ABSTRACT

A STUDY OF SERIAL-RELATED COMPOSITIONAL TECHNIQUES PRIOR TO SCHOENBERG'S METHOD OF COMPOSING WITH TWELVE TONES

By

Donna Gartman Schultz

The Problem

The problem of this study was to find compositional techniques bearing a direct relationship to the serial method of Arnold Schoenberg in earlier music. Schoenberg's method is sometimes thought to be revolutionary. The examination of earlier music, however, reveals that his techniques often had been used by predecessors. Therefore, music written prior to Schoenberg's dissemination of his method should be studied for evidence of such techniques.

The Procedure

A definition of serial composition as proposed by Schoenberg was established in order to ascertain what compositional techniques could be considered serial-related. Two principles were shown to be required in order to have true serial composition--a use of all twelve notes of the chromatic scale, and a consistent and pre-determined ordering of those twelve notes. Other important aspects of Schoenberg's method--such as the transposition of the

series to any pitch level, the use of derived forms of the series, and the horizontal-vertical use of the series--were also defined.

The search for serial-related compositional techniques in earlier music involved not only the original analysis of musical examples, but also a study of analyses by other music theorists who have attempted to prove that Schoenberg's method had precedent. Each aspect of serial composition was considered separately.

Music studied included compositions by Mozart, Bach, and Beethoven, together with later compositions by Richard Strauss, Reger, Hindemith, Bartok, Ruggles, Hauer, Debussy, Stravinsky, and Scriabin.

Conclusions

Each aspect of Schoenberg's serial method of composition was seen to have precedent in music written prior to his discovery of the method. However, none of the examples studied could be correctly labeled as true serial composition.

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INTRODUCTION

The first twenty-five years of the twentieth century should no doubt be regarded as years of major significance in the development of music. Within this relatively short span of time, tonality, which had dominated the music of preceding centuries, was, for many composers, replaced by music that allowed no one tone to predominate, but rather stressed each of the twelve tones of the octave equally. The ultrachromaticism and denial of traditional harmonic function in the music of the late nineteenth century--as seen in the music of Richard Wagner, Richard Strauss, and Gustav Mahler--led ultimately to a denial of any existing tonal center in music, or atonality. The works of the early twentieth-century Viennese school (Arnold Schoenberg, Alban Berg, and Anton Webern being the most prominent members) are often regarded as the first examples of atonal music. Indeed, with Schoenberg's clear definition in 1923 of his new method of composing wherein all tones are related to each other, and not to a tonal center, atonality and serial composition were given decisive recognition. It should be noted that Schoenberg himself objected to the use of the term "atonality,"

instead preferring in its place "pantonality." However, since the ultimate effect is a denial of any one note as a tonal center, the use of the word "atonality" would seem to be appropriate. This is supported by George Perle in Serial Composition and Atonality:

> Schoenberg objected to the use of the term "atonality" to designate a musical idiom not based on the traditional tonal functions, recommending in its place "pantonality." The intended implication, presumably, is that the new musical language is a consequence of the merging of all tonalities. But since, according to Schoenberg and his followers, the immediate effect of this supposed merging of all tonalities was the obliteration of the characteristic features of tonality in general, "atonality" would seem to be a more appropriate designation for this language.[1]

Schoenberg, in a letter to Josef Hauer dated December 1, 1923, stated that he objected to the term "atonality," and "not . . . the thing itself!"[2]

Schoenberg occupies a unique position in the annals of music history. In retrospect, his music might be viewed as the culmination of all preceding Western music. As already pointed out, Strauss, Wagner, Mahler, and others were groping for a new harmonic language, one in which the boundaries of conventional harmonic function would no longer exist. It was Schoenberg who supplied this new harmonic language and perhaps exploited it to its fullest potential.

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[1]George Perle, Serial Composition and Atonality, (Berkeley: University of California Press, 1962), p. 7.

[2]Arnold Schoenberg Letters, ed. by Erwin Stein, trans. by Eithne Wilkins and Ernst Kaiser (London: Faber and Faber Limited, 1964), p. 105.

But Schoenberg must also be regarded as a pioneer of sorts, for it is with his definition and explanation of serial technique that the means for reaching this new atonal harmonic language were first achieved. Serial composition, even to the present day, has found its way into contemporary musical composition, and has served as the springboard for many composers who have strived to rid themselves of the boundaries of traditional harmony.

But even though Schoenberg was the first actually to define the new structural organization upon which atonal music was based (i.e., serialism), he and his disciples were not the first to use techniques that are closely analogous to serial composition.

During recent years several music theorists have attempted to prove that serial composition began not with Schoenberg, but with music prior to that of Schoenberg. George Perle devotes an entire chapter to the subject of "Nondodecaphonic Serial Composition," in which he examines music supposedly based upon a series containing less than twelve tones.[1] Although Perle includes examples of music by Debussy and the Russian composer Roslavetz in his discussion of the use of serial techniques, he gives particular emphasis to Alexander Scriabin as a forerunner of Schoenberg. Hans Keller has set the beginning of serial

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[1]George Perle, Serial Composition and Atonality.

composition as far back as the time of Mozart and Beethoven.[1] It would appear that, with such a widespread opinion regarding its date of origin, the study of serial composition deserves yet another look to determine just how much, if any, of Schoenberg's method has historical precedent.

Josef Hauer's compositional technique has received due consideration in light of its relationship to Schoenberg's serial method. He proposed the use of all twelve tones of the scale without regard to their fixed order other than the placement of any six notes in one group (referred to by Hauer as a "trope") which is mutually exclusive of the remaining group. Hauer's theories should be included in any discussion of the origin of serialism, regardless of their relationship to Schoenberg's method.

If any true understanding of the term "serialism" is to be reached, it is necessary for one to examine both the theoretical writings dealing with the subject of the origin of serial technique as well as the music which is purported to contain early examples of serialism. After such a study one would be able to define more clearly the compositional techniques that are used, and either be able to determine their justification for being described as

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[1]Hans Keller, "Strict Serial Techniques in Classical Music," Tempo, XXXVII (Fall, 1955), pp. 12-24.

serialism, or to make clear what, if any, relationship to the techniques of serialism exists.

The following study, then, attempts to find within music which appeared before 1923 those techniques which are related to serial composition either directly or indirectly. It is entirely possible that from this study, greater clarity of the definition of terms will be achieved, and that the need for the use of more precise terminology will be indicated.

CHAPTER I

SERIAL COMPOSITION DEFINED

Before one can begin to examine the techniques which are analogous to serial composition in music prior to Schoenberg's serial works, one must first have a clear understanding of what serial composition is in its most strict form.

In A History of Western Music, Donald Grout describes serial composition in this manner:

> By 1923, after six years during which he published no music, Schoenberg had formulated "a method of composing with twelve tones which are related only with one another." The essential points of the theory of the twelve-tone (dodecaphonic) or serial technique may be summarized as follows. The basis of each composition is a row or series consisting of the twelve tones of the octave arranged in any order the composer decides. The tones of the series are used either successively (as melody) or simultaneously (as harmony or counterpoint), in any octave and with any desired rhythm; but, in theory at least, all twelve should be heard before any one recurs. The row may also be used in inverted, retrograde, or retrograde inverted form, and in transpositions of any of the four forms.[1]

Thus, according to Grout, there are two requisite principles to the theory of serial composition: (1) the

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[1]Donald Jay Grout, A History of Western Music, (New York: W.W. Norton & Co., Inc., 1960), p. 651.

conscious use of all twelve tones as a structural device, and (2) a predetermined ordering of those twelve tones. Each of these two principles must be present in order to justify a work as having been created serially as defined by Schoenberg.

According to Oliver Neighbour, the first principle--the use of all twelve tones--has historical precedent:

> The twelve notes are to be found in close proximity even in Wagner, for as tonality expanded its boundaries chromatic sequences arose which brought them together. There is no suggestion of a new constructive principle in this, and the most that can be said is that the mere presence of such passages prepared the way for later developments [i.e., Schoenberg]. Gradually, however, chromatic variety began to exert an attraction of its own. This is observable in some of Mahler's and Reger's melodies which reach out, without recourse to sequences, almost to the twelve-note limit before turning back, though they are harmonised within a tonal framework. Where this tendency became especially strong, as it did in Schoenberg, it affected every aspect of the music so that the framework could not hold.[1]

No doubt the music of Wagner, Mahler, and Reger was moving toward dodecaphony, but it was left to Schoenberg to arrive at the complete organizational principle of it. Since Schoenberg's objective was to deny any sense of tonality or tonal function, then the absence of one or more notes from any statement of the series would tend to emphasive the remaining notes. The systematic use of all twelve notes was an attempt, for Schoenberg at least, to

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[1]Oliver Neighbour, "The Evolution of Twelve-note Music," Proceedings of the Royal Musical Association, LXXXI (1955), p. 50.

achieve the atonality toward which the music of the late romantic composers, with its ultrachromaticism, had been leading.

The second requisite principle of serial composition--a predetermined ordering of the twelve tones--is supported by Perle:

> The specific ordering of the notes is a necessary consequence of the concept of the set as a unitary structure whose elements are not functionally differentiated. An unordered twelve-tone set would be equivalent to the semi-tonal scale, that is, it would be simply a statement of the available tone material. The seven-tone scale may be analogously regarded as a diatonic system, but in addition, certain functional relations among the elements of the seven-tone scale are implied. Since the elements of the twelve-tone set are not thus functionally differentiated, they must be ordered if the set, conceived as a unitary structure, is to have any constructive significance whatsoever.[1]

Oliver Neighbour makes a similar observation:

> The chromatic scale . . . is a special case since it represents the complete tonal field of western music and lacks any limiting factor unless some order is imposed upon it. It is one of the functions of the series to do this. . . .[2]

The predetermined ordering of the twelve tones appeared to Schoenberg to be the solution to his problem; with the use of a consistent order of the twelve tones, a means of logical construction had been found. The necessity for such a constructive principle arose directly from the disappearance of tonal function in music. Schoenberg himself states that:

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[1]Perle, Serial Composition and Atonality, p. 5.

[2]Neighbour, "The Evolution of Twelve-note Music," p. 58.

> The method of composing with twelve tones grew out of a necessity . . . [of creating a] new procedure in musical construction which seemed fitted to replace those formal and structural differences 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]

Josef Rufer explains how significant the disappearance of tonality was to musical composition:

> At the moment when it was no longer possible to relate harmonic and melodic phenomena to a key-note, they lost an essential basis of their musical and logical coherence . . . for with the cessation of tonality the ordering of the notes produced by tonality--harmonically by means of the triad, and melodically by means of the major and minor scales--no longer applied. This tonal organization is a hierarchy, set up and ruled over by the key-note, which drew all the remaining eleven notes toward itself, and related them to itself. They only existed through the key-note, as its satellites; as being the third, sixth, etc., of the key-note.[2]

Without a predetermined and consistent ordering of the twelve-tone set, the basic structure of serial music would seem to be undermined. In tonal music all tones exist only in their relation to the tonic note. Without this principle, tonal music would have no logical and

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[1]Arnold Schoenberg, Style and Idea, trans. by Dika Newlin (New York: Philosophical Library, 1950), p. 103, 107.

[2]Josef Rufer, Composition with Twelve Notes, trans. by Humphrey Searle (Third ed. rev.; London: Barrie and Rockliff, 1965), p. 79.

meaningful construction to support it. In Schoenberg's serial music, all tones exist only in relation to each other; Schoenberg called it "composition with twelve notes related only to one another." Without order, which is necessary to provide that relationship of tones to each other, the fundamental constructive principle of Schoenberg's method is lacking. The negation of a strict ordering would tend to have an effect similar to that of omitting notes as described before--certain notes would begin to emerge as having greater importance in relation to others by virtue of their repetition out of sequence. It is this aspect of order that probably has the greater bearing on the serialism of a composition. As will be shown in the following chapters, certain techniques described by various composers and theorists as being analogous to serial composition deny this fundamental principle of order. Yet it would seem that, in order to use the word "serial," a systematic ordering of notes must be present. According to George Perle, "In a strict sense the term 'series' denotes an ordered succession of elements, such as the Schoenbergian twelve-tone set."[1]

Indeed, the free use of various terms in discussion of serial music can lead to a great deal of confusion. All too often different terms are used synonymously, and the

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[1]Perle, Serial Composition and Atonality, p. 40.

precise definition of each separate term is overlooked. The twelve notes of the chromatic scale, arranged in their predetermined order, are variously referred to as a "row," a "series," or a "set." The original German term Reihe may be translated to mean any of these; but the choice of the English equivalent, in light of the fact that the choices have slightly different connotations, should be determined by the compositional technique found in the music itself. "Row," the first term to be used in English writings, is now possibly the least used; as George Perle states, it "implies a certain regularity, not necessarily characteristic of the set."[1] "Series," popularized mostly through the writings of Ernst Krenek, is frequently used; it would seem to be the best choice, for it implies the use of a consistent order, without which there is no twelve-tone music as proposed by Schoenberg. "Set," used first by Milton Babbitt and subsequently adopted by Perle and others, was originally a term used in mathematics to refer to a "collection of some kind"--in mathematics, to a collection of numbers.[2] Logically, a set may also refer to a collection of pitches. But in mathematics where the term originated, "set" implies no specific order of the

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[1]Perle, Serial Composition and Atonality, p. 2.

[2]Edwin F. Beckenback, Irving Drooyan, and William Wooton, College Algebra (Belmont, California: Wadsworth Publishing Company, Inc., 1964), p. 1.

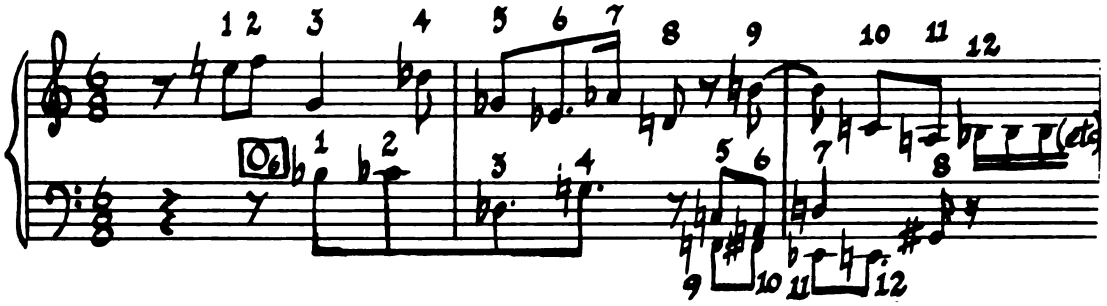
elements of the set. Therefore, its use to refer to an ordered collection of pitches is somewhat misleading. The use of the word "set" in discussing compositional techniques would seem to be most appropriate when an unordered collection of pitches is being used; the use of "series" would be the preferred term when an ordered collection of pitches is being used.

