute and relative values of Figure 14 are examined in Figure 15. In the original series as presented in Figure 14, Example 1, the total ambit of the series extends from $D^{\#1}$ ($D^\#$ above middle C) to $G^{\#2}$ ($G^\#$ an octave and augmented fifth above middle C). This is the fixed tessitura of the series. In Example 2, the transposition of the series at the tritone, the exact register of each pitch class is maintained. In other words, the original registral placement of each pitch remains unchanged. This application of registral values is exactly the same as that of durational values, and results in a nullified field of fixity.

The sequence of chords in Example 3 moves in parallel fashion. This means that the transpositions a major seventh above and below the prime (forms P-11 and P-1) reflect the registral disposition of the members of the prime form of the series. The field of fixity in this instance is stable: the transpositions follow the pattern of registral displacement of the prime. This is not the case in Example 4. The complementary pair 1/11 switches registral position from Chord A' to Chord A. The E^b which is the second member of the P-1 series is displaced down two octaves in the first of the A chords. Similarly the $D^\#$ of P-11 is displaced up two octaves. The result is a registral exchange between the two forms of the series. The prime is *fixed* while the complementary pair 1/11 is *mobile*. This relationship is called *positive*. When the prime is mobile and the complementary pair derived from it fixed, the relationship is *negative*. These two adjectives describe the *index of fixity* between registrally fixed and mobile structures.

FIGURE 15: SYNTACTIC ORGANIZATION OF 'RELATIVE' VALUES

Graph 1 of Figure 15 shows the registral disposition of the comple-
mentary forms of the series throughout the chord sequence of Figure 14,
Example 4. The diagonal lines show registral change between chords. Of the
four pairs of complementary forms of the series used in this excerpt, only
two are placed symmetrically, in terms of register, around the axis of the
prime--1/11 and 5/7--and of these two, only in the latter case is that
symmetry maintained. The changes in register and the lack of unified
symmetry indicate a degree of independence in the organization of *tessitura*.

Graph 2 is a more detailed analysis of the registral organization. On
the left side of the graph, the various chords are listed; above the graph the
entire *tessitura* is shown ranging from A$^{\#-1}$ (pitch class six below middle C)
to A$^{\#+3}$ (three octaves higher). The presence of a form of the series at a
particular register is represented by the grey vertical bars under the appro-
priate pitch-class number. The black horizontal bars show the intervallic
distance in semi-tones between members of the chord in question.

In Chords A' and B' the symmetry is exact; the two outer voices are
equidistant from the prime. This exact symmetry is offset in Chord A by the
addition of a segment of P-6 in the highest register. If the symmetry were
to be maintained, a segment of P-6 would appear in the lowest register
(shown by the light-grey bar on the left of the graph), resulting in a doubling
at three octaves. Chord B displays both symmetric and asymmetric organi-
zation of *tessitura*. Series 5 and 7 offset each other symmetrically, but the
complimentary pairs 2/10 and 3/9 are displaced in so as to create an
imbalance about the prime axis (15 semi-tones below versus 14 above).
Although P-2 is offset by P-9 and P-3 by P-10, this is not exact symmetry.

Finally in Chord C, there is no symmetry around the prime. However, the outer voices of the chord are symmetric around the prime's complement, P-6 (shown in the graph as a light-grey bar). It is interesting to note that where symmetry (or near symmetry) around the prime does not exist, the "ghostly" presence of its complement is used to explain the divergence. It can be said that the registral symmetry reflects to a large degree the symmetry of the absolute pitches around the prime form of the series. Therefore an *organic* correspondence does exist between relative and absolute pitch values in this excerpt.

Appendix C: Analysis

Figures 16, 17 and 18: *The Third Piano Sonata*

The composition of the *Third Piano Sonata* was concurrent with the writing of *On Music Today* and *Form*. Therefore it is not surprising to find the terminology of the latter used to describe the former. Boulez has offered his own analysis of his composition in the article *Sonate, que me veux-tu?*[1]. Indeed the *Third Piano Sonata* has been a favored subject for examining the concept of controlled chance in Boulez's music, at the levels of micro- and macro-structure.

