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I hereby recommend that the thesis prepared under my supervision by ALAN STAPLES

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OF ANTON WEBERN AND

ARNOLD SCHOENBERG

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A COMPARISON OF THE STRING TRIOS
OF ANTON WEBERN AND
ARNOLD SCHOENBERG

By
ALAN STAPLES

To fulfill the thesis requirement
for the degree

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PREFACE

Throughout the history of chamber music the string trio has been overshadowed by the more popular string quartet and piano trio. Aside from the small number of works by Mozart, Beethoven, Schubert and Dvorak, few composers have attempted works for this medium. Although this neglect has continued to the present day, two outstanding twentieth century Viennese composers, Arnold Schoenberg and Anton Webern, have made important contributions to the string trio medium. Based on the twelve-tone method of composition, both works are strikingly unique in their effect on the listener. This thesis proposes to analyze these works, concentrating on similarities and differences in the application of the twelve-tone method from the standpoint of melodic and harmonic events, texture, form, special effects and performance problems. Musical examples, tables and illustrations are included wherever appropriate, and the results are summarized in the conclusion. It is hoped that this study will provide greater insight into the variety of musical expression possible for the string trio medium.

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I. INTRODUCTION

A. Development of the twelve-tone technique

In the historical development of music in the Western World basic changes in style have been largely due to new methods of musical organization, such as the principle of fundamental bass in the late seventeenth century, the development of sonata form in the eighteenth century and the development of the twelve-tone technique in the twentieth century. During the eighteenth and nineteenth centuries the three fundamental elements of music--melody, harmony and form--relied upon tonal relationships for their unity and comprehensibility. Beginning in the late nineteenth century, however, particularly with the works of Wagner and Strauss, a gradual breakdown of tonality occurred resulting in long sections of enlarged or suspended tonality. Arnold Schoenberg's early string chamber work, Verklärte Nacht, falls into this category. By the beginning of the twentieth century, the threshold of atonality had been reached. For Schoenberg, this transition to the atonal period began with the String Quartet in f#minor which contains the words "air from other planets" in the added vocal part of the finale. However, as Schoenberg once commented in an interview, the transition from tonal to atonal music "happened gradually, in accordance not with any wish or will, but with a vision, an inspiration; it happened perhaps instinctively. . . The psychological motives

behind my stylistic development? I was driven onward by the need for brevity, precision, definition and clarity. I had the sense that I was now saying it better, more clearly, more unambiguously, more personally."¹

The fluid state of tonality which was taking place in the vertical axis (harmony) may also be noticed in the horizontal axis (melody) in works of the early twentieth century. Themes with seven to twelve notes without repetition of pitch may be found in the String Trio, Op. 111b of Max Reger (first movement, main theme), the opening theme of the first movement of Bela Bartok's Quartet No. 1 and the opening of the third movement of Hindemith's String Trio No. 2. Thus, the trend toward atonality was widespread; with it arose the need for a solution to the problems of unity and comprehensibility. Although Joseph M. Hauer² and others were seeking the answer, it was Arnold Schoenberg who devised the organizational means by a new method known as the "tone-row" or "twelve-tone" method. The development of this method was a gradual process, occurring between the years 1915 to 1924. In a letter to Nicolas Slonimsky, Schoenberg explained how this transitional period began:

The first step was taken about December 1914, or at the beginning of 1915, when I sketched a symphony, the latter part of which later became the Jakobsleiter, but which has never been continued. The scherzo of this symphony was based on a theme consisting of the twelve tones. But this was only one of the themes. I was still far away from the idea of using such a basic theme as a unifying means for a whole work.

¹Willi Reich, Schoenberg, trans. Leo Black (N.Y.: Praeger Publishers, 1971), p. 24.

²Devised a system of tropes using all twelve tones.

After that I was always occupied with the aim of basing the structure of my music consciously on a unifying idea, which produced not only all the other ideas but also regulated their accompaniment and the chords, the 'harmonies'.³

Thus, the tone-row became the basic unit of melodic and harmonic material, similar to scales in tonal compositions. Rules governing how a tone row may be used are as follows:

- 1) The twelve-note series is constructed in such a manner that no note may be repeated until all twelve notes have been presented.
- 2) Each series may be used in four different forms: original, inversion, retrograde (backwards) or retrograde inversion (inverted, backwards). Each of these forms may be linked with itself or with any of the other forms, either consecutively or simultaneously.
- 3) Each of the four forms of the series may be transposed to any of the remaining eleven notes of the chromatic scale, thus producing 48 series in all.
- 4) Each note within the series may appear in any octave.
- 5) An immediate repetition of a note is allowed if: a) it is a characteristic element in a motive, b) a note which, as part of a sonority, is apt to stop sounding too soon (i.e. string pizzicato), or c) for compositional reasons (i.e. pedal point).
- 6) Octave doublings are to be avoided except those instances in which added sonority is desired.