Not only are the various words used to refer to the twelve notes confusing; confusion also arises over the various names given to the particular style of composition that Schoenberg developed. "Serial music," "twelve-tone music," (or "twelve-note music"), "dodecaphonic music," and "atonal music"--all are frequently used interchangeably to refer to Schoenberg's music. Schoenberg called his compositional technique "a method of composing with twelve tones related only to one another." The other terms used to refer to it are inventions of others. The most appropriate--and the one being used in this study--is "serialism," for it implies the ordering of the twelve tones that is a prerequisite of Schoenberg's method. The other terms are somewhat misleading, for they can also be correctly applied to music that is not based upon Schoenberg's method--for instance, free atonality and free tonality. Schoenberg's music is certainly not alone in its use of all twelve tones. Thus the terms "twelve-tone" and "dodecaphonic" are not restrictive enough. George

Perle refers to this confusion when he notes that "dodecaphony" usually means serial music, but ought to refer to any music based upon a twelve-tone scale.[1]

To illustrate the process of strict serial composition as defined by Schoenberg, the following examples, with serial analysis, are included. These examples illustrate both the principle of the use of all twelve notes and the principle of a prescribed order. By virtue of this, they may be considered strict serial composition. For further study, the reader may refer to Ernst Krenek's Twelve Short Piano Pieces in the Twelve-Tone Technique, Op. 83 (1938), each of which demonstrates the strict use of serial technique as described previously.

Example 1: From the Präludium, Suite für Klavier, Schoenberg, Op. 25, measures 1-3.



Though only two things--the use of all twelve tones, and a predetermined ordering of those tones--are necessary for serial composition as defined by Schoenberg, another aspect of the method of serial composition must be

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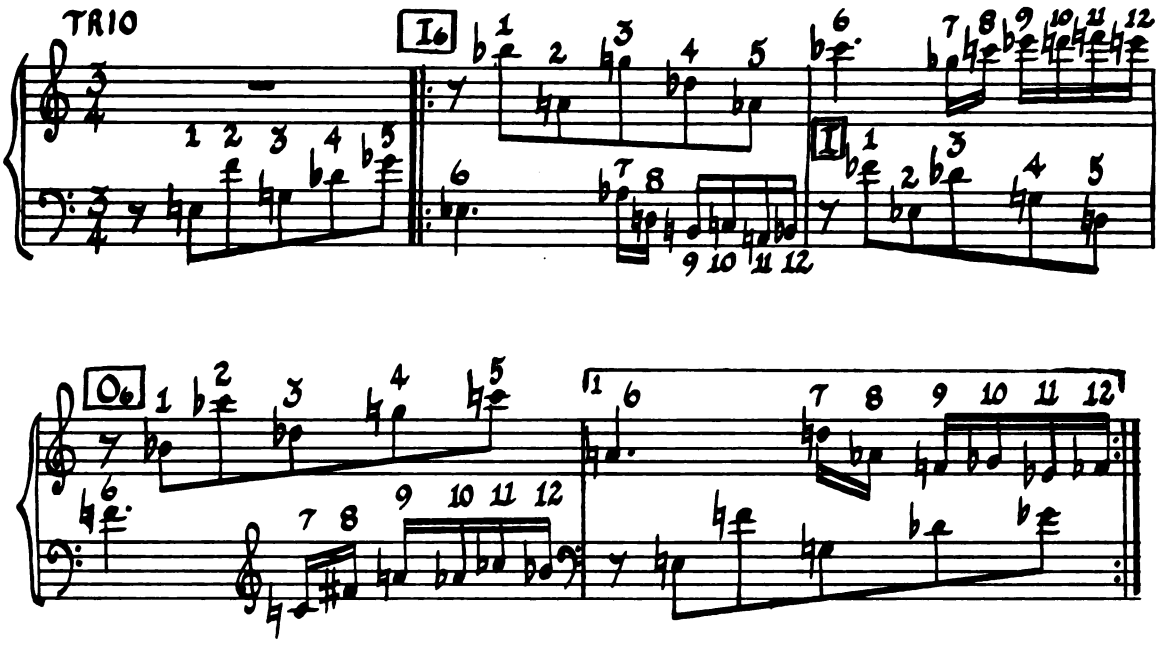
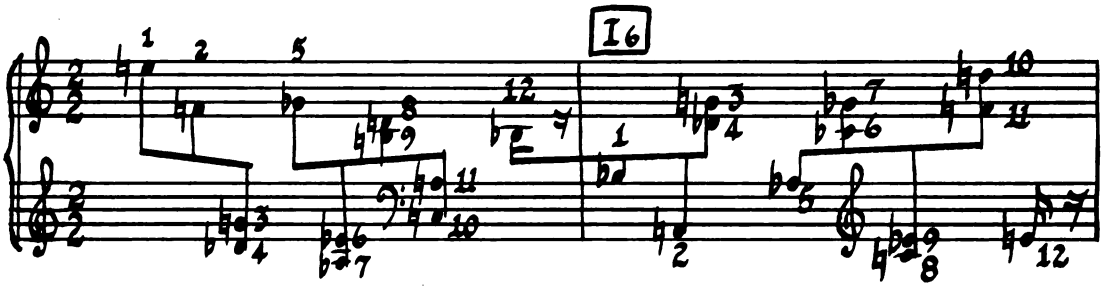
[1]Perle, Serial Composition and Atonality, p. 8.

Example 2: From the Minuet and Trio, Suite für Klavier, Schoenberg, Op. 25, measures 34-38.

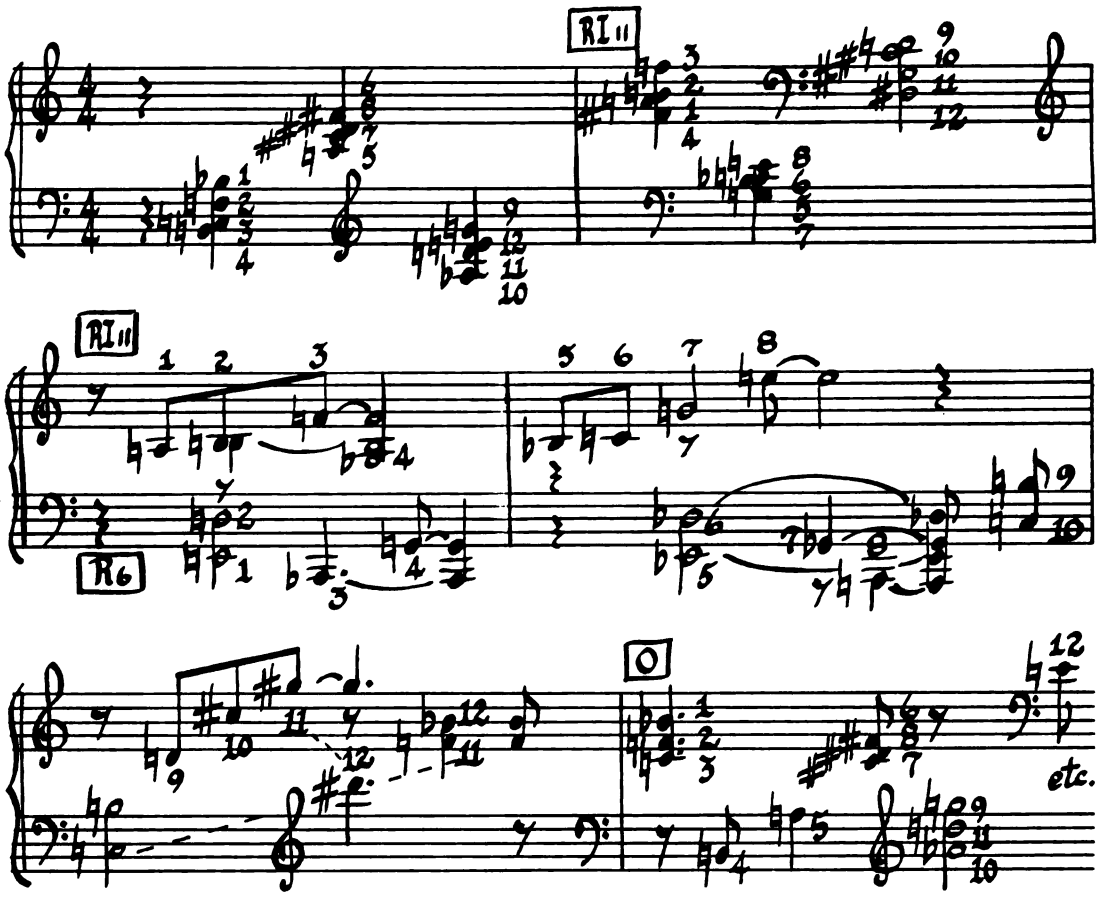


Example 3: From the Gigue, Suite für Klavier, Schoenberg, Op. 25, measures 1-2.



considered here because of its relationship to techniques being used in music before 1923. An analysis of serial composition that consists merely of counting notes is a naïve one indeed. One must also take into consideration

Example 4: From Klavierstück, Schoenberg, Op 33a, measures 1-6.



the manner in which the notes, in their respective order, are being used. An important aspect of Schoenberg's method was that the notes could be used either as melody or harmony--"The tones of the series are used either successively (as melody) or simultaneously (as harmony or counterpoint). . . ."[1] Note that the preceding examples of Schoenberg's music illustrate both the successive

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[1]Grout, A History of Western Music, p. 651.

(melodic) use of notes and the simultaneous (harmonic) use of notes. This technique can be found in music prior to that of Schoenberg, as will be shown subsequently.

Any use of notes other than the notes of the prescribed row in their successive order--including the inversion, the retrograde, and the retrograde inverted together with any transposition of the four forms--must be considered a deviation from strict serial technique. However, certain such "deviations" are so common in the music of strict serial composers that they are considered an integral part of the technique by composer and theorist alike. According to rule, no one note may appear before the other twelve notes have been sounded; but in practice, a note, or note-group, is often repeated sooner: any one note may be repeated at the same pitch an indefinite number of times before the next note is played; two notes may alternate, thereby forming trill or tremelo effects; and larger groups of notes may be repeated before proceeding to the next notes of the series. Schoenberg himself admits the possibility of varying the order of the tones:

> . . . It will be observed that the succession of the tones according to their order in the set has always been strictly observed. One could perhaps tolerate a slight digression from this order . . . in the later part of a work, when the set had already become familiar to the ear. However, one would not thus digress at the beginning of a piece.[1]

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[1]Schoenberg, Style and Idea, p. 117.

The preceding discussion and illustration of the strict use of serial technique serve now as a basis for the study of serial-related compositional techniques in music written prior to 1923.

CHAPTER II

THE RELATIONSHIP OF SCHOENBERG'S WORK TO CLASSICAL CONTRAPUNTAL TECHNIQUE

As mentioned earlier, Schoenberg occupies a unique position in the course of music history in that his work may be viewed both as a culmination of previous trends, and, at the same time, as a new, revolutionary style of composition. All too often greater stress is placed upon the latter factor. Yet in order to fully understand and appreciate serial music, one must be aware of the fact that Schoenberg drew a great deal of his technique as a composer directly from his study of classical music. To quote Oliver Neighbour, "His method evolved in accordance with his genius for close musical thinking in the tradition of the Viennese classics and Brahms."[1] Perhaps this is recognized most readily in his use of inversion and retrograde for derived forms of the series; that he would conceive the possibilities provided by such transformations proves that Schoenberg had studied the music of Bach, Mozart, Beethoven, and Brahms and their use of similar

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[1]Neighbour, "The Evolution of Twelve-note Music," p. 60.

transformations of a musical idea. This knowledge of contrapuntal manipulation displays itself throughout his music, and its use in his serial compositions will serve as a comparison to some of the serial-related techniques to be discussed in the following chapters.

> Schoenberg's unprecedented achievement was made possible . . . because he recognized that the great masters are the ultimate source of learning. Thus, he assiduously studied the music of Bach, Haydn, Mozart, Beethoven, Schubert, Brahms, and Wagner, the masters of the Austro-German heritage. He was and remained a traditionalist at heart, despite the musical revolution he brought about. In his teaching, too, he drew his examples from the works of the named composers, seldom venturing beyond Brahms. His students all testify to his amazing knowledge to shed new light on a Bach fugue or Beethoven string quartet.
>
> . . . The music of Schoenberg and his school should be looked upon as the last link in a long line of musical evolution. It represents the crystallization and distillation of a long historical process, and it speaks with the sophistication and differentiation of the accumulated knowledge of many generations.[1]

Schoenberg himself relates that Wagner and Brahms exerted the greatest influence upon his music: Wagner for his harmonic freedom, and Brahms for his careful contrapuntal thinking.[2]

The phrase "careful contrapuntal thinking" is an important one, for it perhaps sums up one of the most important aspects of Schoenberg's composition. The techniques

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[1]Otto Deri, Exploring Twentieth-Century Music (New York: Holt, Rinehart, and Winston, Inc., 1968), p. 271.

[2]Arnold Schoenberg, "My Evolution," Musical Quarterly XXXVIII (1952).

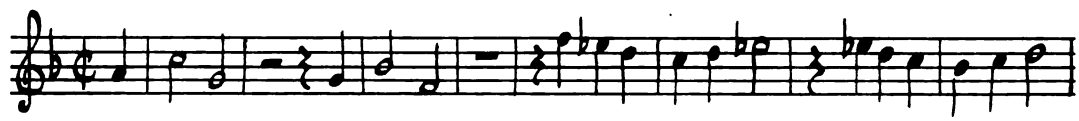
of conscious contrapuntal manipulation--inversion, retrograde, etc.--were used by Schoenberg to obtain the necessary variation while maintaining unity (of the twelve-tone line). The devices that give coherence and form to the fugues of J. S. Bach are the ones that Schoenberg used for the same purpose.

Schoenberg illustrated the classical roots of his method of composing with one example of Beethoven's music:

> In his only written exposition of his method (Composition with Twelve Tones, in Style and Idea, New York, 1950, and London, 1951), Schoenberg illustrates its classical history by a single example from late Beethoven which shows Beethoven's use of pre-classical contrapuntal devices. . . .[1]

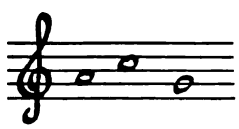
The example quoted is from the finale of the F Major Quartet, Op. 135 (measures 13-20):

Example 5:

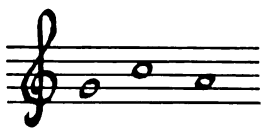


Schoenberg explained the relationship between the first four-measure phrase and the second four-measure phrase in the following manner:

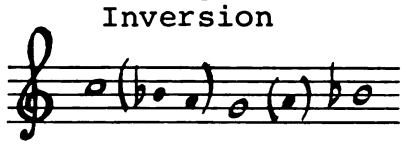
a) Original



b) Retrograde



c) Retrograde-Inversion



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[1]Hans Keller, "Strict Serial Techniques in Classical Music," p. 12.

Thus, the second phrase is a transposed retrograde-inversion, with passing tones, of the original figure in the first phrase.

In discussing the connection between Schoenberg and Beethoven, Erwin Stein makes the following observation:

> . . . Schoenberg's technique of thematic development--with its strettos, condensations, and segmentations into the smallest motivic unit--roots in Beethoven. . . . The time will come when we shall better understand how Schoenberg's "composition with twelve notes" too, derives--as a final consequence--from Beethoven.[1]

One cannot deny the fact that most of Schoenberg's music is constructed contrapuntally and contains numerous examples of contrapuntal manipulation. But the mere existence of contrapuntal devices is not enough to justify an assessment of a work as being related to serial music. If it were, then more music than not would be serial-related. Hans Keller has stated that,

> In themselves, the mirror forms are old, primarily contrapuntal devices of thematic economy and by no means a decisive characteristic of serial technique.[2]

Serial composition, though well-suited to the processes of contrapuntal manipulation, is something more. Therefore, in order to find serial-related compositional techniques in music before Schoenberg's method was developed, one must

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[1]Erwin Stein, "Musical Thought: Beethoven and Schoenberg," in Orpheus in New Guises (London: Rockliff, 1953), p. 95.