The most thorough analysis to date is Manfred Stahnke's doctoral dissertation entitled *Struktur und Ästhetik bei Boulez*[2] which examines the second formant, or movement: *Trope*. Because we are dealing here exclusively with matters of overall form, the reader is directed to Stahnke's work for details of serial organization at the morphological level. We will also be referring Dominique Jameux's text *Pierre Boulez*, as well as articles by Iwanka Stoianowa[3] and Anne Trenkamp[4].

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[1] Idem, *Sonate, que me veux tu?*,' in *Orientations*, pp. 143-54.

[2] Manfred Stahnke, *Struktur und Ästhetik bei Boulez: Untersuchungen zum Formanten "Trope" der Dritten Klaviersonate* (Hamburg: Verlag der Musikalienhandlung Karl Dieter Wagner, 1979).

[3] Iwanka Stoianowa, *'la Troisième Sonate de Boulez et le projet mallarméen du Livre,* " *Musique en jeu* 16 (1974), pp. 9-28.

[4] Anne Trenkamp, "The Concept of *'Aléa'* in Boulez's *Constellation-Miroir,* " pp. 1-10.

The *Third Piano Sonata* consists of five formants. Only the second and third-- *Trope* and *Constellation-miroir*--have been published. The dynamic relationship between the five formants is the telling characteristic of the form of the work. Boulez explains:

> I find the concept of works as independent fragments increasingly alien, and I have a marked preference for large structural groups centered on a cluster of determinate possibilities... The five *formants* clearly permit the genesis of other distinct entities, complete in themselves but structurally connected with the original *formants;* these entities I call *développements*...
> ... the physiognomy of any work is determined by its structural *formants*, i.e. by specific general characteristics capable of generating developments. Each of these characteristics appears exclusively in each of the pieces that comprise the work, so that they may later provide the *développants* mentioned above by means of exchange, interference, interaction and destruction. The titles that I have given to these *formants* underline their individual characteristics: 1 *Antiphonie,* 2 *Trope,* 3 *Constellation* and its pair *Constellation-Miroir,* 4 *Strophe,* 5 *Séquence.*
> Each of these formants can be used with a greater or less degree of determinacy according to the degree or liberty taken in relation to the overall form or local structure.[5]

Figure 16 below[6] gives a general outline of the possible interchange of formants in the *Third Piano Sonata.* The middle formant-- *Constellation*-- remains fixed in its position. However the outer formants are exchangeable around the central axis of *Constellation,* giving eight possible orders:

Antiphonie--Trope--Constellation--Strophe--Séquence
Antiphonie--Trope--Constellation--Séquence--Strophe
Trope--Antiphonie--Constellation--Strophe--Séquence
Trope--Antiphonie--Constellation--Séquence--Strophe
Strophe--Séquence--Constellation--Antiphonie--Trope
Séquence--Strophe--Constellation--Antiphonie--Trope
Strophe--Séquence--Constellation--Trope--Antiphonie
Séquence--Strophe--Constellation--Trope--Antiphonie

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[5]Boulez, *"Sonate, que me veux-tu?"* in *Orientations,* pp. 148-9.

[6]Ibid. p. 153.