With the disappearance of tonal relationships, motives take on an added importance and counterpoint becomes a more significant feature. Rhythm, too, plays a more important role in tone-row music not only as a motivic element, but also as a means of sustaining forward motion in the absence of harmony. Rufer explains the important role rhythm plays in producing motivic individuality:

³H. H. Stuckenschmidt, Arnold Schoenberg, trans. Roberts and Searle (London: John Calder, 1964), p. 86.

The part played by rhythm in building musical shapes becomes greater in twelve-tone music (and in serial music generally), through the marked character and individual contours of the rhythmical motives, in proportion to the importance of the part played in the piece by the shape itself. One can quite simply say "by their rhythm shall ye know them" - not only the musical shapes themselves, but also their functions and their position in the whole musical organization of the piece.⁴

Schoenberg's first works incorporating partial and complete use of the twelve-tone method appeared in 1923: the Five Pieces for Piano, Op. 23, the Serenade, Op. 24 for clarinet, bass clarinet, mandoline, guitar, string trio and bass voice and the Suite for Piano, Op. 25. The Serenade, the first instrumental chamber work to employ the new method, explores three different techniques. The single vocal movement uses repeated statements of the original tone row in the vocal part while the accompanying instruments use the row as a source for motives. Another movement is based on a fourteen-note row, while a third movement has sections which contain complementary six-note sets. Further development of the twelve-tone method may be observed in subsequent chamber works. The Wind Quintet, Op. 26 of 1923-24 was the first to utilize classical forms, incorporating all transpositions of the original row. Preference is shown for using these transpositions or set forms similar to keys in a tonal composition; that is, the original row serves as a central point about which the other set forms revolve. This was the first work in which the tone row was divided into two six-note groups, with the second six notes used as an accompaniment to the first six notes. Earlier tonal practices may be detected within its twelve-tone

⁴Josef Rufer, Composition with twelve tones, trans, Searle (London: The Cresset Press, 1969), p. 64.

context: 1) the initial note of the original row (Eb) is noticeable in the finale, ending with a unison Eb and 2) the coda contains both frequent movement in the bass part of the perfect fifth interval and disguised "perfect" cadences. The Third String Quartet, completed the same year as Anton Webern's String Trio Op. 20, is based on a tone row which, although not combinatorial, uses the original row and its inversion a fifth lower for the first and second themes respectively within the sonata form of the opening movement. Perhaps the most well-known of Schoenberg's string chamber works, the Fourth String Quartet (1936), was the last to incorporate the classic form of four separate movements; in the final three chamber works, the Ode to Napoleon, the String Trio Op. 45 and the Phantasy Op. 47 for violin and piano, Schoenberg returned to the single movement form which he had used for the First String Quartet. In the final quartet, a new twelve-tone technique, semi-combinatorial form, is used for the first time in a chamber work; it is again encountered in the String Trio and the Phantasy.

B. The String Trio Op. 45

Schoenberg's interest in string music began early, with his learning to play the violin at eight, and the cello shortly thereafter. During his early years he took part in playing chamber music with his fellow students writing duets, trios and quartets for this purpose. From his first major work, the String Quartet in D major of 1897 to the Phantasy written two years before his death, he returned intermittently to the medium of string chamber music. Before the outbreak of World War II he moved to the United States, where he ultimately resided in

Los Angeles, California. It was while living here that on August 2, 1946, the composer suffered a severe heart attack; death was narrowly averted by an injection and he was taken to the hospital. Work on the String Trio began shortly thereafter on August 20, and was completed by September 23. Schoenberg, in relating the circumstances of the trio's conception, told Thomas Mann⁵ it was a reflection of the physical and psychological suffering of his illness and of his convalescence in the hospital. The emotional impact on the listener is that of passages filled with turmoil and biting dissonance alternating with those of repose, reflecting both his suffering and subsequent release from pain.⁶ This work has been described as containing " a quite exorbitant accumulation of varying tone colors on three strings. . . and on top of this a profusion of dynamic contrast as a result of which the total sound contradicts all previous musical experience. The shock effect of the first minutes is inescapable; it stamps the piece as a brilliant work of anxiety and appression from which strange melodies, sounds and rhythms unexpectedly lead us to a realm of unearthly, dreamlike truth."⁷ Commissioned by Harvard University, the first performance took place in 1947 at a symposium of American music critics.