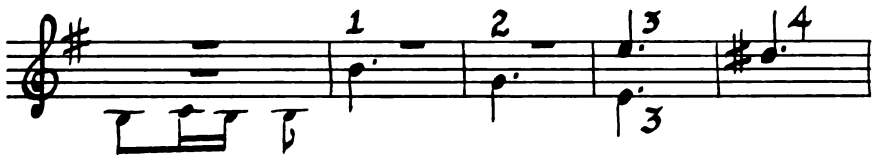
[2]Keller, "Strict Serial Techniques in Classical Music," p. 12.

look for something that goes beyond merely exploiting contrapuntal devices.

Hans Keller has given various examples from Mozart and Beethoven which he claims are directly related to Schoenberg's serialism.[1] Keller bases his claim for the "strict serialism" of his examples upon the fact that the "series" (usually only three or four notes long) is not rhythmically committed, as contrapuntal variations usually are. For example, a connection is made between the first subject of the first movement of Mozart's G major Quartet, K.156, and the beginning of the same movement's development section. Taking the four-note series D, B, G, F♯, one can see that a transposed form of the same series appears to be used in the development, and that no ryhthmic relationship is present.

Example 6a: first subject of exposition

Example 6b: opening of development

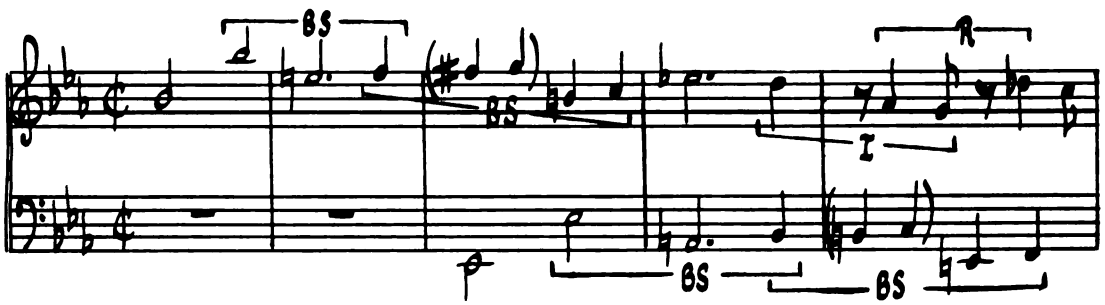


[1]Ibid., pp. 12-24.

However, the transposition of the series is not exact, but rather a tonal transposition (as opposed to real).

In yet another example, the opening of the development section of the first movement of the Quartet in E^b of Mozart, K. 428, Keller claims that a three-note series is found in transposed, inverted, retrograde, and retrograde-inverted forms. He calls this ". . . a mature example of strict serialism . . ." and states that "this is purest Schoenberg."[1] A portion of his analysis is shown:

Example 7:



In addition, Keller also marks each statement of a minor second, calling it ". . . a series in extremest miniature."[2]

The possibility of so many statements of the series, including inverted and retrograde forms, is made possible by the use of the tritone in such a short series. The question here seems to be one of degree: when does

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[1] Ibid., p. 15.

[2] Ibid.

contrapuntal manipulation (obviously present in the above example, even though quite complex) become true serial technique as proposed by Schoenberg? The concept of order is implicit in any example of contrapuntal manipulation; but to be described as "strict serialism," it would seem that use of a more extensive and complicated series than is shown here is necessary. Again, serial composition consists of much more than the exploitation of contrapuntal devices.

CHAPTER III

MUSIC USING ALL TWELVE TONES

In order for one to discuss the techniques that are serial-related in music prior to Schoenberg's serial writing, the two requisite principles, as described earlier, must be considered separately. The evolution of the use of all twelve notes, no one being given the function of a tonal center, is a development independent and exclusive of the evolution of the organizational technique of arranging a group of notes (not necessarily twelve, but any number of notes) into an ordered series for compositional purposes. Only in Schoenberg's music did the two merge to form a sophisticated and highly intellectual method of composition.

The evolution of the use of all twelve tones of the chromatic scale is easily traced up to the dissolution of tonality in 1923. One must have only a basic knowledge of tonal harmony in order to understand that atonality was perhaps inevitable. Early Western music was almost completely diatonic, with notes outside of the scale being allowed only as chromatic embellishments, or non-harmonic tones. Yet as harmony developed, more chromatic tones

were allowed to function harmonically. In the hands of the romantic composers, chromatic harmony, with its rich palate of colorful chords, still functioned as tonal harmony, despite the high frequency of chromatic tones.

As chromatic chords became more and more accepted, they began to be used more by composers--such as Mahler and Wagner--often without regard to their harmonic function in a key. Debussy carried this even further in his use of unresolved chromatic, active sonorities and a vagueness of tonality involving quickly shifting modulations. That atonality came about as a further consequence of the use of chromaticism in music, is supported by Oliver Neighbour's comment: "We may fairly conclude that the tendency towards total chromaticism was a natural historical development."[1] All twelve notes were seen more and more frequently, and the necessity for a key center was no longer apparent. The problem facing composers of the early twentieth century was one of organization: with the organizational principle of tonality no longer present, some means had to be found to give coherence and unity to music using all twelve tones.

Schoenberg's ultimate solution to this problem was to put the twelve notes into an ordered series. Other composers chose different solutions for the organization of the twelve tones.

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[1]Neighbour, "The Evolution of Twelve-note Music," p. 50.

> With the adoption of [the twelve-tone system] as an exclusive basis for atonal composition in the works of Schoenberg and his immediate disciples, the period of "free" atonality was seen as a closed historical epoch that necessarily and inevitably had been superseded by a new stage of development. But the twelve-tone system has its source in only a few of the seemingly inexhaustible implications of the music of that period. It is conceivable that viable structural principles other than those of the twelve-tone system may still be discovered in this music.[1]

One of the most often-mentioned composers, other than Arnold Schoenberg, who attempted to organize all twelve notes for compositional purposes, is Josef Hauer. One of Schoenberg's student-colleagues, Egon Wellesz, has described Hauer, his music, and his influence upon Schoenberg:

> It was in 1916 that I received the visit of a soldier who was sent to me by my friend, Rudolph Reti. . . . This soldier was an elementary-school teacher whom the military medical authorities considered too high-strung for active service. His name was Josef Matthias Hauer. He showed me some of his works. I had never seen such a mixture of amateurish writing, without any training in harmony and counterpoint, and of passages of undisputed originality. He told me that he wanted to write music like the ancient Greeks. He showed me his compositions. All were very short. Each piece represented a Nomos, and the Nomos consisted of twelve tones. . . . This meant that each melody represented the whole compass of the chromatic scale, but the tones were chosen in such a way that the layout of a row sounded almost diatonic. The music was easily singable. Hauer's compositions became known in our small circle and were brought to Schönberg, who, at that time, had occasionally made use of the serial technique. But undoubtedly Hauer's twelve-tone compositions showed him the way out of his crisis; they came to him as the right impulse at the right moment.

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[1]Perle, Serial Composition and Atonality, p. 34.

> . . . He [Hauer] provided Schönberg with the principal idea, the row of twelve tones as a new principal of composition.[1]

Hauer's technique consisted of dividing the twelve notes of the chromatic scale into two groups of six notes each, called "tropes." No note was repeated in each segment, and no note was common to both segments. Unlike Schoenberg's serial method, Hauer suggested no prescribed order for the notes in each segment; his only restriction was that each segment be used in alternation with the other segment of six notes. Hauer's method, as compared to that of Schoenberg, allowed much more freedom of choice in twelve-note composition in that neither harmony nor melody were predetermined by any concept of series. Had Hauer had the skill to handle his concepts in a manner that would have produced music of great value, he, rather than Schoenberg, might have been the composer to be credited with originating a new method of composition.

Hauer's method did not provide for the conscious contrapuntal manipulation whose value Schoenberg had the foresight to realize. If the notes in each trope or hexachord do not have a prescribed order, then the possibility of systematic transposition, inversion, and retrograde has no significance. Transposition and inversion of a trope,

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[1]Egon Wellesz, "The Origins of Schoenberg's Twelve-Tone System," a lecture delivered in the Whitehall Pavillon of the Library of Congress, Washington, D.C., 1958, pp. 7-9.

while possible, would more frequently than not produce duplication of notes within the following hexachord. Retrograde has no meaning at all since the order of the six notes is not predetermined. Although Hauer's method lacks the close-knit organization of serialism, it does nevertheless present a method for composing with twelve tones.

How Hauer first conceived the possibility of using all twelve notes in his composition is not known, but his first theoretical concept of twelve-note music was of a melodic line--the Melos--in its purest form, devoid of rhythm or harmony. Rhythm, supposedly, would develop from the suggested stress and nature of the intervals. Harmony was to be a result of notes still sounding after they had served their melodic function; this would be similar to the process in tonal music where a melodic figure consisting of an arpeggiated triad is harmonized by the chord itself. This concept of the Melos is, in part, responsible for the weakness in Hauer's music. Since harmony and rhythm are determined only by the implications of the melody itself, Hauer's music tends to contain an overabundance of stagnant harmony which moves in relatively regular rhythmic patterns.[1]

The following examples, with analysis, illustrate the typical compositional technique of Hauer.

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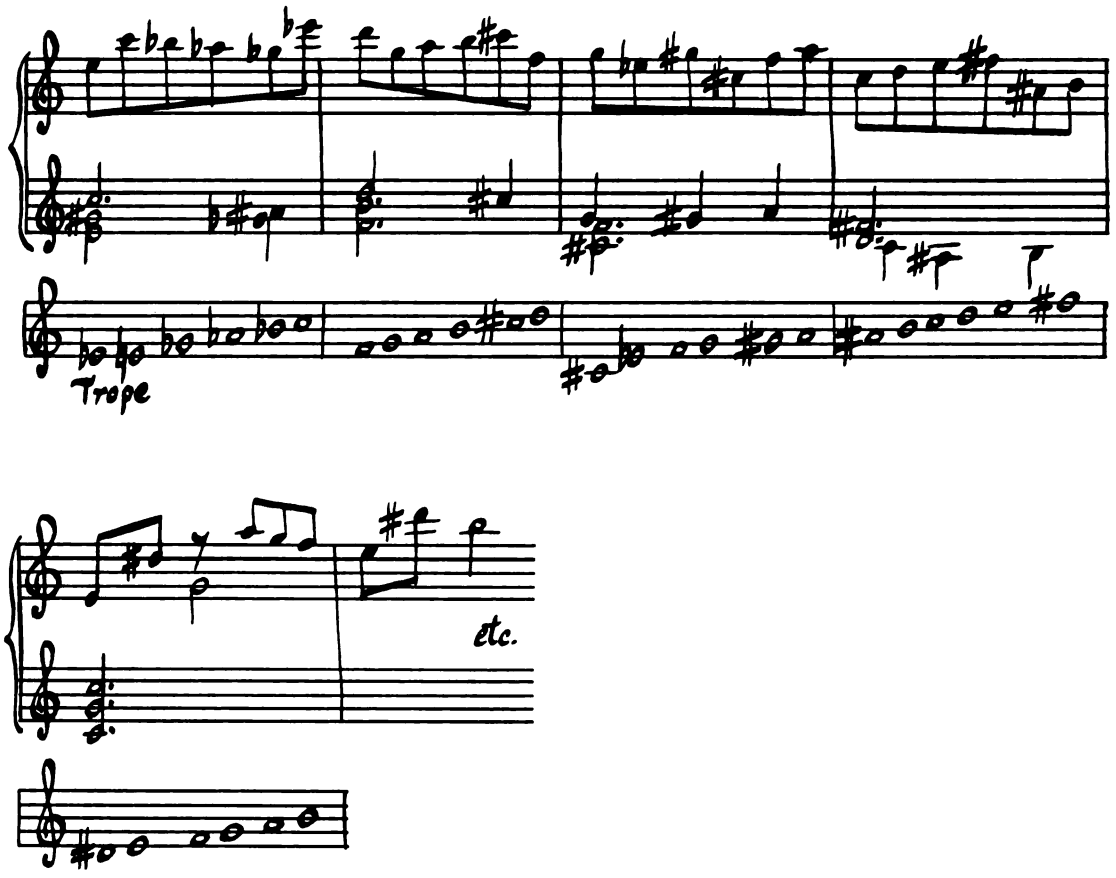
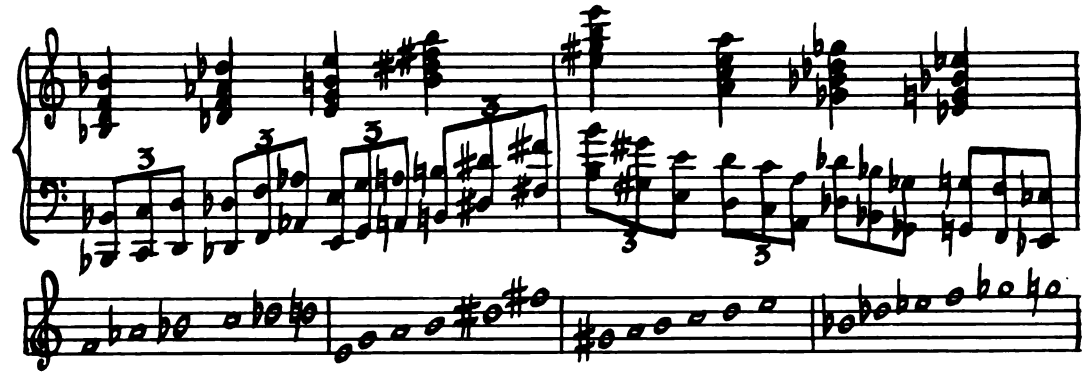
[1]Neighbour, "The Evolution of Twelve-note Music," pp. 53-54.

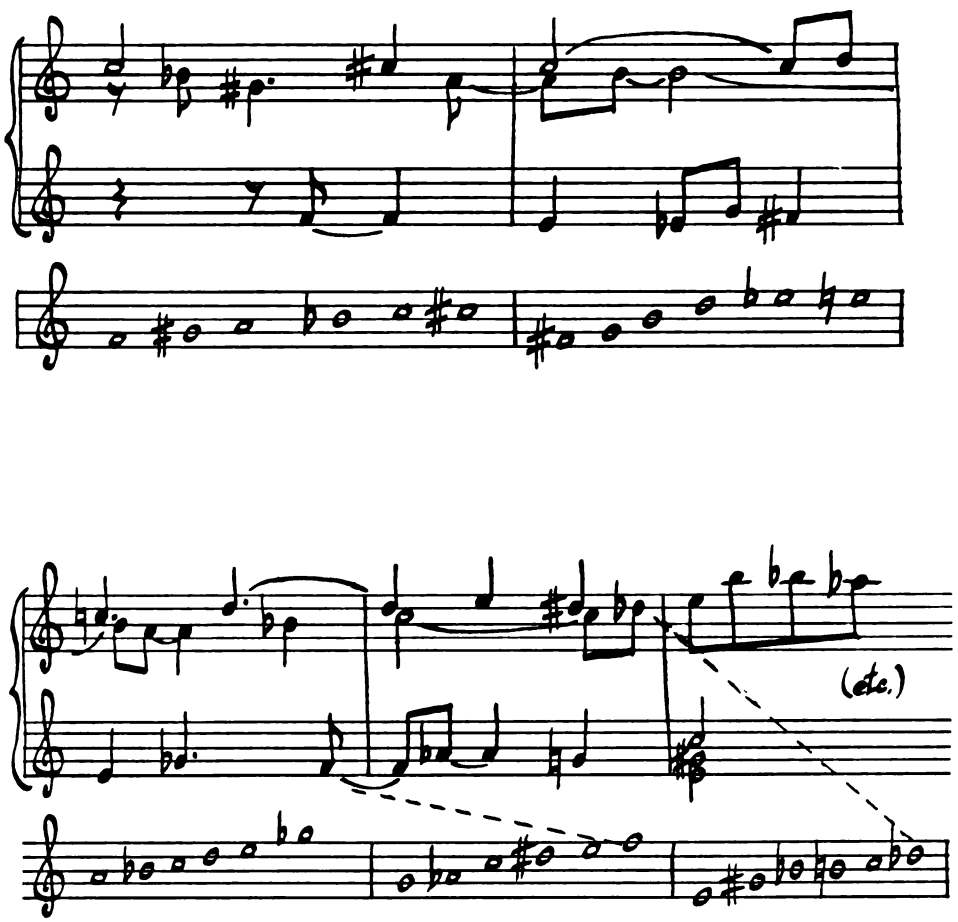
Example 8: From "Fantasie," Op. 37.