FIGURE 16: GENERAL PHRASE OF THE *THIRD PIANO SONATA*
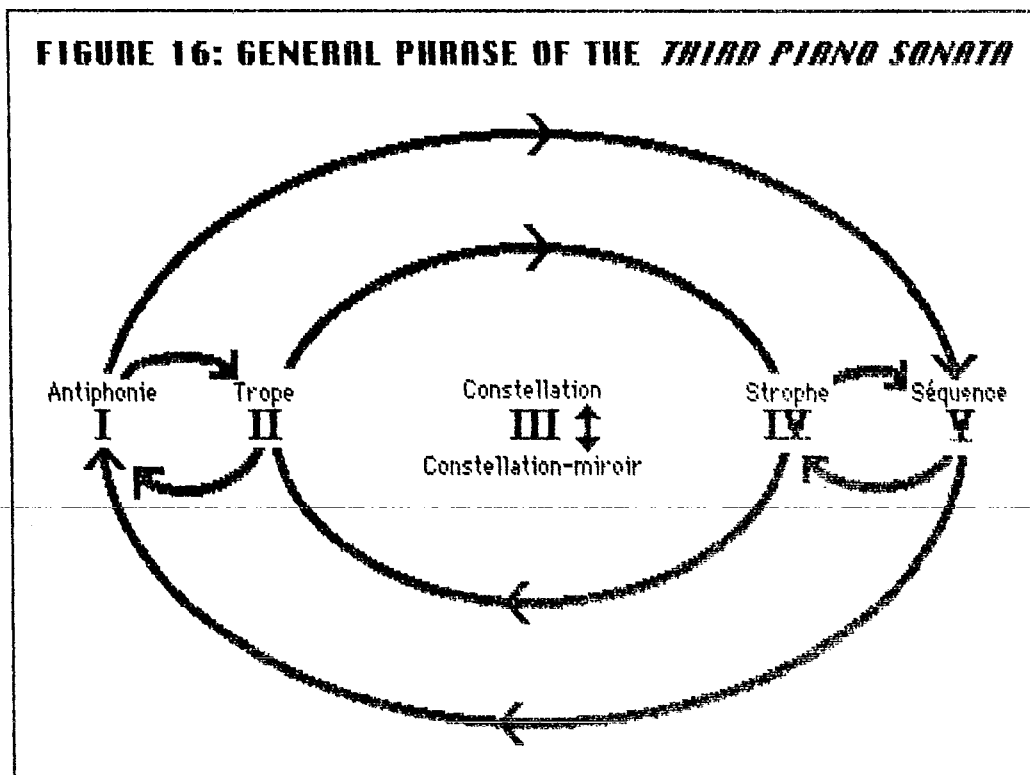
Note that the outer formants are always grouped in two pairs: *Trope* with *Antiphonie*, and *Strophe* with *Séquence*. The principle of alternating the outer pairs of formants around the central one is the phrase [*le phrase*] of the work. Once an order is chosen for a performance, it is fixed. Therefore the mobility of the phrase is not apparent to the audience, as Stoianowa notes:

> As the composer does not envisage several executions of the sonata in different versions during the same evening, the mobility of the movements inevitably remains unperceived by the audience. To the listener, the sheets are fixed [in position]. Now, as the last twenty years have shown us, in all the practice of the permutations of the so-called "open" work, the operative mechanism of such a musical statement remains *per force* linear, unidirectional in the unfolding of time.[7]

---

[7]Stoianowa, *"la Troisième Sonate de Boulez et le projet mallarmeen du Livre,"* p. 20. The translation is my own.

This would indicate that mobility and nonhomogeneity are particular to the construction of the work, but not necessarily to its performance. The presentation we hear is in itself a totality, although it represents only one of a multitude of possibilities.

We turn our attention now to the formal organization of the two published formants: *Trope* and *Constellation-miroir*. The name *Trope* is a reference to the interpolation of music with text in Gregorian chant. Boulez uses the idea of *Trope* as follows:

> To this idea of trope I have added that of circular form. I have employed a series of interrelationships for this *formant*, subdivisible into four fragments, giving rise to four different serial orders... If I call these serial fragments A, B, C, D, the two orders are A, B, C, D and A, B, D, C. If I apply the properties of this series to the overall form, I get two original orders, with their circular permutations. Development A is called *text*, development B *parenthesis*, development C *commentary*, and development D *gloss*--related, almost synonymous words indicating the very slight differences between the different tropes. The idea of the form is circular: each autonomous development may serve as beginning or end, a general curve being in each case established by the registers selected, the density of the texture and the preponderant dynamic.[8]

The series referred to above is displayed in Figure 13. That series was divided into four fragments which were rotated. This organizational method at the morphological level is also applied to the overall form, tying these two structural levels together. The details of the morphological organization are discussed by Stahnke[9] and Stoianowa[10]. The latter makes note of the correspondence at these divergent levels:

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[8]Boulez. *"Sonate, que me veux-tu?,"* p. 150.