C. Webern's string chamber music prior to Op. 20

Anton Webern (1883-1945) showed an early interest in music, and while attending the Gymnasium at Klagenfurt he received private tutoring

⁵Thomas Mann, Die Entstehung d. Dr. Faustus (Bermann Fischer, 1949), p. 190.

⁶H. H. Stuckenschmidt, Arnold Schoenberg, pp. 136-37.

⁷Ibid., p. 139.

in piano, cello and music theory. In 1902 he attended Vienna University where he studied harmony and counterpoint, and musicology with Guido Adler. It was here, while still a student, that he met Schoenberg and became his pupil in the autumn of 1904. In describing their relationship years later Webern said: "It is not twenty years since I became a pupil of Schoenberg. But however hard I try I can't perceive the difference between then and now. Friend and pupil: one was always the same as the other."⁸ The early influences of Wagner and Strauss are evident in a chamber work, Langsamer Satz, written in 1905 during his student days. Beginning in 1909, four important atonal chamber works appeared: the Five Movements for String Quartet Op. 5, the Four Pieces Op. 7 for violin and piano, the Six Bagatelles Op. 9 and the Three Small Pieces Op. 11 for cello and piano. Even in these early works, the following characteristics of his later style may be observed:

- 1) Preference for the interval of the minor second in both horizontal and vertical axes. Op. 9, no. 5 is based entirely on minor seconds sounding separately or together.
- 2) Brevity. This characteristic is brought to its extreme point in Op. 11; each movement lasts less than a minute.
- 3) Short motives, one to four notes. Op. 11 contains one-note motives.
- 4) Use of the special harmonic techniques of pedal point and ostinato.
- 5) Frequent changes in manner of playing; use of special effects.
- 6) Subtle gradations of dynamics and articulation.
- 7) Wide intervallic leaps, usually a major seventh or a minor ninth.

⁸Walter Kolneder, Anton Webern, trans. Humphrey Searle (University of California Press, 1968), pp. 15-16.

In addition, what was to become his most important stylistic trait became well-established in these early chamber works--the complete integration of vertical, horizontal and formal elements.

Historically, Webern's achievement is 'identification', the dissolving of counterpoint, harmony and form into a new concept. . . . Certainly the category 'form' had already indicated that it might be a higher stage, in so far as every chord, every melodic detail and every relationship of parts could be determined according to its formal function within the whole. A conception of form in which harmony and counterpoint should themselves be dissolved would, however, have to lay open everything in music above the point where the distinction between the dimensions in fact falls; the relationship of note to note. Webern was the first to set foot in this virgin territory. . . .⁹

Webern began to adopt the twelve-tone method in 1924 with the Three Traditional Rhymes Op. 17; it was followed in subsequent years by two other vocal works, Op. 18 and Op. 19 (1925-26) which further explored the serial technique. Compared to Schoenberg's many years of experimentation, Webern's transition to the twelve-tone method was relatively uneventful. Differences in the change to serial technique in the music of these two composers is described by Winfred Zillig:

With Schoenberg the step to the twelve-tone system was taken after almost ten years of interior battle with himself and the material had the effect of an explosion: with Webern the step happened almost unnoticeably, and his entry into the method hardly makes any appreciable difference in the works of his second period--there is certainly no break in style.¹⁰

The String Trio Op. 20 which followed, marked an important point in Webern's career; this was his first instrumental work based on the twelve-tone method and his first serial work to utilize the classic forms.

⁹Heinz-Klaus Metzger, "Webern and Schonberg", Die Reihe no. 2 (Theodore Presser Co., 1959), pp. 43-44.

¹⁰Winfred Zillig, Variationen uber neue Musik (Munich: Nymphenburger Verhandlung, 1959), p. 187.