Example 9: From Vom Melos zur Pauke.



Example 10: From "Fantasie," Op. 37.



Wellesz's account of Schoenberg's knowledge of Hauer's work supports the supposition that Schoenberg was influenced by Hauer. How important that influence was must be left to speculation. Perhaps Schoenberg was influenced to some degree by Hauer's conscious attempt to manipulate all twelve notes of the chromatic scale in some sort of systematic fashion; but conceivably, Schoenberg would have

reached the same conclusion with regard to his own method of composition had he never heard of Hauer or his music.

Josef Hauer is not the only one to be credited with anticipating Schoenberg's discovery. Desire Pacque, a Frenchman born in 1867, traces twelve-tone music back to the beginning of the nineteenth century, and is supposed to have written three atonal violin sonatas by 1911. And the Ukranian composer Jef Golysheff in 1914 wrote a string quartet showing dodecaphonic characteristics, as well as an orchestral piece in 1919 which further developed his style of twelve-note composition. However, neither of these works by Golysheff was ever published, and the writings and work of Pacque have subsequently been lost.[1]

The conscious use of twelve notes (or almost twelve notes, in many cases) as a melodic idea is not restricted to the late nineteenth and early twentieth centuries. Numerous examples from earlier periods are to be found that use many notes within a few measures, though the usage is most often melodic and is harmonized within a tonal framework.

J. S. Bach used all twelve tones of the chromatic scale in the three-measure subject of Fugue No. 24 in B minor in the first volume of The Well Tempered Clavier:

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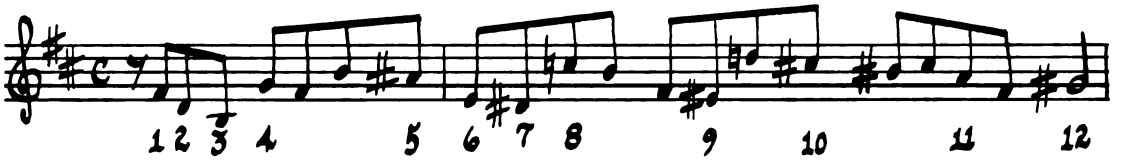
[1]Mósco Carner, A Study of 20th-Century Harmony, Vol. II: Contemporary Harmony (London: Joseph Williams Limited, 1942), p. 65. Also see Neighbour, "The Evolution of Twelve-note Music," p. 49.

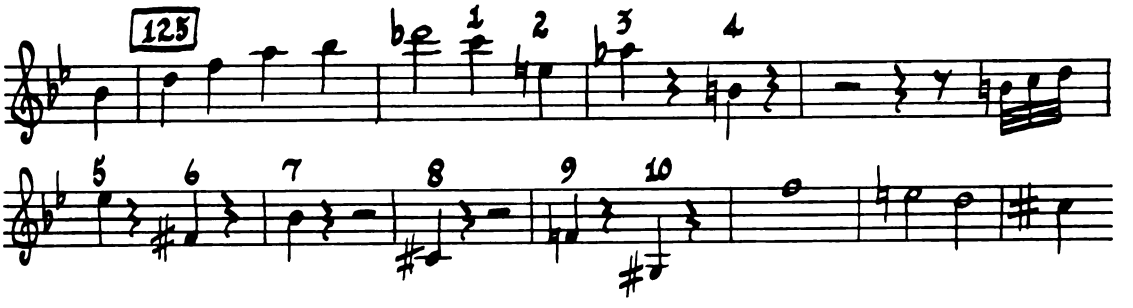
Example 11:



The idea here is a sequential one, of course; and the subsequent treatment of the subject is within the structure of tonality. But this, as well as several other subjects in similar Bach fugues, is remarkable for its use of many notes.

Heinrich Jalowetz, in an article on Schoenberg, observed that the beginning of the development section of the last movement of Mozart's G minor Symphony (K. 550) contains a "genuine twelve-tone line, . . . a series of ten tones of the chromatic scale that are treated as of equal value and therefore not as in traditional chromaticism."[1]

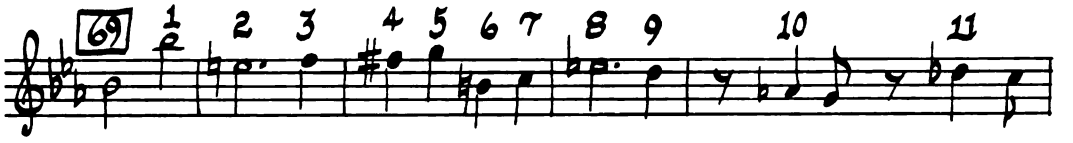
Example 12:



[1]Heinrich Jalowetz, "On the Spontaneity of Schoenberg's Music," Musical Quarterly, XXX (October, 1944), p. 387.

In yet another example taken from Mozart, eleven of the twelve notes appear; the following line is from the beginning of the development section of the first movement of the String Quartet in E^b, K. 428:

Example 13:



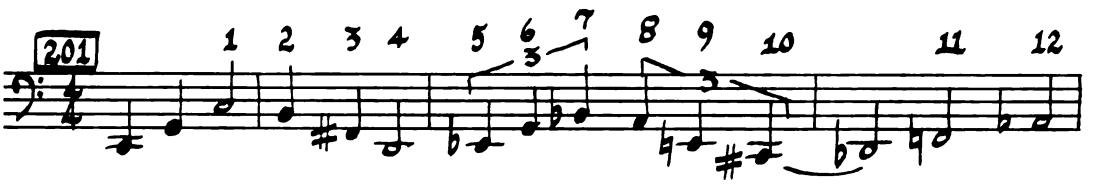
The missing note, A, appears in the viola and violoncello parts in the fourth measure.

Both of the Mozart examples seen above also employ a sequential idea, however briefly, as did the subject of the Bach fugue in Example 11. It is, of course, impossible to determine whether the inclusion of so many notes of the chromatic scale was a conscious effort. The effect becomes one of a momentarily-suspended tonality, which is often typical at the opening of a classical development section.

The use of twelve-note melodic ideas became much more prevalent, however, in the late nineteenth century. Various passages in the music of Richard Strauss are remarkable in their use of all--or most of--the notes of the chromatic scale. It seems that each time Strauss has included as many notes as possible, within as short a space as possible, resulting in a lack of any strong sense

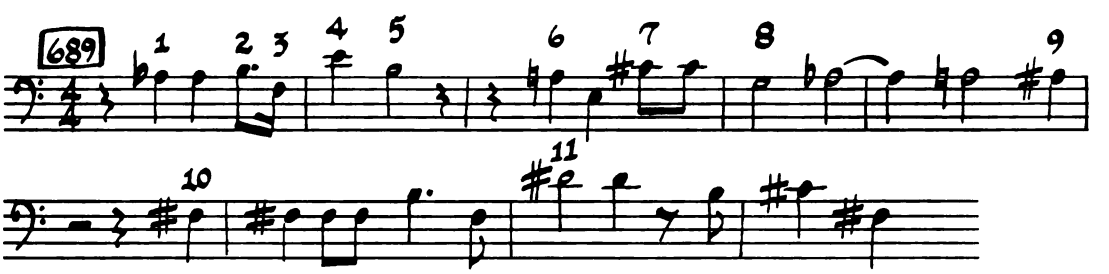
of tonality. Even in as early a work as the symphonic poem Also sprach Zarathustra (1896), the following theme, using all twelve notes, appears:

Example 14:



Several years later, in Salome (1905), Strauss used similar themes even more frequently. In one line sung by Jochanaan, eleven of the twelve notes appear:

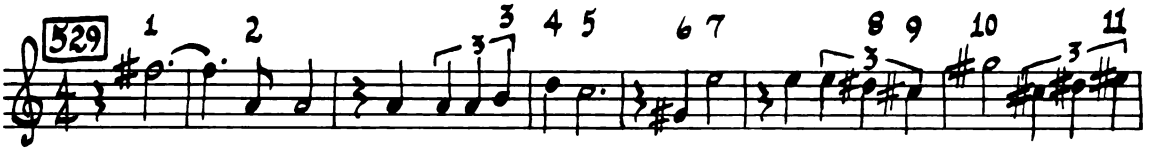
Example 15:



The twelfth note, $C^{\natural}$, appears in the accompaniment played by the cellos and double basses in the fourth measure; the accompaniment, on the whole, here merely elaborates upon the vocal line, so that the complete texture uses most of the notes of the chromatic scale.

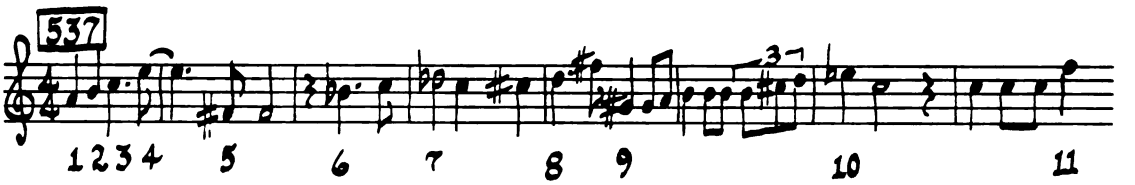
In another place, eleven notes appear in even closer succession in a line sung by Salome; only $B^{\flat}$ is missing.

Example 16:



This is followed immediately by another similar melody, again using eleven of the twelve tones; here, G is the missing tone:

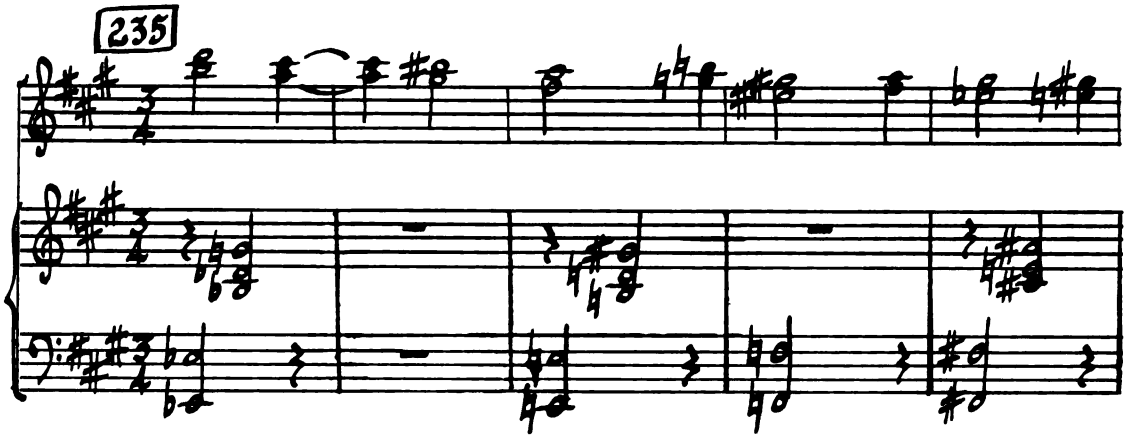
Example 17:



Though the harmonization here is basically triadic, the use of eleven of the twelve tones suggests that Strauss was making a conscious effort to exploit their use.

In yet another instance, the twelve notes are used vertically as well as horizontally within a span of only five measures. Their use here is even more related to Schoenberg's method in that there appears to be a conscious effort to let twelve notes, and not tonality, control the organization of the music, however briefly.

Example 18:

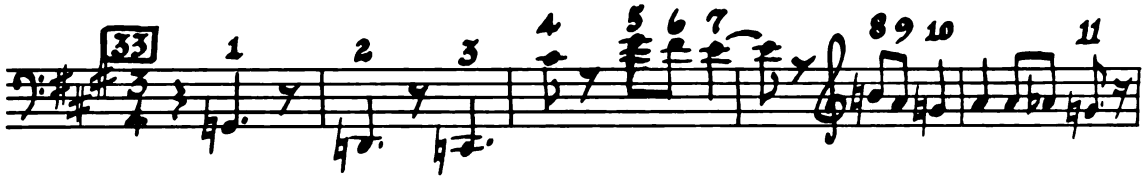


Eleven notes are found in the top staff, with few repetitions; and the twelfth note, B^{b}, can be found in the chords underneath both in the first and last measures. However, if one looks for all twelve notes in the complete texture here, they occur even sooner; by the $E^{\#}$ in the fourth measure, all twelve notes have been heard, again with few repetitions.

Strauss's use of the twelve notes of the chromatic scale hardly constitutes true serial music. But close analysis has revealed that he was perhaps consciously attempting to employ the twelve tones in some manner that tonality would not admit.

Max Reger uses all twelve notes with even greater frequency, and in perhaps a more controlled manner, than does Strauss. In the first movement of the String Quartet in $f^{\#}$ minor, Op. 121 (1911), the following is found:

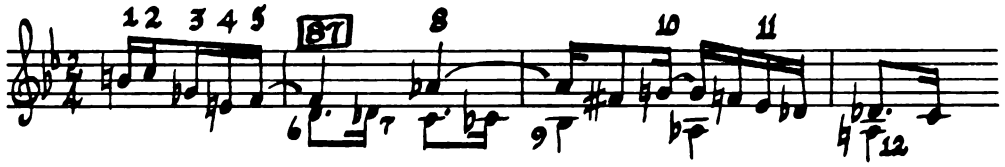
Example 19:



The missing note, F♮, appears in another instrument just before the G♮ in the last measure.