[9]Stahnke. *Struktur und Ästhetik bei Boulez.* pp. 20-24.

[10]Stoianowa, *la Troisième Sonate de Boulez et la project mallarméen du Livre,"* pp. 20-24.

> The mobility of the *formants* in Boulez's *Sonata* co-exist with the
> mobility of sections of the *formants*, as well as the variability
> within the section of the *formant*... With Boulez the internal
> relations manifest themselves in each movement of the *formant*
> Trope: 1. At the level of serial language where the circularity
> reproduces the circular principle of the entire Trope; 2. At the
> formal structural level of the movements, where the symmetry
> reproduces the principle of symmetry of the entire sonata.[11]

Following the principle outlined by Boulez, there are two basic orders
for the four developments of *Trope*: Text-Parenthesis-Commentary-Gloss
(A, B, C, D) or Text-Parenthesis-Gloss-Commentary (A, B, C, D). These two
orders can be rotated, in the same way the four fragments of the primary
series of *Trope* are also rotated. This results in eight possible variations:

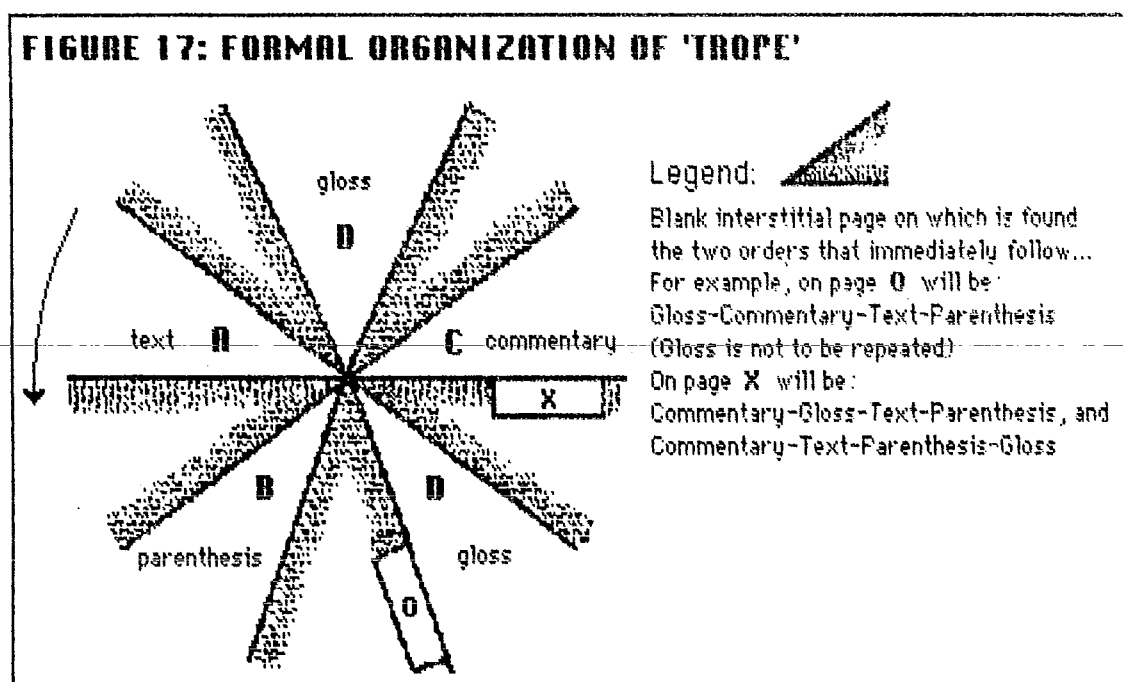|			
ABCD	Text-Parenthesis-Commentary-Gloss	ABDC	Text-Parenthesis-Gloss-Commentary
DABC	Gloss-Text-Parenthesis-Commentary	CABD	Commentary-Text-Parenthesis-Gloss
CDAB	Commentary-Gloss-Text-Parenthesis	DCAB	Gloss-Commentary-Text-Parenthesis
BCDA	Parenthesis-Commentary-Gloss-Text	BDCA	Parenthesis-Gloss-Commentary-Text