D. The String Trio Op. 20

Two earlier attempts for the same medium, the Satz fur Streichtrio¹¹ and an unpublished sketch for a string trio¹² preceded Op. 20 by two years. The String Trio Op. 20 was begun and completed during a summer holiday at Hafnung in Styria in 1927. Webern's daily schedule was a combination of work and relaxation:

Tried to begin work at eight o'clock in the morning. In fine weather went straight from bed to bathe in the kruppenbachl. Work until about one o'clock. Staying in one's room not pleasant, cold and damp, a bit cellar-like on hot days. After lunch rested in the meadow behind the house, an hour at most. Sometimes went bathing with the children and Minna. Then work until teatime. Sometimes also later. After six o'clock, usually a walk in the Krumengraben or its surrounding woods, looking for fungi or berries.¹³

Webern planned a three movement work originally, but after careful deliberation decided on only two; the brief introduction to the second movement serves as a substitute. In November, 1927, publication was undertaken by Universal Edition and the first performance was by the Kolisch Ensemble on January 16, 1928, in Vienna. Reaction to the work was, unfortunately, less than enthusiastic; it elicited hissing and general disturbance by audiences at both the ISCM Festival in Siena and a composer's festival in Schwerin. Ten years later Webern described in a letter to Willi Reich an incident which had taken place recently: "Did you hear about the awful thing that happened when my string trio was performed in London? The cellist got up saying 'I cannot play this

¹¹See Appendix E.

¹²See Anton von Webern Sketches.

¹³Friedrich Wildgans, Anton Webern, trans. Roberts and Searle (New York: October House, Inc., 1967), p. 97.

thing!' and walked off the platform! Surely nothing like that has ever happened before!"¹⁴ Performance time as indicated in the score is 9½ minutes, although the actual playing time is approximately 8 minutes, 14 seconds.¹⁵

¹⁴Anton Webern, The Path to the New Music (Theodore Presser Co., 1963), p. 58.

¹⁵Recording time taken from the complete set of recorded works.

II. Webern: String Trio, Op. 20

A. Row Structure

The basic series for Op. 20 illustrates Webern's characteristic preference for the semi-tone interval. It is comprised of six pairs of semi-tones separated by perfect 4th intervals or, in one instance, a major 3rd interval. The row is used as a unit, constructed with the following features:

1. It is not symmetrical; that is, the second half of the row (notes 7-12) is not an exact retrograde of the first half of the row (notes 1-6). Many of the later works (Op. 21, 28, etc.) used symmetrical rows.
2. Series notes 7 to 10 are an inversion of notes 1 to 4.
3. Alternating pairs of tritone intervals occur in notes 1 through 4 and 7 through 10.

EXAMPLE 1

Example 1 consists of two musical staves, (a) and (b), each with 12 numbered notes. Staff (a) is labeled 'Original' and staff (b) is labeled 'R-4'. Both staves are in treble clef. Staff (a) notes: 1 (Bb), 2 (C), 3 (D), 4 (Eb), 5 (F), 6 (G), 7 (Ab), 8 (Bb), 9 (C), 10 (D), 11 (Eb), 12 (F). Staff (b) notes: 1 (F), 2 (Eb), 3 (D), 4 (C), 5 (Bb), 6 (Ab), 7 (G), 8 (F), 9 (Eb), 10 (D), 11 (C), 12 (Bb). The R-4 transposition is a retrograde of the original row.

The original row (Example 1a)¹ is that of the second movement; the first movement is based on its R-4 transposition (Example 1b).²

¹Set-form quoted from Wildgans, Webern, p. 139; taken from Webern's mss.

²See Pearle, Serial Composition and Atonality, 2nd ed. (University of California Press, 1968), pp. 125-26.

This rather unusual procedure of using the R-4 form rather than the original row form for the opening movement may be explained by the fact that a third movement had originally been planned. Thus, the first movement may have been considered for a second or third movement and the second movement may have been planned for a first or third movement.