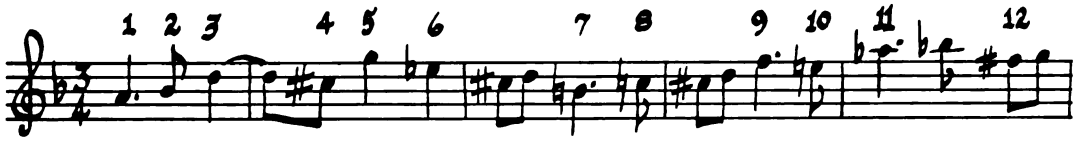
Later in the same movement, there is a passage very similar in style to Schoenberg's use of one series in two voices:

Example 20:



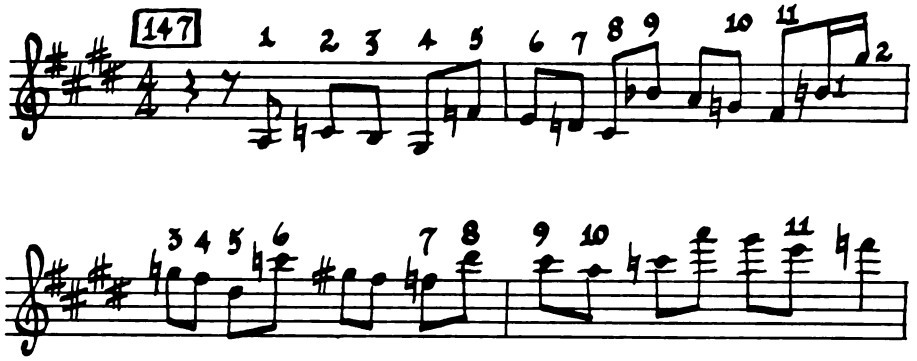
The String Trio in d minor, Op. 141b (1915), opens with the following theme containing all twelve notes:

Example 21:



And from the Violin Sonata in e minor, Op. 122 (1911), comes this theme:

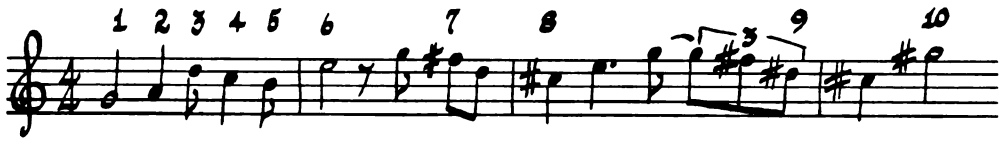
Example 22:



In the previous example, the first statement of eleven notes is immediately followed by another statement of eleven notes, though in a different order. In each group of eleven notes, the missing twelfth note ($D^{\#}$ in the first group, $A^{\#}$ in the second) can be found in the accompaniment near the beginning of each group.

Paul Hindemith also used themes containing most or all of the twelve notes in his music. The Third String Quartet, Op. 22 (1922), opens with this theme played by the first violin:

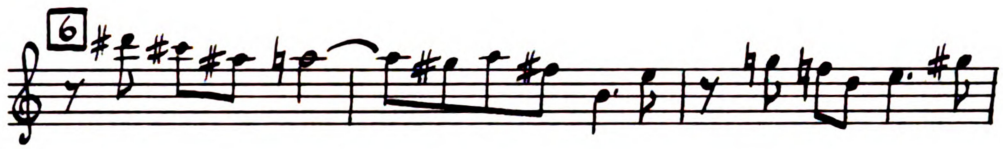
Example 23:



The two remaining notes--F and B^{b}--appear in the fifth measure in an imitative entry of the viola. Then in the

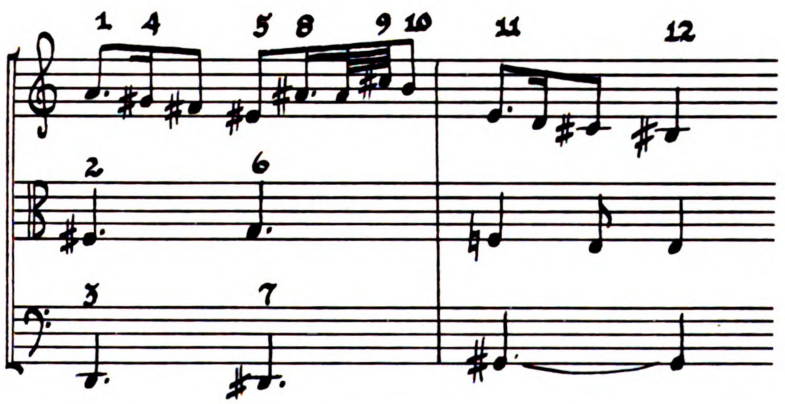
very next measure the violin begins a statement of eleven notes in which only one is repeated:

Example 24:



The twelfth note, C, appears in the following measure. And in the first measure of the third movement of the Second String Trio (1933),[1] ten notes are present; the remaining two follow in the next measure:

Example 25:



Numerous other examples of the use of all twelve notes both thematically (melodically) and as harmony can be

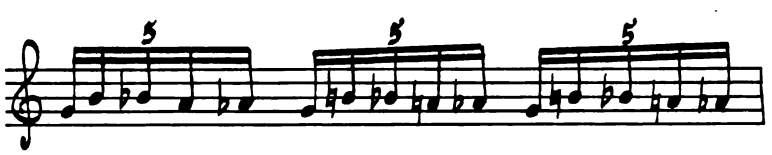
[1]In including a very few examples of music composed after 1923, the author is assuming that Schoenberg's development of his serial method was of no influence on the composition of these particular examples.

found in the music of Strauss, Reger, and Hindemith, as well as the music of other composers contemporary with them. But there is little evidence that any viable organizational method based on twelve tones exists in their music, other than perhaps briefly.

This is not true of Béla Bartok, however. In at least one piece there is justification that the piece--in its entirety--is organized and controlled by twelve tones, though in a manner quite different from that of Schoenberg. "Bartok . . . was, as far as I know, the first composer to use a group of twelve notes consciously for a structural purpose."[1]

The third one of Bartok's Fourteen Bagatelles, Op. 6, for piano, composed in 1908, is clearly organized for the purpose of employing all twelve tones. Throughout the entire piece the right hand plays an ostinato of five notes:

Example 26:



When the left hand enters with the melody in the third measure, it introduces four more notes in the first phrase:

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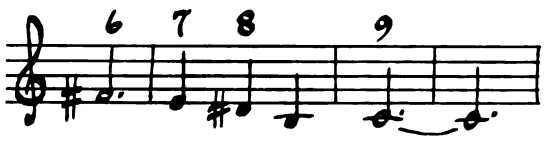
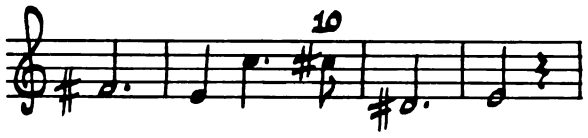
[1]Neighbour, "The Evolution of Twelve-note Music," p. 53.

Example 27:



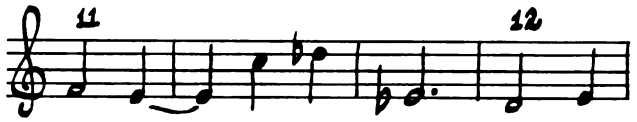
The phrase is repeated; then the third phrase introduces yet a tenth tone, $C^{\#}$:

Example 28:



And, finally, in the fourth phrase, the eleventh and twelfth notes, F and D, are heard:

Example 29:

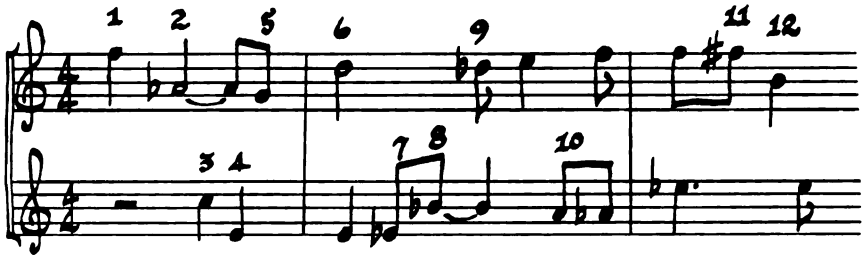


The piece then concludes with a phrase recalling the melody of the first phrase. To call this particular piece anything other than a conscious effort to employ all twelve tones structurally would seem inconceivable.

Other examples of Bartok's use of twelve tones are perhaps not so well-organized, but yet bear some resemblance to Schoenberg's method. All twelve notes occur within the opening statement of the first movement of the

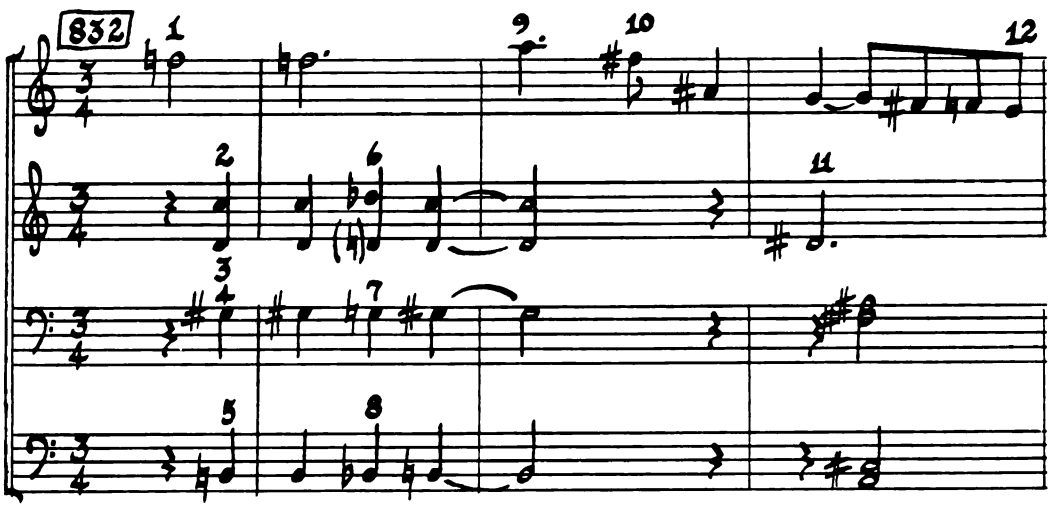
First String Quartet, Op. 7, also composed in 1908, in a two-part contrapuntal setting which could easily be mistaken for Schoenberg's:

Example 30:

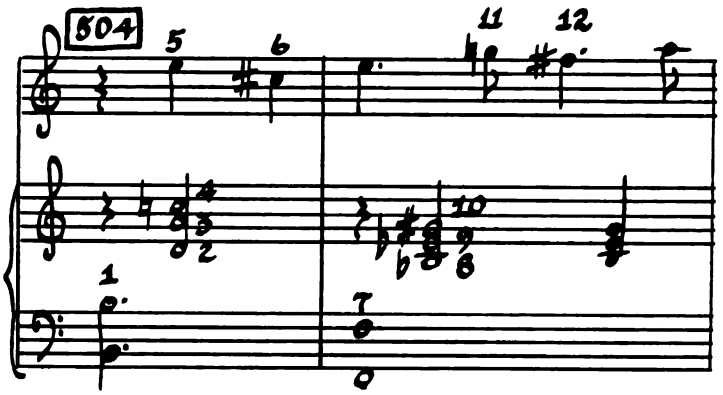


Several places in The Wonderful Mandarin, Op. 19 (1919), use all twelve notes in a similar manner:

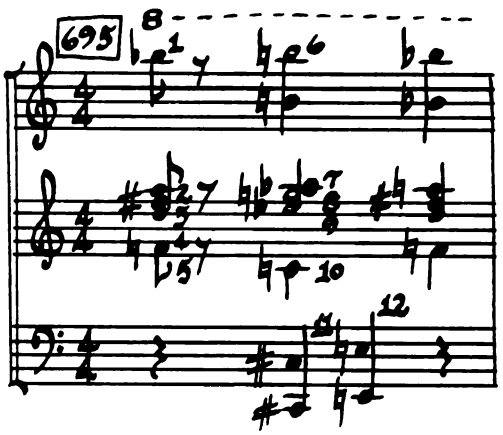
Example 31:



Example 32:



Example 33:



Another composition, the First Sonata for Violin and Piano, written in 1921, begins with the piano playing an arpeggiated figure based upon ten notes; when the violin enters, its melody adds the two remaining notes.

Numerous other examples of Bartok's use of all twelve notes may be found in music written prior to 1923. But he never really used the twelve notes as consciously for constructive purposes as did Schoenberg. A definite method for organizing the twelve tones for compositional purposes was either never arrived at, or perhaps even searched for. As Oliver Neighbour observes:

> So many passages of an extremely chromatic nature were not easily to be brought within a structure of tonalities. Bartok was faced with a choice. Continuing in the same direction he would have abandoned tonality and reached a position not essentially different from that of Schoenberg in Herzgewächse (1911), a work in which the twelve notes are almost continuously present, though it is perhaps not intentional here. A new problem of organization would have then presented itself, as it did to Schoenberg. Instead he hesitated until he had finished his Second Violin Sonata . . . and then gave up the twelve-note idea.[1]

An American composer, Carl Ruggles, also sought to use as many of the twelve tones as possible in his music. Ruggles, born in 1876, did not begin to compose until he was forty years old. His compositions, relatively few in number and usually quite short, were subjected to many revisions. But analysis of his music reveals that he, too, was using techniques closely related to Schoenberg's method even before 1923.

Ruggles technique was based upon his own idea that no tone should be repeated until a number of tones--at

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[1]Neighbour, "The Evolution of Twelve-note Music," pp. 54-55.

least nine, usually--had been heard. No predetermined and consistent order was used; in fact, the opposite idea--that no two notes should be adjacent in separate but closely spaced statements of notes--was often employed.

As George Perle observes,

> . . . there is the self-imposed rule, applied freely and with exceptions that have their own evident logic, that within the melodic line no note is to be repeated until eight or nine have intervened. Assuming that the ideal is a perfectly balanced texture based on the equivalent function of all twelve notes, as it seems to be, there should be no repetition until the remaining eleven notes have been sounded, but such a formula can be applied strictly only through the constant reiteration of a single arrangement of the twelve notes--a twelve-note row, in other words. Schoenberg himself has suggested that this principle of non-repetition is the source of his concept of twelve-note serial composition. Since Ruggles often tends to avoid literal motivic repetitions and, within a phrase, sometimes even the return of adjacent pairs of notes, it is impossible for a single pitch element to remain in a constant ordered relation to the remaining eleven notes.[1]

Henry Cowell analyzed Ruggles' style of composition as early as 1930.

> Carl Ruggles has developed a process for himself in writing melodies for polyphonic purposes which embodies a new principle and is more purely contrapuntal than a consideration of harmonic intervals. He finds that if the same note is repeated in a melody before enough notes have intervened to remove the impression of the original note, there is a sense of tautology, because the melody should have proceeded to a fresh note instead of a note already in the consciousness of the listener. Therefore, Ruggles writes at least seven or

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[1]George Perle, "Atonality and the Twelve-Note System in the United States," The Score, July, 1960, p. 56.

> eight different notes in a melody before allowing himself to repeat the same note, even in the octave.[1]

And Charles Seeger made similar observations in 1932:

> The determining feature or principle of the melodic line [in Ruggles' music] is that of non-repetition of tone (either the same tone or any octave of it) until the tenth progression. This applies rigidly to the leading melody and characterizes the other parts to a surprising extent.[2]

Perle observes that, "The principle of non-repetition is applied harmonically as well as melodically, in the avoidance of octave doublings apart from the occasional consistent doubling of a single line for the sake of sonority."[3]

The opening measures of Carl Ruggles' Portals, for string orchestra, composed by 1930, reveal the use of all twelve notes. The second statement of ten notes is here numbered in the analysis to correspond to the first statement of twelve notes, for the purpose of showing that only notes 9 and 10 (E^b and B) are adjacent in both statements of the twelve.