In the graph in Figure 17 below,[12] the two basic orders of the four
developments is shown by the two-fold appearance of Gloss, before and after
Commentary. The performer opens to a blank page in the score before one
of the four developments and follows one of two possible alternatives based
on the rotation of the original orders. It should be noted at this point that
the graph in Figure 17, and the lay-out of the eight possible permutations of
the developments of *Trope* as presented by Boulez and Stoianowa, disagree
with the actual printed score. The development which has an alternative
placing is not Gloss but Commentary, which is reproduced twice in the score
to reflect this fact. As a result, the normal order suggested by the score is
Commentary-Gloss-Text-Parenthesis instead of Text-Parenthesis-

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[11]Ibid, p. 19.

[12]Ibid, p. 20.

Commentary-Gloss. This difference aside, the principle of organization for

the formant *Trope* remains the same.

FIGURE 17: FORMAL ORGANIZATION OF 'TROPE'

Legend:

Blank interstitial page on which is found
the two orders that immediately follow...
For example, on page 0 will be
Gloss-Commentary-Text-Parenthesis
(Gloss is not to be repeated)
On page X will be:
Commentary-Gloss-Text-Parenthesis, and
Commentary-Text-Parenthesis-Gloss

gloss   D

text   A   C   commentary

X

B   D

parenthesis   gloss

0

There is some ambiguity in the use of the two terms *developant* and

development. The latter word, used to describe the sections of the *formant*

Trope, indicates a sub-level of musical structure between syntax and form.

The word developant is used by Boulez to signify the structures within

formants that arise due to the workings of controlled chance (discussed in

Chapter Seven). Just as the relationship between formants within the

context of the general phrase is variable, so is the relationship of develop-

ments within the formant. The developments of *Trope* in themselves are

relatively fixed sub-sections, whereas the developants of *Trope* consist of

the variable orders of these sub-sections within the totality of the formant.

The formant *Constellation-miroir* is fixed in its position within the general phrase. However, it can be played forward--as *Constellation*--or backward--as *Constellation-miroir*. The formant consists of five sections (developments), called Points and Blocks, plus a sixth variable section (developant) called Mixture (*mélange*) made up of syntactic units of Points and Blocks. Mixture is, in effect, a microcosm of *Constellation*. In the following quotation, Boulez describes the morphological construction of the developments of *Constellation*:

> The score is in two colors, red and green: green for the groups
> marked *points* and red for those marked *blocs*. These two words
> are exact indications of the morphology of the structures used.
> *Points* are structures based on pure, isolated frequencies, chords
> being formed simply by the simultaneous occurrence of two or
> more points. *Blocs* are structures based on perpetually shifting
> blocks of sound, and these may be struck vertically or may
> disintegrate horizontally in very rapid succession, so that the
> listener's ear retains the identity of the block. In this way groups
> of points are contrasted with groups of aggregates; or, in other
> words, an unvarying neutrality (pure frequency) is contrasted
> with a varyingly characterized individuality (sound block) [13]

There are three groups of Points and two groups of Blocks. The performer begins with Points 1, and alternates between Points and Blocks, finishing with Points 3. In *Constellation-miroir*, the performer begins with Points 3 and goes backward. However, the order of musical events within each development remains the same, reading from left to right on the score. Mixture consists of six brief fragments--three Points and three Blocks in miniature--which also alternate. The coloring scheme is reversed (Points are red, Blocks are green). Mixture precedes the five developments in *Constellation*, and follows them in *Constellation-miroir*.

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[13]Boulez, *"Sonate, que me veux-tu?,"* p. 151.