B. Melodic application

The most important structural element is the semitone interval; it is the basis for two, three and four note motives in both movements. These motives are subjected to a process of continuous variation of rhythm, octave transposition, mode of performance and change of dynamics. In a forward to the printed score, Erwin Stein comments:

The principle, to develop a movement by variation of motives and themes is the same as with the classical masters. In his manner of developing his motives, however, and in the thematic treatment Webern deviates far from the classical examples. Motives and themes are invariably immediately subjected to a process of variations and whenever they recur it is in a very modified shape. . . The parts are, mosaic-like, composed of elements derived from one tone-series. Through various combinations, the same elements serve to create manifold and continually changing sounds. One may well compare this system to the Kaleidoscope, where ever new effects are gained by varying grouping of a number of colors and elements of forms.³

The first movement is a classical rondo form: Introduction, A,B,A¹,C,C¹, introduction, A²,B¹,A³. The opening measures (mm.1-3) present the original set-form (P-0)⁴ immediately followed by its retrograde (R-0). In measure 3 the last two notes (11,12) of the P-0 series in the viola and cello are also the beginning notes (1,2)

³See Appendix bibliography.

⁴See Appendix for complete set-forms for this work.

of the R-0 series, and a retrograde of the previous rhythm, dynamics and mode of performance. Two important characteristics of the first movement are presented in these three measures: 1) frequent grace notes and 2) repeated notes, played by the cello in measure 2.

EXAMPLE 2

I

Sehr langsam (♩ = ca 42)

Anton Webern Op. 20
(1883-1945)

Geige
Bratsche
Violoncell

The introduction returns later (measures 40-43) as a new variation comprised of a two-note figure () treated in a manner suggesting pointillism. As in the opening measures, a rhythmic retrograde is concurrent with the R-0 series; here, however, the earlier retrogrades of dynamics and mode of performance are replaced by a gradual diminuendo and a change in mode of performance in measure 43 to am steg.

EXAMPLE 3

molto rit.

41
42
43

P.O.
R-O

am steg

Section A which follows the introduction, returns three times in variation. Three motives are announced at the beginning of this section, comprised of from two to four notes (motives R, S and T). With each return, these motives are varied through changes in rhythm, octave transfer of one or more notes, manner of performance, dynamics and interchange of parts. In the first three presentations, A, A¹ and A², the rhythmic figure  is characteristic; in the final return A³, this rhythmic pattern is reversed (). The original statement (A) is indicated to be played at a general dynamic level of piano (p). In its return the following two times, the dynamic is lowered to pianissimo (pp), while in the final return it is raised to forte (f). Motive R is inverted and transposed an octave higher in its initial return; partially inverted and transposed an octave lower in its second return (A²). In its final appearance it achieves added prominence through octave transposition of the third note to a higher register combined with a crescendo to a sff dynamic. Motive S is changed in mode of performance from arco to pizzicato in its first repetition; in its following return the major 7th interval is emphasized by means of a glissando. In its initial return (A¹) motive T is changed rhythmically and transposed down an octave; in its following appearances it is subjected to further rhythmic variation and melodic inversion. In the final presentation (A³) the beginning two-note motivic segments of S and T are expanded to three notes.

EXAMPLE 4

A

A¹

A²

A³

In section B (measures 9¹/₂-15), major 7th and minor 9th intervals are the melodic basis of a three-note rhythmic motive ().

Beginning with the violin in measure 10 (tempo, ruhig), this motive is freely imitated among all three instruments in the following measures (mm.10-11, violin and cello; mm.12-13, violin, viola and cello).

EXAMPLE 5

In the return (B¹) of this section (mm. 51-56), variation is achieved by several means: 1) expansion of the basic melodic interval to a major 15th, 2) reversing the basic rhythmic pattern, 3) a faster tempo (lebhaft) and 4) a raised dynamic level for the violin (forte) and frequent sf indications for the entire ensemble.

EXAMPLE 6

The musical score for Example 6 consists of two systems of staves. The first system contains measures 51, 52, and 53. Measure 51 is marked 'rit.' and 'tempo (lebhaft)'. It features a violin melody starting with a major 15th interval, followed by a pizzicato (pizz.) and arco section. Measures 52 and 53 continue the violin melody with various dynamics (ppp, p, f, sf) and articulations (pizz., arco). The second system contains measures 54, 55, and 56. Measure 54 is marked 'accel.'. Measures 55 and 56 continue the violin melody with various dynamics (sf, p, f, sf) and articulations (pizz., arco). The score also includes parts for Violin II, Viola, Cello, and Double Bass, with various dynamics and articulations.

Section C (mm. 22-30), marked fliessend, ausserst zart begins with a technique characteristic of this section, that is, the "pyramiding of sound" produced by the entrance of instruments in close succession. The vertical sonority of the opening measure is followed by a four-note motive played by the solo violin. The cadence in measure 24 is provided harmonic punctuation by the viola and cello.