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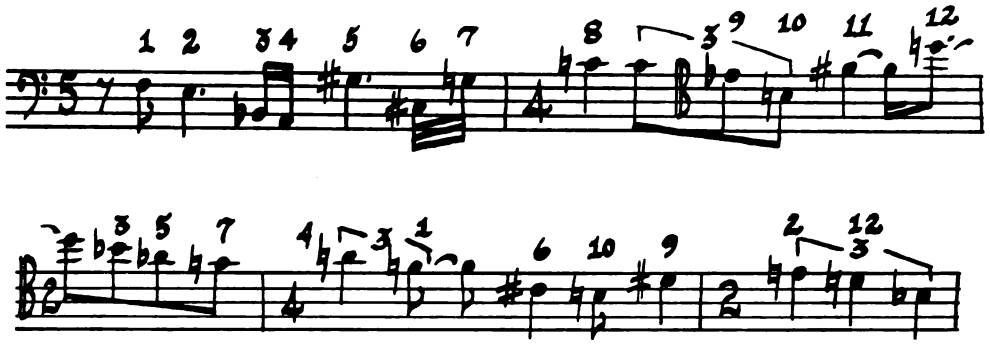
[1]Henry Cowell, New Musical Resources (New York: Alfred A. Knopf, 1930), pp. 41-42.

[2]Charles Seeger, "Carl Ruggles," The Musical Quarterly, XVIII (1932), p. 582.

[3]Perle, "Atonality and the Twelve-Note System in the United States," p. 57.

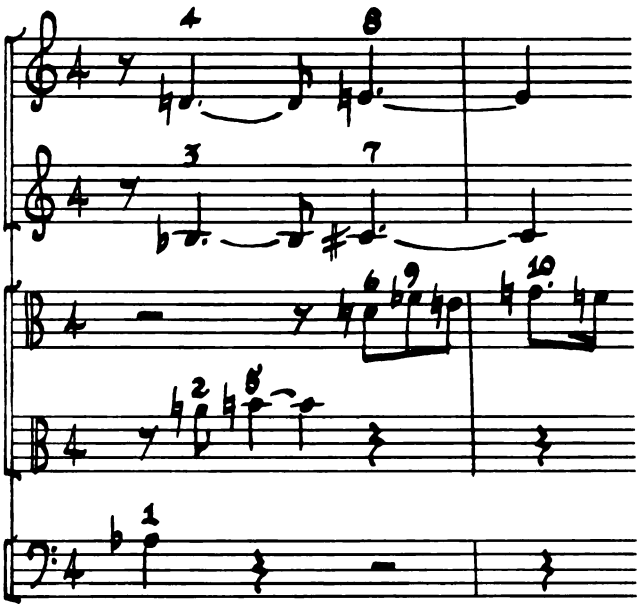
Example 34:



Perle points out that the first B, in the second bar, in a later edition was changed by Ruggles to B^b in order to avoid repeating the two adjacent notes.[1]

The following example, also taken from Portals, demonstrates that Ruggles also used as many as ten notes, without repetition, harmonically as well as melodically:

Example 35:



[1]Perle, "Atonality and the Twelve-Note System in the Unites States," p. 56.

Carl Ruggles developed his own method for using as many notes of the chromatic scale as possible, if not all twelve, in his compositions. The relationship of his method to that of Schoenberg lies mainly in the aspect of non-repetition of tones before a certain number of others had intervened.

The fact that many composers were using twelve, or most of the twelve, tones in their music with great frequency--sometimes consciously, more often perhaps unconsciously--brought about the need for an organized method of composition. Bartok, Ruggles, Hauer, and perhaps others demonstrated in their music that, for themselves at least, they had each developed some systematic method of control over twelve tones. Their methods were not the methods of Schoenberg; but perhaps had they been developed as extensively as Schoenberg's serial method has been, they would offer equally viable solutions to the problem of composing with all twelve tones as serialism ultimately did.

CHAPTER IV

MUSIC USING SETS OF NOTES AND OTHER SERIAL-RELATED COMPOSITIONAL TECHNIQUES

The origin and the use of the term "set" was discussed in some detail in Chapter I (pp. 11-12). Having originated as a mathematical term to denote a collection of numbers, it has subsequently been adopted by Milton Babbitt, George Perle, Allen Forte, and others, to refer to compositional techniques related to serial composition. In the adoption of this mathematical term "set" into musical terminology it would seem logical simply to substitute the word pitches for the word numbers: a "set" is a collection of pitches. When used in referring to mathematics, "set" denotes only a collection of elements (numbers) without implying any specific order of those elements. If a predetermined order is imposed upon the elements of a set, then that set becomes a special kind of set--i.e., an ordered set. Though the term "set" may be used to refer to an ordered collection of pitches, that, too, is a special kind of set--an ordered set. The term "series," which implies a predetermined and specific order of

elements, would seem to be most appropriate in referring to an ordered set. This is supported by George Perle:

> In a strict sense the term "series" denotes an ordered succession of elements, such as the Schoenbergian twelve-tone set. Hauer's "tropes" are only partially ordered, while in the works of Scriabin and some other composers the set is a collection of pitches the specific ordering of which is purely compositional.[1]

In an effort by this author to avoid any confusion, the use of the term "set" in this study will denote only an unordered collection of pitches; the term "series" will denote a collection of pitches used in an ordered manner.

The use of a set as the basic structural material of a composition is a technique closely related to Schoenberg's method. Schoenberg used a twelve-tone, ordered set--i.e., a series; other composers prior to Schoenberg used unordered sets of notes from which they selected their musical material.

> For the moment let us regard a "set" as any collection of notes. If we seek historical precedents to justify such arbitrary sets as basic musical components there is no lack of material. Leaving aside the most obvious examples, the traditional chords of tonal music, we find the notion of the set implicit in the late experimental works of Liszt, in the nonfunctional chords of Debussy's music, in the "constructivist" works of Scriabin, and in the iconoclastic atonal music of Schoenberg and his eminent pupils.[2]

If a set is defined simply as any collection of unordered pitches, then all music must be considered to be

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[1]Perle, Serial Composition and Atonality, p. 40.

[2]Allen Forte, "A Theory of Set-Complexes for Music," Journal of Music Theory, VIII (1964), p. 136.

based upon sets. In order to draw a parallel between the use of any set as a compositional device and Schoenberg's use of a series, one must look for a specific manner in which the set is being employed that bears a relationship to Schoenberg's serial technique.

One of the most important ways in which a set may bear a relationship to Schoenberg's method lies in the property of a set to be used both successively--as melody--and simultaneously--as harmony. Schoenberg developed this idea into an integral facet of his serial method. When the same technique is applied to a set, one can see the relationship between the techniques being used.

> In his Harmonielehre Schoenberg already pointed out that a note can be understood in both its vertical and horizontal implications: that is to say, its overtones can be presented simultaneously in a chord or arranged one after another in a scale. The simultaneity of the notes of a chord can be changed into consecutiveness.[1]

Schoenberg again commented upon this property of a set in "Composition with Twelve Tones:"

> The elements of a musical idea are partly incorporated in the horizontal plane as successive sounds, and partly in the vertical plane as simultaneous sounds. The mutual relation of tones regulates the succession of intervals as well as their association into harmonies; the rhythm regulates the succession of tones as well as the succession of harmonies and organizes phrasing.[2]

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[1]Rufer, Composition with Twelve Notes, p. 48.

[2]Schoenberg, Style and Idea, p. 109.

The application of this concept, as Rufer has summed it up, can be seen as easily in compositions based upon unordered sets as it can in Schoenberg's serial works:

> The perception of these facts had decisive results for composition with twelve notes; for it made it possible to use a basic series of twelve notes, as a whole or in parts, in either dimension--that is to say, allowing its notes or note-sequences to appear both vertically in a chord and horizontally in a melodic formation.[1]

A second way in which music based upon sets bears a relationship to Schoenberg's method is apparent when transposition of the basic set forms an important aspect of the compositional technique. If a set is unordered, then the concepts of inversion and retrograde do not apply. Therefore, the use of transposition becomes an even more important means of achieving a sense of development.

The presence of compositional devices related to Schoenberg's method--such as the horizontal and vertical use of the set, or the transposition of the set--makes it possible to relate music based upon unordered sets to that of Schoenberg. However, a further parallel may be drawn when the construction of an unordered set is seen to be similar to the construction of a twelve-tone series. The diatonic scale or chords of major-minor tonality may be considered, in the simplest sense, a set. But the basic

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[1]Rufer, Composition with Twelve Notes, pp. 51-52.

construction of the major or minor scale is diametric to that of Schoenberg's series; the diatonic scale is based upon a functional relationship of each tone to the tonic note, whereas in the twelve-tone series no functional relationship exists other than through the relationship of one adjacent tone to another. The construction of a set is said to be similar to the construction of a twelve-tone series only when the various pitches of that set bear no functional relationship to each other.

George Perle has described the properties of sets that are related to twelve-tone series by content or construction in the following manner:

> The overextension and consequent weakening of the traditional tonal functions gave rise, prior to Schoenberg's formulation of his "twelve-tone method," to a number of attempts to base a total musical structure upon a complex [or set] of functionally undifferentiated pitch elements.[1]

Perle, in describing such a pitch collection, or set, has said that it

> . . . cannot be regarded as analogous to a "mode" or "scale," since (1) its elements are functionally equivalent, (2) transpositions are freely used so that there is a constant circulation of all twelve notes, and (3) there is no special criterion of simultaneity, such as the triad in the major-minor system or the limited consonant intervallic relations of the modal system. The unordered content of the set is the sole general basis of both simultaneity [harmony] and succession [melody].[2]

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[1]George Perle, "An Approach to Simultaneity in Twelve-Tone Music," Perspectives of New Music (Fall-Winter, 1964), p. 91.

[2]Ibid.

Some of the earliest and simplest examples of such sets can be found in the music of Hindus in which a raga or mode--a certain combination of various tones--is used as the entire basis of construction, both melodic and harmonic, of a piece. Egon Wellesz observed the relationship between the ragas use as sets and Schoenberg's work:

> The principle of the series of tones and the twelve-tone row is not an entirely new system, which Schönberg or Hauer invented, but the revival of the technique of formulas which originated in the East, came to the West with plain-chant, and is one of the basic principles of early medieval polyphonic music.[1]

Debussy's use of whole-tone scales and pentatonic scales provides a similar use of a set. Each comprises a group of pitches which are used in an unordered manner. There are no functional relationships inherent in the whole-tone scale, and functional relationships in the pentatonic scale are limited. These scales, or sets, function equally as both melody and harmony. However, the transpositions are limited by the nature of these particular scales, causing a lack of any real sense of progression or development. Voiles, from the first book of Préludes, is based entirely upon these two sets. For the major portion of the piece, the whole-tone scale (B^{b} C D E $F^{\#}$ $G^{\#}$) forms the basic set; six bars within the piece are based upon a set comprised of a pentatonic scale. Even the one

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[1]Wellesz, "The Origins of Schoenberg's Twelve-Tone System," p. 10.

available transposition of the whole-tone set is not used, thus giving the entire piece an overall static quality.

Perle's analysis of Voiles is consistent:

> The tone material of each of the three sections of this work is rigorously derived from a restricted selection of the notes of the semitonal scale, defined only with regard to content, not order. The only tonal contrast in the work results from the fact that the set upon which the middle section is based [i.e., the pentatonic set] is not the same as that of the two outer sections [based upon the whole-tone set]. Each set functions both as chord and as scale, that is, as the sole criterion of both simultaneity and linear succession. Since both sets are extremely limited in harmonic content, there is an absence of tension and movement, and the texture is excessively homogenous. As an example of serial composition the work is admittedly naïve, but as an isolated adumbration of later musical developments it is worthy of attention.[1]

A similar, yet different, use of a set as scale and chord was made by Stravinsky. The first of Three Pieces for String Quartet (1914) uses a ten-tone set by assigning to each instrument a sub-set of these tones: the first violin plays only the notes G, A, B, and C; the second violin, $F^{\#}$, E, $D^{\#}$, and $C^{\#}$, always in a descending scale pattern; the viola plays a D only; and the 'cello plays a three-measure ostinato built on the notes C, D^{b}, $D^{\natural}$, and E^{b} (duplicating the two notes of the second violin's sub-set). The piece consists of repetitions of these sub-sets at different intervals causing them to ". . . coincide in almost every possible combination. It is as though

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[1]Perle, Serial Composition and Atonality, pp. 40-41.

the piece were based on a single chord which is never heard in its entirety but from which any selection may be made."[1]

Stravinsky's use of repeated patterns as basic sets from which both melody and harmony are derived occurs frequently in The Rite of Spring. Taking as one example the "Dance of the Youths and Maidens" in Part I, one can observe the use of the basic set E^{b}, $E^{\natural}$, g, $G^{\#}$, B^{b}, B , and D^{b}. At the beginning it occurs as a complete sonority; after eight bars the melodic material begins to be drawn from the same set, with the addition of an eighth tone, C, to the overall pitch content of the set. From here on, the section is based upon different patterns built from the notes of this basic set; other notes occur, but are used primarily in an embellishing role.

In the music of Alexander Scriabin is perhaps to be found the most consistent and highly structured use of sets (composed of notes containing no functional relationships), along with the use of these sets in a manner closely related to Schoenberg's serialism.

> Along with Schoenberg (Three Piano Pieces, Op. 11, 1908), Webern (Five Pieces for String Quartet, 1909), and Charles Ives (Three-Page Sonata, 1905), Skryabin (Fifth Sonata, 1908, and onwards) is exploring atonality and providing structural principles to replace traditional tonality.[2]

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[1] Neighbour, "The Evolution of Twelve-note Music," p. 55.

[2] Peter Dickinson, "Skryabin's Later Music," Music Review, XXVI (1965), p. 19.

A similar observation is made by Reti:

> The search for a new musical style was not carried on solely by the two great antipodes, Debussy and Schoenberg. There were a few others who, though their influence did not prove so far-reaching, nevertheless contributed greatly to the evolution. One eminent figure in this respect . . . was Alexander Scriabin. Scriabin's artistic path was somewhat blocked by inner and outer obstacles. His aesthetic vision and the practical realization of his musical ideas were not as balanced, clear and unified as were those of Debussy, nor as definite, bold and revolutionary as Schoenberg's work. Yet Scriabin's influence on both these composers and on the whole musical world cannot be overlooked. Though his talents were somewhat dissipated, he was still more than a mere experimenter. In some of his most mature works he developed musical structures of real strength and beauty which have not yet been fully exploited. In the present intensified search for the origins of the new musical style Scriabin's music may still experience a revival.[1]

Scriabin, born in Russia in 1872, was a well-known concert pianist (performing almost exclusively his own works), up until his untimely death in 1915. The music that he wrote for piano and for orchestra follows a clear line of development from nineteenth-century romanticism. The earliest works are in imitation of the piano music of Chopin; after these comes a period of extreme romanticism in which Scriabin was influenced by the chromatic writing of Liszt and Wagner. The development of this highly chromatic style soon evolved into music that approaches the brink of atonality. This last period (beginning as early, perhaps, as the Fifth Sonata, Op. 53, and clearly present in the Seventh Sonata, Op. 64) contains many

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[1]Rudolph Reti, Tonality, Atonality, Pantonality (London: Barrie and Rockliff, 1958), pp. 59-60.

examples of the use of sets that are closely analogous to Schoenberg's serialism.