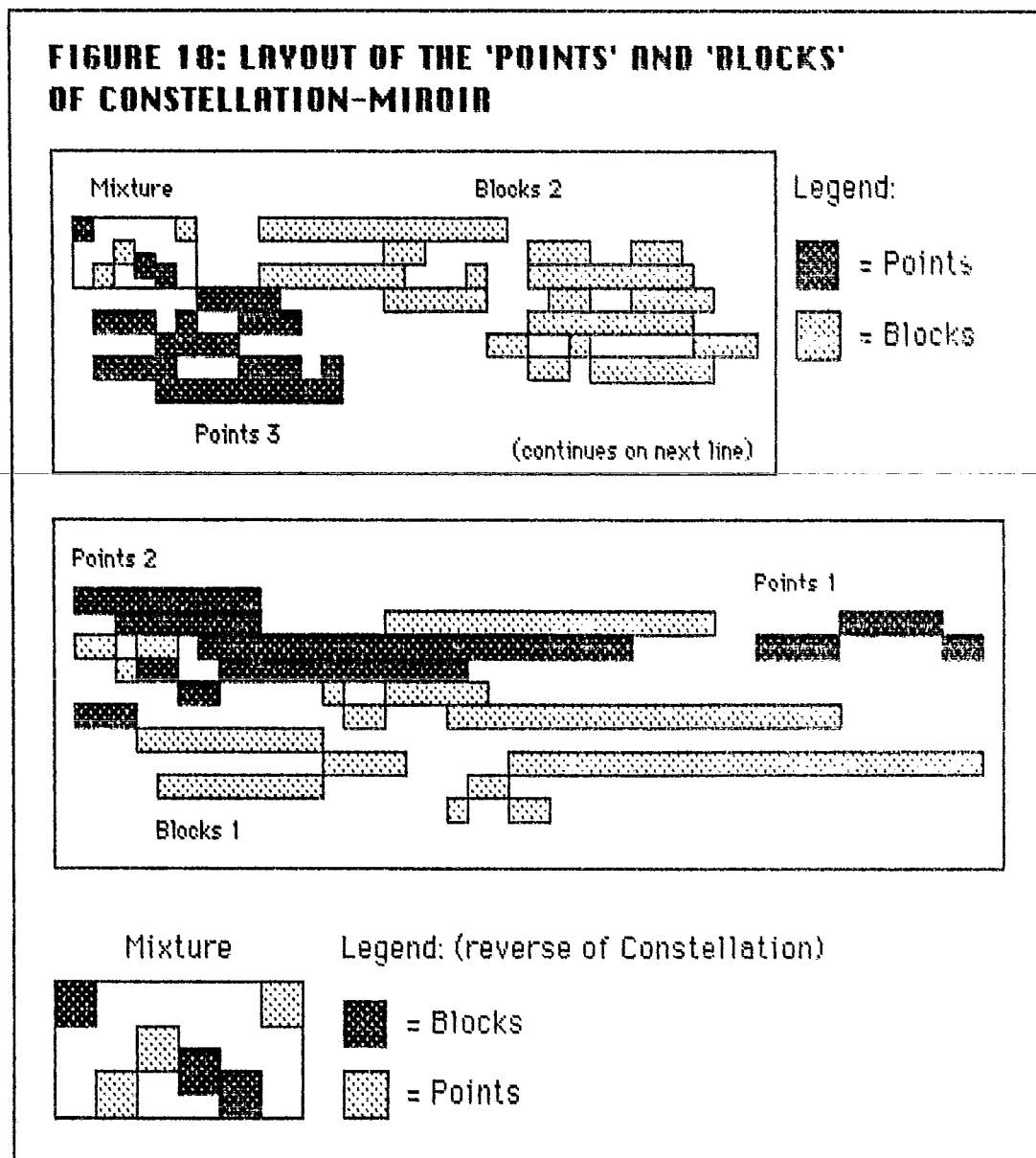FIGURE 18: LAYOUT OF THE 'POINTS' AND 'BLOCKS' OF CONSTELLATION-MIROIR

Figure 18 above depicts in the relationship of the six sections of this formant according to its *Constellation-miroir* order, as presented in the published score. The *Constellation* order is arrived at by reversing the order of the developments as they appear in the score. The graphs in Figure 18 are meant to display the spatial lay-out of the score. Each box is a staff-line. Movement between lines within a single Point or Block is determined

by a series of lines with arrows which precede and follow each line. Again, there is a choice in the direction to be taken in the context of the development.

In her article "The Concept of 'Aléa' in Boulez's *Constellation-Miroir*" Anne Trenkamp reveals how the syntactic units of the developments form units using the same principle of symmetric exchange found at the level of the formants and the developments. She deals with pitch, tempo, dynamic and tessitura at the level of morphology.