EXAMPLE 7

verlöschend, molto rit. - - - fließend, äußerst zart

ca 84

21 22 23 24 25 26

sehr zart pizz. arco

rit. - - - tempo

pizz. arco

pp p

The immediate repeat of this section (C^1), measures 31 to 39 $\frac{1}{2}$ is varied from the original statement by: 1) a change of instrumentation and octave register, 2) a changed order of entrances, 3) a change in playing manner to am steg in the first measure, 4) a change in articulation of the beginning two notes, 5) the inversion, octave change, rhythmic variation and lengthening of the four-note motive previously played by the violin to a five-note motive played by the cello, and 6) a change in dynamic level from pp to ppp.

EXAMPLE 8

tempo rit. - - - tempo

31 32 33 34

am steg pizz. am steg pizz.

ppp p dim.

tempo rit. - - - tempo

am steg pizz.

ppp p

The second movement is in sonata form preceded by an introduction. The introduction, marked Sehr getragen und ausdrucksvoll, is constructed entirely from semi-tone intervals. Through note repetition these two-note cells are expanded to four and five-note motives; variety is achieved through different rhythmic groupings, octave transfer and changes in mode of performance.

EXAMPLE 9

Sehr getragen und ausdrucksvoll ($\text{♩} = \text{ca } 66$)

These semitone repeated-note motives reoccur with further variation in the later development, recapitulation and coda. At the beginning of the development section, a new version of motive a occurs as a consequence of the imitation of repeated notes between cello and viola in measures 74-75 and the violin and viola in measures 76-77. New rhythmic versions of b), c) and a) follow in an imitative manner in measures 78-80.

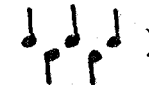
EXAMPLE 10 sehr ruhig ($\text{♩} = \text{ca } 56$)

A later variation of version a) is in sixteenth notes; it is momentarily lengthened to a five-note group, a¹ in measures 159-160. A measure later (m. 160) the condensation of a) and b) produces two new three-note versions, d) and e) in the violin and viola.

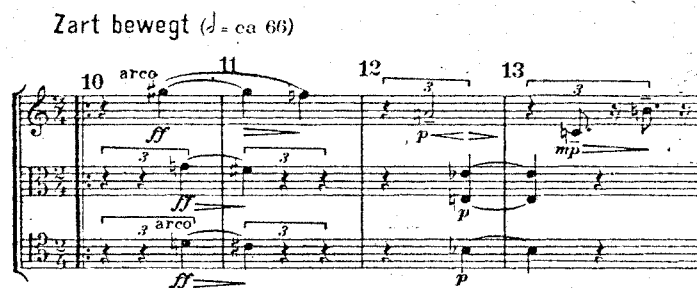
EXAMPLE 11

In the final coda variations of a) and b) occur in imitative style between the violin and the viola. Combinations of harmonics, pizzicato together with dynamic changes produce constant variety.

EXAMPLE 12

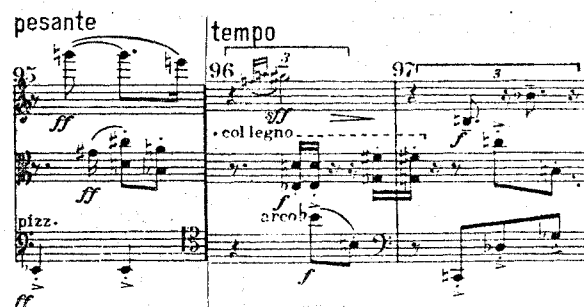
In the sonata form which follows, the exposition of A (Zart bewegt) begins with a four-measure motive in the violin accompanied by two and three note chords played by the viola and cello. Characteristic of this section are the frequent two against three rhythms () and the soloistic treatment of the violin.

EXAMPLE 13



Another variation of the violin motive is played by the same instrument in the development section. A change in dynamic markings, rhythmic alteration of the beginning notes, the addition of a turn to the third note and transposition down a half step are present. The simple chordal punctuation by the lower two instruments has been replaced by a more contrapuntal texture.

EXAMPLE 14



In the recapitulation of A (measure 118, tempo, massig) only the final three notes of the original motive are discernable. The preceeding PO series notes 1-10 are reproduced in measures 115-117 as vertical chord structures in the viola and cello against a sustained Eb pedal in the violin.