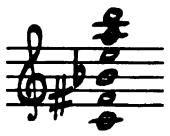
The similarity of Scriabin's music to the later-developed serialism of Schoenberg has been observed by more than one person. In 1967, Eric Salzmann wrote,

> Already over a period of years a number of Soviet composers have been working with twelve-tone and other contemporary materials . . . whose twelve-tone chromatic styles suggest roots in Scriabin as well as Schoenberg and Berg.[1]

Otto Deri has made a similar observation:

> We find evidence in his [Scriabin's] later piano sonatas of an attempt to replace tonality by a rigid harmonic scheme, which can be considered the first explorations in serialism. In this system, a chord [whose notes form the members of a set] may serve as the foundation of a work, such as the famous "mystic" chord to his Prometheus, from which all melodic and harmonic material is derived.[2]

The previously-mentioned "mystic" chord of Prometheus is built in fourths--augmented, diminished, and perfect:



Scriabin, using as his basis the overtone series, derived the notes of this chord from the eighth through the sixteenth partials, omitting only the twelfth and fifteenth

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[1]Eric Salzmann, Twentieth-Century Music: An Introduction (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967), p. 137.

[2]Otto Deri, Exploring Twentieth-Century Music, p. 150.

partials. Harmonically, this one chord is quite productive, for different combinations of its notes produce all four qualities of triads: a major triad with a root of D, a minor triad with a root of A, a diminished triad with a root of $F^{\#}$, and an augmented triad with a root of B^{b}. This "mystic" chord is the structure which Scriabin frequently used as a basic set for his composition. By the addition of other notes of the chord to the triads to form seventh, ninth, eleventh, and thirteenth chords, by the occasional alteration of notes in the chord or addition of another note to it as a part of the basic set, and by the frequent inversions and transpositions of the basic set, Scriabin had at his disposal a veritable wealth of material within the set. These factors enabled him to take the basic set and use it as the basis of an entire composition. The set has become, according to Neighbour, ". . . a tonal field which is equally chord and scale. . . ."[1]

The Seventh Sonata, Op. 64, composed in Switzerland in 1912, is based upon the same chord as that used in Prometheus. However, Scriabin allowed both the D and the $F^{\#}$ to be lowered a half-step and permitted the addition of a fifth (G) above the root, forming a basic set of nine notes:

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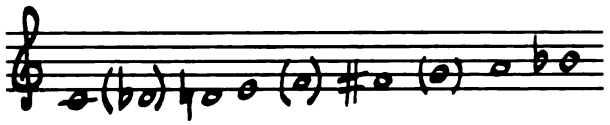
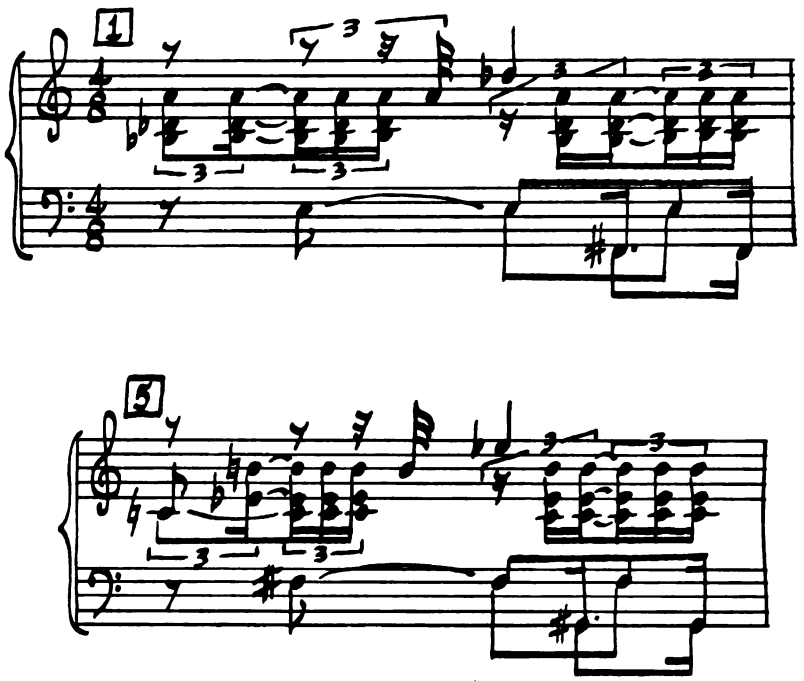
[1]Neighbour, "The Evolution of Twelve-note Music," p. 56.

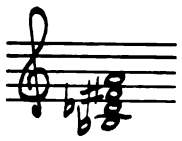


The first four measures of this sonata are based entirely upon this basic set, used both melodically and harmonically. The following four measures have a transposition of the same material (and set) a major second higher.

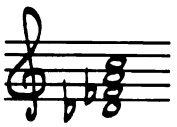
Example 36:



In an effort to define further the compositional technique using this basic set which Scriabin has employed in the Seventh Sonata, Perle has developed a system of analysis whereby he extracts the following chord--used as a sub-set--from the basic set:



This sub-set and its transposition at the interval of a minor third above,



are, according to Perle, ". . . derivable from a single statement of the set, a possibility that permits the establishment of a closed system of transpositions and a principle of progression."[1] By transposing only these four notes of the sub-set to other pitch levels, Perle is able to offer an analysis of the Seventh Sonata by using different transpositions of only this four-note segment: "T-1" is used as a symbol to indicate the transposition of the set up one half-step, "T-2" is its transposition up two half-steps, etc.[2] By using such a system of transposition of the sub-set, Perle has eliminated the necessity of transposing the entire set; but actually transpositions of the basic set do occur, with Scriabin electing to use only certain pitches from the set as his compositional material in the given examples.

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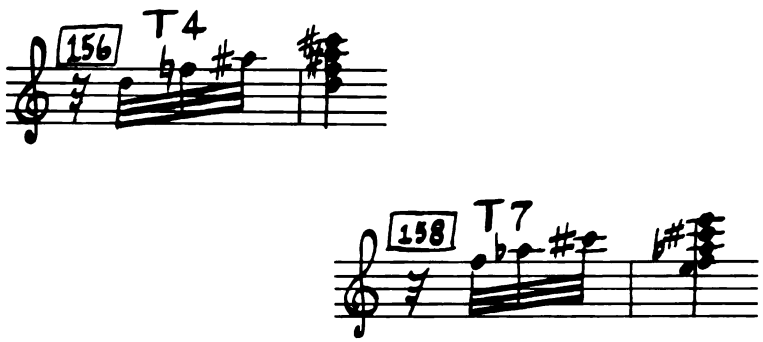
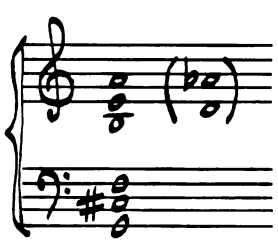
[1]Perle, Serial Composition and Atonality, p. 41.

[2]Ibid., pp. 41-43.

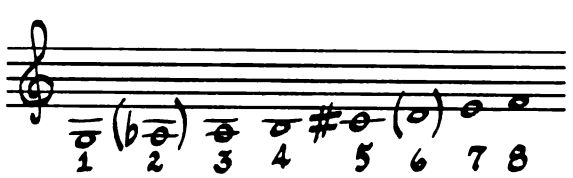
Example 37:



The Sixth Sonata, Op. 62, also composed in 1912, is based on a set similar to that of the Seventh Sonata. Here, the root of the chord used as the basic set is G instead of C; again, the fifth above the root frequently appears, as does the lowered second degree:



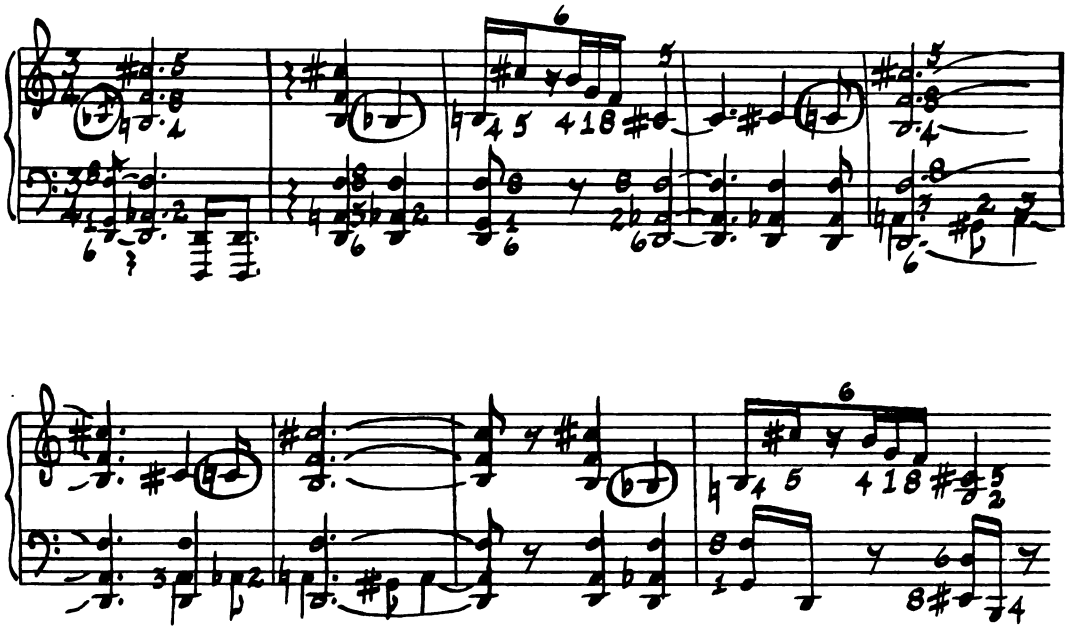
The same set, arranged in a linear manner, is as follows:



The use of this set as basic compositional material is shown in the opening of the Sixth Sonata. The notes are numbered, corresponding to the set given above, in order to show their use; it should be observed that no concept

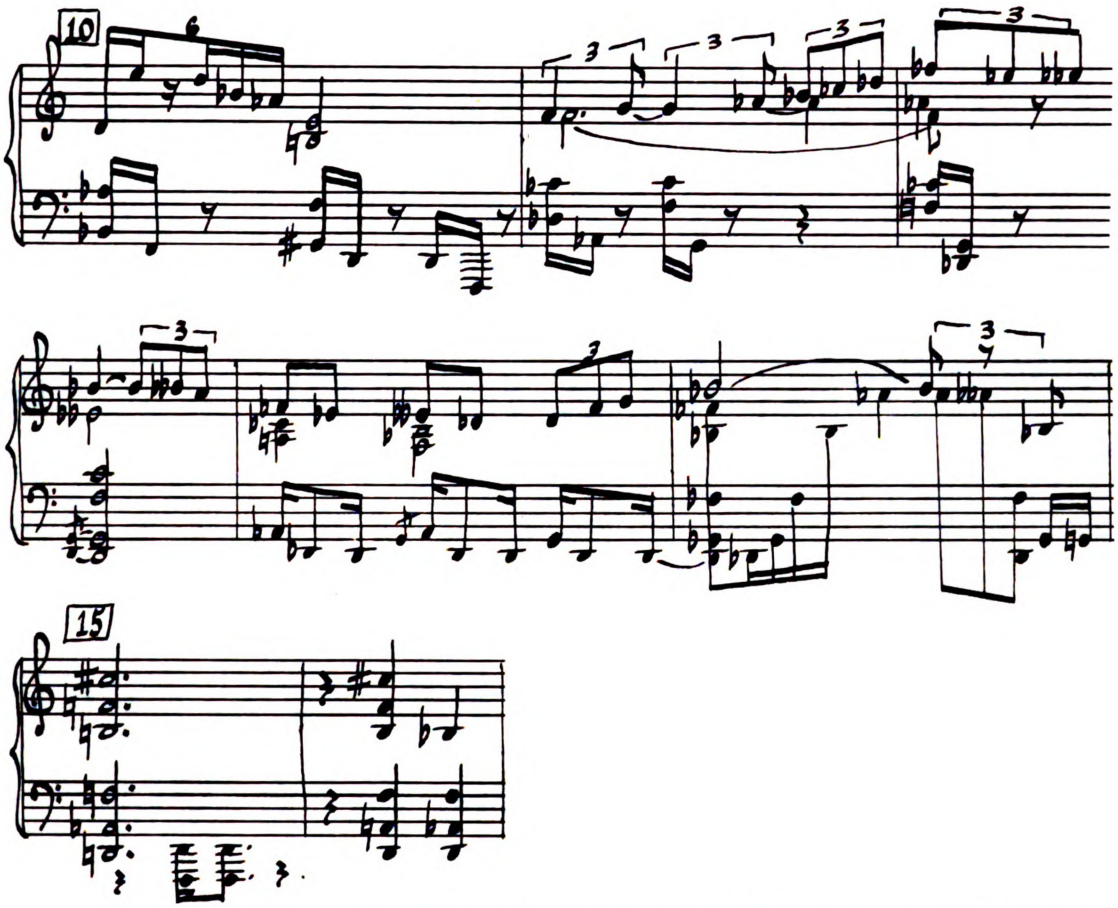
of order is implied by this method of analysis. (The only exceptions to the exclusive use of notes from the basic set, as indicated, function much in the manner of nonharmonic tones in earlier music.)

Example 38:



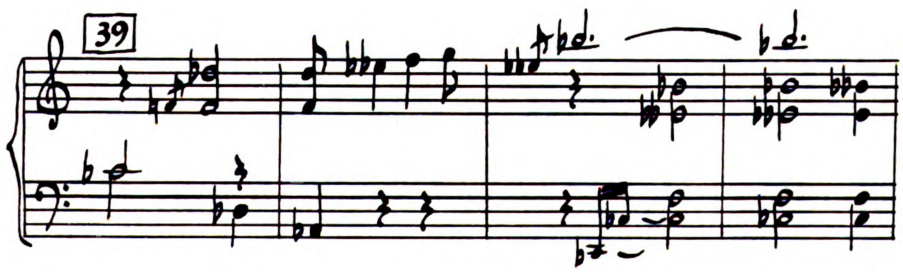
The next measure (m. 10) is based upon the same set transposed up a minor third (B^b - B - C - D - E - F - G - A^b); the following four measures (11-14) use the basic set transposed up yet another minor third (D^b - D - E^b - F - G - A^b - B^b - B), after which there is a return, in measure 15, to the original pitch level of the set.