Figure 19: *Éclat*

Éclat was written for of two ensembles: Group A is made up of wind, brass and string instruments (alto flute, English horn, trumpet, trombone, viola and cello) and Group B contains percussion and plucked instruments (piano, celeste, harp, glockenspiel, vibraphone, mandoline, guitar and cymbalom). The solo piano sometimes serves as a link between developments. The role that timbre plays in defining the structure is shown in Example 2 of Figure 19 on page 146. Group A appears only at the beginning and the end of the piece. Group B is heard almost throughout. Example 2 is a graph of timbral distribution throughout the work.

Éclat is divided into five sections or developments, hereafter called sections one through five. The general phrase of the changes in the use of choice is the clearest indicator of the divisions between these sections. This is shown in Example 2 of Figure 19. Comparing Example 2 with Example 1, it will be noticed at a glance that there is some correspondence between the

distribution of timbre and the use of choice-operations in *Eclat.* In both cases there is some symmetry, suggesting an arch form. There is also a sense of unidirectionality, because section five, though similar to section one, does not reproduce its contents exactly.

There is little use of choice in section one (rehearsal numbers 1-3). There is some flexibility in tempo and dynamic, but otherwise the morphological and syntactic units are fixed. The first element of chance is found in section two (rehearsal numbers 3-14). Within this section there are developants indicated by large boxes, grouping certain instruments together. Within each box, each instrument has a sequence of four morphological units. The performers are instructed to begin at any one of these units and complete the sequence in order. The harp has a sequence of eight notes, and can begin this sequence on six of them.

Similar insertions of chance figures appear from numbers three to fourteen. Among these effects are found the following:

--five pitches divided into two groups wherein the group of three precedes or follows the group of two (rehearsal no. 5). In this and other similar figures, such components as timbre. dynamic, and tempo are also matters of choice, but these are inevitably linked. so that a faster tempo will have a lower dynamic, and so on.

--a series of rapid figures that are played according to the performer's capacity, and not in any particular meter, though approximate tempo is indicated (rehearsal no 8). It should be noted that the indeterminate figures are usually more rapid and florid than the fixed ones. which tend to be sustained notes and trills.

The third section of *Éclat* (rehearsal nos. 14-20) applies choice to duration. The means by which this is done are described in Example 3 of Figure 19. The large numbers in bold type are those found in the score between the harp and glockenspiel. They indicate the number of quarter-note beats that the unit of time below should take up. Where there are two sets of numbers in smaller bold print (i.e. 4-2 over 2-4) then if the first unit is four beats, the second is two, and vice versa. The figures in boxes mean that the order of the units is *ad lib.* In other words 1-4-3 in the box means that the first unit may be 1 or 4 or 3, and so on.

The small numbers beneath the large bold ones indicate two things. those in parentheses are metronome markings. those to their right are numbers of seconds. To illustrate, let us take the durational units at no. 14. There are a total of 14 units (3+1+6+4) which are played at MM=60 (one unit per second). Therefore the total duration of no. 14 is fourteen seconds. In some cases there are two metronome markings given, as at rehearsal no. 15. In the middle part of this section (no. 17). there is further complexity in that rather than a choice of single metronome markings is given, but a range (i.e. 40-45) within which the musician is to play.

If a tally is made of the possible durations of this middle section, following the upper line of numbers yields 145 seconds while following the lower line gives 151 seconds--a difference of six seconds. Despite many variable elements, the duration of this section is tightly controlled. If one were to choose the shortest and the longest combinations from among the two lines , the difference would be approximately a minute and six seconds.

FIGURE 19: ANALYSIS OF 'CHOICE' OPERATIONS IN *ÉCLAT*

Example 1: Structural organization of timbre

REHEARSAL NUMBERS

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
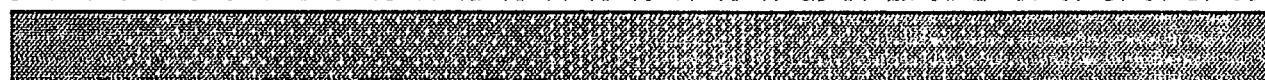

☐ = piano   ▦ = piano, flute, English horn, trumpet, trombone, viola, cello

▨ = piano, celeste, harpe, vibraphone, mandolin, guitar, cymbalom, tubular bells   ▥ = full ensemble

Example 2: Structural organization of 'choice' operations

REHEARSAL NUMBERS:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

FIXED   MORE VARIABLE   MOST VARIABLE   MORE VARIABLE   FIXED

▦ Pitch, register, order of entry all fixed; slight variation in tempo, dynamics in nos. 1-2, but preset in 25-31.

▦ Cyclic entry of groupings; ad lib entry of fixed groupings; choice of groupings, tempo, dynamic.

▦ Choice of metronome markings, relative length of beats in sections, dynamics, order of entry.

Example 3: Choice operations applied to temporal values in section 3 (nos. 14-20)

First line of numbers = Rehearsal numbers. Second line of numbers = Number of beats.
Numbers in brackets = Metronome markings. Numbers beside MMs = approx. seconds to complete the measure.

14				15					16
3	1	4 2 / 2 4	4	[1 4 3]	[4 3 2]	8	[1 4 3]	[3 2 1]	16
MM = 60 3	1	6	4	(80) 6	(68) 7	(60) 8	(80) 6	(180) 2	(60) 16
				(240) 2			(240) 2	(60) 6	

17

1 3 1 2   2 3 1 3   2 3 2 1   1 3 2 3
(52) 8   (40-45) 12-13.5   (120-135) 3.5-4   (35-45) 12-15.5

3 2 3 1   1 2 3 2   3 1 3 2   2 1 3 1
(68) 8   (120-135) 3.5-4   (40-45) 12-13.5   (105-135) 3-4

18   2 1 3   1 3 2   **19** 4 2   3 1
            3 1 2   2 3 1   4   1 1   2 4   12   1 3   1 3   4 2
   (90)   4   4   (60) 4   (60) 2   (120) 3   (60) 12 (80) 3 (40) 6   (30) 12
            1 3 2   1 3 2   (30) 4
            2 1 3   2 3 1   3 1   2 4
   (120)   12   12   (20) 12   (60) 6

But duration is not the only variable element in this middle section. Dynamics, or ranges of dynamics may be chosen. The conductor raises or lowers his hand, signaling to the players which indication to follow in the score (arrows going up or down). At times, the order of entries of instruments is staggered according to the players' whims. At rehearsal no. 16, the pianist has a solo passage (16 units and 60 MM equaling sixteen seconds in length) made up of eight fragments which are performed in any order.

The fourth section, from rehearsal nos. 20-25, reverts to the same practices as the second section, i.e. the completion of cycles of three or more units. Again there is the same differentiation between rapid-moving, variable elements, and fixed, stable elements. However there is no choice between dynamics; the intensity of each unit is fixed, and unique.

The last section, rehearsal nos. 25-31, is even more fixed than the first. The Group A instruments return, with the rest of the ensemble joining in at no. 27. Here for the first time we find the use of meter, notated above each bar. (The triangles and other symbols above the staff from no. 28 on are divisions of the bar for the use of the conductor.) This final section also shares with the opening section a contrapuntal texture unique that provides a sense of pulse which is absent from the middle sections of the work. The differentiation between rapid passages and sustained notes and trills which was characteristic of the middle sections is also missing here.

Example 2 summarizes the arch-form (or phrase) determined in part by the degree of variable degrees in the music. Listed below the graph is a key which shows the kinds of chance elements in each section of the piece, as described above. Other aspects are also coordinated in the same way, as,

for example, the change from contrapuntal to homophonic texture. True to his word, Boulez has created a form which, while variable, filled with the element of *choice,* is still clearly organized into a coherent structure. Moreover, the parts of the work are easily distinguishable, not just in the score, but to our ears. *Éclat* is proof that Boulez's use of chance-choice is an effective means of creating musical structure.

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Where both French and English texts are referred to, the French is given immediately before the English.

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