Example 39:



The second theme of this sonata is composed from the basic set again transposed to D^{b}:

Example 40:



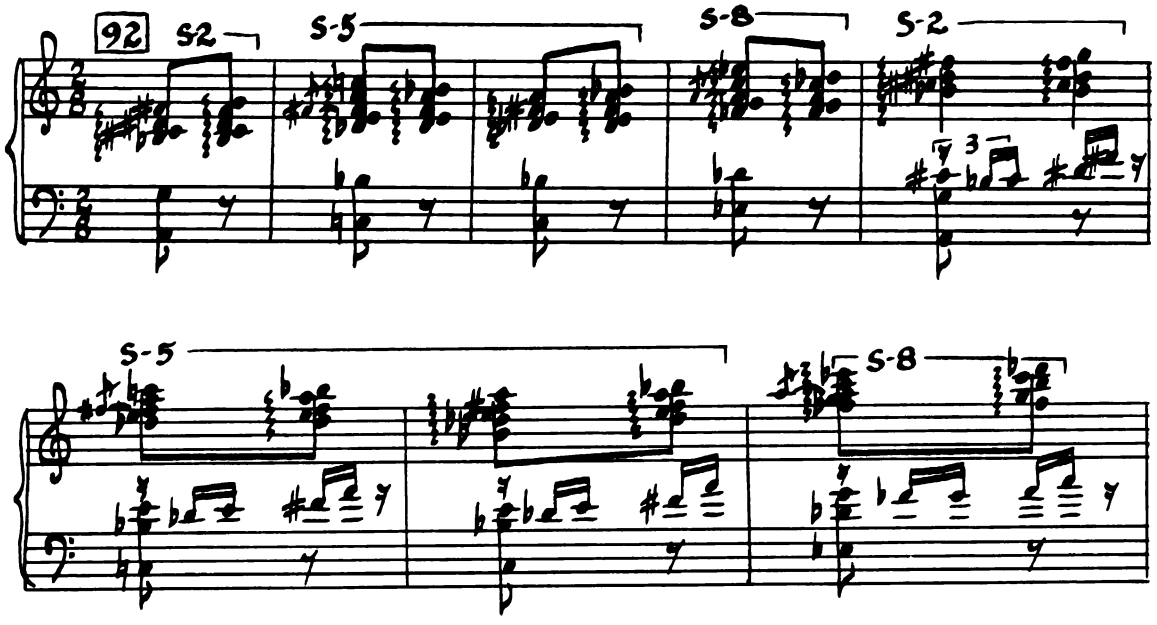
The third theme appears to be built from the following transpositions of the basic set:

S-2*: A - B^{b} -(B)- $C^{\#}$ - $D^{\#}$ -(E)- $F^{\#}$ - G

S-5 : C - D^{b} -(D)- E - $F^{\#}$ - (G)- A - B^{b}

S-8 : E^{b} - E -(F)- G - A -(B^{b})- C - D^{b}

Example 41:



In the examples given from both the Seventh and the Sixth Sonatas, Scriabin has used the interval of a minor third for adjacent transpositions of the set. Though other intervals of transposition of the set occur in Scriabin's music, he does seem to indicate a particular fondness for the minor third transposition.

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*The designation S-2 is used to indicate the transposition of the basic set up two half-steps.

As further illustration of this same principle, one may observe the construction of the opening of Scriabin's Vers la flamme, Op. 72. Because of its chordal texture and use of repetition when the basic set (E - $A^{\#}$ - D - $G^{\#}$ - $C^{\#}$ - $F^{\#}$) is transposed, the transposition of the set up a minor third in measure 5, and the transposition of the set up yet another minor third in measure 11 can easily be seen.

An interesting feature of Scriabin's frequent use of the minor third as the interval of transposition of his basic set is the fact that each time the set is transposed, two or more notes are always common to both transpositions of the set. For example, taking as a basic set the previously-discussed "mystic chord," which forms the basis of most of Scriabin's sets, along with transpositions by minor thirds of that set, one can see that each transposition of the set has two notes in common with the same set a minor third removed:

S-0: C - $F^{\#}$ - B^{b} - E - A - D

S-3: E^{b} - A - D^{b} - G - C - F

S-6: G^{b} - C - F^{b} - B^{b} - E^{b} - A^{b}

Perle describes such notes which are common to two different statements of a set as ". . . invariant segments that function as pivotal elements among the various transpositions."[1] Scriabin often employed such notes in common to

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[1]Ibid., p. 41.

a set and its transposition as a sort of pivot between them, in much the same manner that Schoenberg would frequently use one or more notes common to two forms of a series. To quote Oliver Neighbour,

> Where the usage is strict, the flexibility and mobility of the technique are reminiscent of Schoenberg. One of Skryabin's favourite devices is particularly so: his use of a group of notes as a pivot between two transpositions of his chord. His Seventh Sonata, for instance, is based on the commonest of his scales: C, Db, E, F#, A, Bb [the notes from the same chord used earlier in this study]. The main subject of the work makes great use of the triad with both major and minor thirds. . . . It can be derived in two ways from the scale I have quoted [i.e., using as roots the notes F# and A, triads with both major and minor thirds can be obtained], so that one such chord can be interpreted as belonging to two transpositions, and can be heard with two different pairs of notes to make up the complete forms. There is a striking parallel here with Schoenberg's habit of punning on a group of notes common to two forms of his basic series.[1]

This use of notes as pivotal elements between transpositions of the set can again be seen in measures 12-14 of Scriabin's Seventh Sonata. By taking the basic set containing the notes C, Db, E, F#, A, Bb, and these transpositions,

A, Bb, Db, Eb, F#, G

F#, G, A#, B#, D#, E

D#, E, G, G#, C, C#,

one is able to see both the application of transposition of the set as a compositional device and the use of certain

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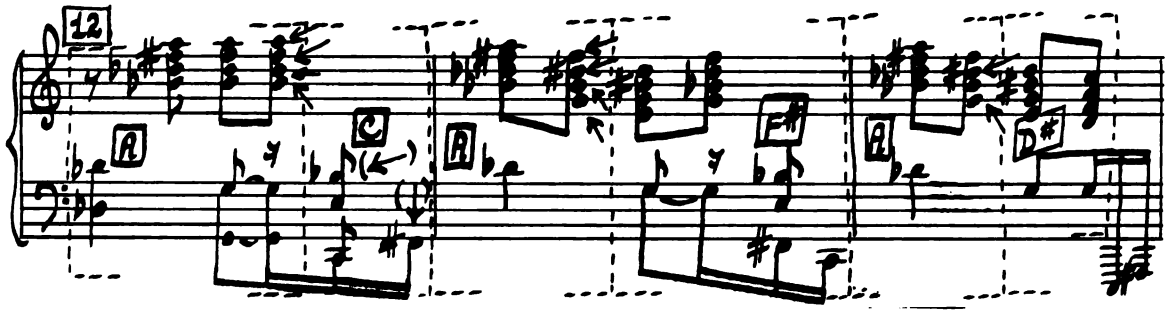
[1]Neighbour, "The Evolution of Twelve-note Music," p. 57.

notes as pivotal elements between the transpositions. The four notes in common to any two transpositions a minor third apart are the notes which form a triad with both major and minor thirds; these notes form the pivotal elements between the transpositions. (The transposition of each set is indicated by the first note of each as given before, and the pivotal notes between transpositions are indicated by arrows.)

Example 42:



In all the examples of Scriabin's music given previously, both harmonic and melodic content have been generated from the same basic set of pitches, with transposition of that basic set being used as the principal means of providing a sense of progression. This practice of deriving both melodic and harmonic material from a basic set was soon to become an important principle of Schoenberg's method.

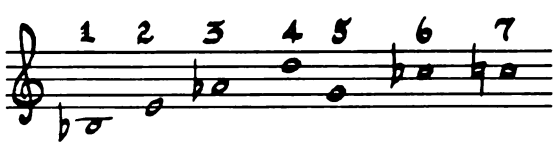
According to Perle,

> The set [as used by Scriabin]--consisting of notes selected out of the possible twelve--is employed not only as the basis of linear association but even more consistently as the basis of vertical association. Since in these instances the set is not ordered, the concept of adjacency does not appear, but only that of content. The total content of the set is here the sole general criterion of harmonic propriety.[1]

Otto Deri further observes that,

> [Scriabin's] derivation of both melody and harmony from the same vertical arrangement of notes, foreshadows the two-dimensional musical space of Schoenberg. . . . Schoenberg bases his claim for historical necessity on two considerations: first, that the motivic use of the twelve half steps of the chromatic scale was in the air in the second half of the nineteenth century; second, that during the same period attempts were already made to view the horizontal (melodic) and vertical (harmonic) aspects as a unified field.[2]

In this practice of deriving all of the notes of a musical texture--both those used in vertical association and those used in horizontal association--from only one given set of notes which have no functional relationship with each other, is to be found one of the basic concepts of Schoenberg's serial composition. Looking at still another passage taken from the Seventh Sonata of Scriabin, and numbering the notes so that they correspond to the set transposed,



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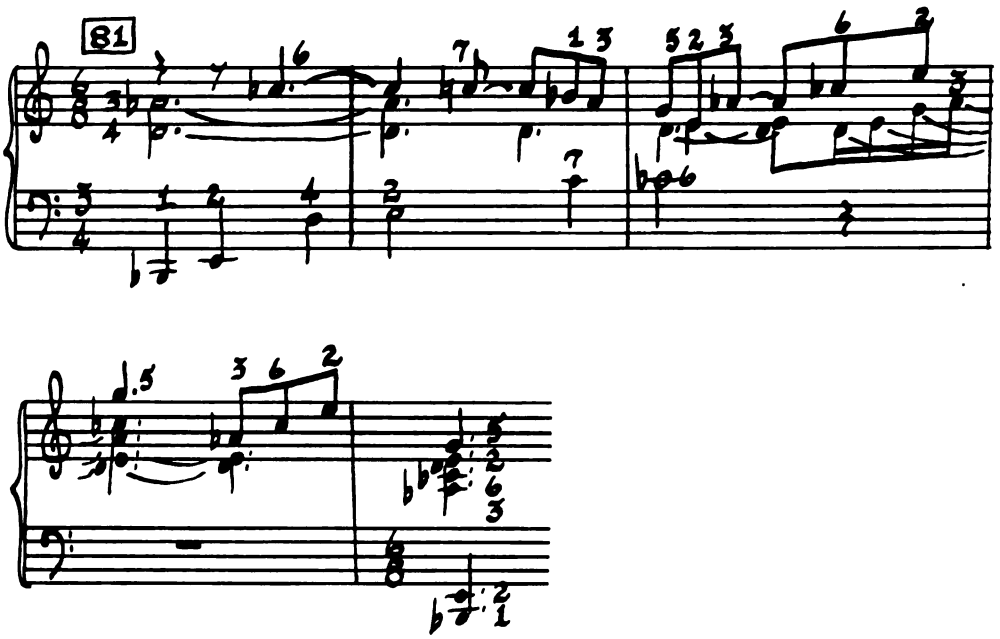
[1]Perle, Serial Composition and Atonality, p. 83.

[2]Otto Deri, Exploring Twentieth-Century Music, pp. 165, 110.

one can observe that both melody and harmony are derived from the same limited set. (Again, the numbering of the notes indicates no implication of a strict order.)

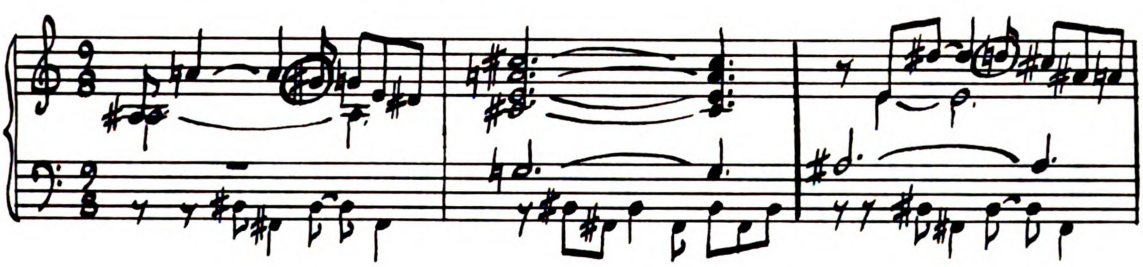
Example 43:



Every set used by Scriabin discussed previously has been derived primarily from his "mystic chord." Though this particular set figures prominently in Scriabin's works, examples are also to be found which use yet a different type of set. One such example is the third of Five Preludes, Op. 74 (his last work), which is based upon a set of eight notes often referred to as an "octotonic scale," a scale derived from the interlocking of two diminished seventh chords:

According to an analysis by Charles Burkhart, this piece ". . . adheres strictly to the notes of the scale [set] except for a few short, rhythmically-weak passing tones."[1] The first three measures are given here:

Example 44:



By using sets without functional relationships among their elements, along with systematic transpositions of those sets, as the basic structural material for much of his music, Scriabin has, in essence, used procedures closely related to the serial techniques of Schoenberg more than ten years before Schoenberg defined them.

> Scriabin, in his employment of a more complicated set [i.e., more complicated than that used by Debussy in Voiles], of transpositions of the set, of invariant segments that function as pivotal elements among the various transpositions, and of consistent variants

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[1]Charles Burkhart, Anthology for Musical Analysis (2nd ed.; New York: Holt, Rinehart & Winston, Inc., 1972), p. 448.

> of the set, may be considered the first to exploit serial procedure systematically as a means of compensating for the loss of traditional tonal functions.[1]

The use of sets whose elements generally bear no functional relationship to each other, together with the use of procedures--such as transposition of the set, and horizontal-vertical use of the set--which are related to Schoenberg's serial method, constitutes a valid example of one more aspect of Schoenberg's method that had precedent. Debussy, Stravinsky, and Scriabin all used procedures related to serialism prior to 1923; but in no case were their procedures ever so well-defined as those of Schoenberg were soon to be.[2]

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[1] Perle, Serial Composition and Atonality, p. 41.

[2] For further study of Scriabin's use of sets, the reader may wish to refer to a dissertation study entitled Quasi-serial Techniques in the Late Piano Works of Alexander Scriabin by John Everett Cheetham (University of Washington, 1969). Mr. Cheetham's analysis, while differing in some respects from that given here, discusses many more examples of Scriabin's use of sets, though the use of the contradictory term "quasi-serial" seems objectionable.

CHAPTER V

CLOSING REMARKS

Schoenberg's serial method, as proposed by Schoenberg himself after 1923, is considered by many to be one of the major musical innovations of the twentieth century. According to Oliver Neighbour, "From the technical point of view, Schoenberg emerges . . . as the central figure of his time."[1] Donald Grout claims that

> Schoenberg has exercised a far-reaching and profound influence on the music of the twentieth century, not only through his compositions but also through his work as a teacher and his intellectual stature as a philosopher and interpreter of the age.[2]

And Leon Dallin states that, "The twelve-tone method or tone-row technique is one of the most significant musical innovations of this century.[3]

To look for evidence of procedures related to Schoenberg's method in music prior to his own serial composition is not to negate Schoenberg's accomplishment. In order for his method to have gained such wide acceptance

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[1]Neighbour, "The Evolution of Twelve-note Music," p. 59.

[2]Grout, A History of Western Music, p. 652.

[3]Leon Dallin, Twentieth Century Composition (3rd. ed.; Dubuque, Iowa: Wm. C. Brown Company, 1974), p. 189.

so quickly after its emergence, there would have to have been a development of related procedures in earlier music. Musical developments are seldom isolated phenomena; they are most often an evolutionary process.

Definition of the most important aspects of serial composition was necessary before evidence of techniques related to serial composition by composers prior to Schoenberg was sought. The music of various composers was then studied for examples of the use of serial-related techniques before Schoenberg's influence. Many examples were found which gave evidence of some precedent for the different aspects--such as the use of all twelve tones, or the use of systematic transpositions of a set--of serial composition. However, in no case could any example be labeled as true serialism as proposed by Schoenberg; for no example prior to Schoenberg's serial works revealed the simultaneous use of the two things necessary to serial composition--the use of all twelve tones combined with a consistent and predetermined ordering of those tones.

Schoenberg's accomplishment was to bring together all of the various aspects of serialism and combine them to form a logical and coherent method of composition which has proved useful to many twentieth-century composers. No other composer prior to Schoenberg used all twelve notes with a consistent, predetermined order, and a systematic method of transposed and derived forms of the series,

together with a derivation of both melody and harmony from the series. Other composers used some of these procedures in their music, and Schoenberg might possibly have been aware of such procedures; but only Schoenberg conceived the possibility of uniting every aspect of his method into what is now known as serial composition.

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