EXAMPLE 15

Section B of the exposition, measures 40-59, opens with closely staggered entrances of the three instruments playing short motivic fragments (x, y and z). The five-note motive x^1 assumes particular importance due to its greater length, and is given dynamic emphasis. The variation treatment of the individual instrumental lines (x,y,z) recalls that of section A in movement I. Two appearances of these motives in both the exposition and the recapitulation produces a total of four variations. In its second appearance (B^1) motive x is an octave lower, played by the cello, while motives y and z are inverted and varied in rhythm and mode of performance. The general dynamic level has been lowered to pianissimo.

EXAMPLE 16 - - *gemächlich* ($\text{♩} = \text{ca } 60$)

Its next return in the recapitulation (B^2) is a rearrangement of the motives, with motive x inverted, but rhythmically and dynamically identical to the original version now played by the viola. Motives y and z, also inverted are varied both rhythmically and in mode of performance. The final complete return (B^3) repeats the original instrumentation with the dynamics of B^1 . However, a new element is introduced by the cello in measure 156--a return of the repeated note motive from the introduction (shown in brackets).

EXAMPLE 17

gemächlich (♩=ca 60)

rit.

144 145 146 147 148

B^2

154 155 156 157 158

rit. tempo (sehr gemächlich)

B^3

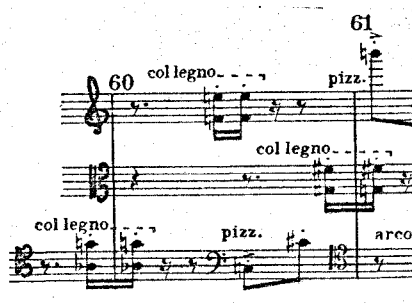
In the final coda section, a partial return of motive x is played by the cello, transposed a semi-tone higher than the original and at a fortissimo (ff) dynamic level.

EXAMPLE 18



The closing section is characterized by a repeated double-stop figure, played col legno. It appears again in the contrapuntal texture of the 2nd section of the development, culminating in the repeated chord at the climax in measure 101.

EXAMPLE 19

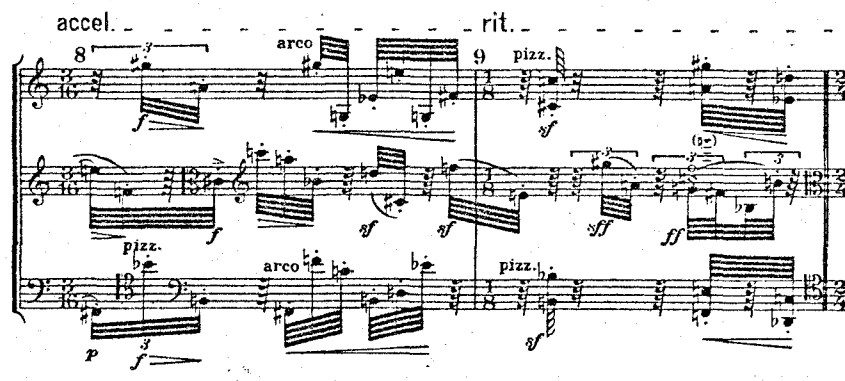


2. The function of rhythm

Rhythm plays an important role as a source of motivic identification and of motivic variation. The formal structure may be divided into sections based on rhythmic characteristics (see Table 1). Rhythmic figures are related through rhythmic diminution and rhythmic retrograde. The triplet quarter-note rhythm () which occurs briefly in the introduction of movement I (EXAMPLE 2, mm.1-3) is also a characteristic rhythm of the accompaniment to motive A in movement II. Later occurrences of this rhythm are at the beginning of the development section (EXAMPLE 10), section 3 of the development, and the final section of the coda. Diminution of this rhythmic figure into triplet

eighth-notes () identifies the beginnings of transition sections of movement II, where it appears as a unison rhythm.¹⁵ Triplet thirty-second notes () are a characteristic rhythm in the beginning measures of the introduction to movement II (EXAMPLE 9). Here, the gradual diminution of note values in measure 8 to sixty-fourth notes () is followed in measure 9 by still further division into triplet sixtyfourth notes (). The gradual quickening of note values is accompanied by a rise in the dynamic level and an accelerando leading to the climax in measure 9 (EXAMPLE 20).

EXAMPLE 20



The return of motives in rhythmic retrograde, or reversed rhythmic pattern, has been mentioned above; i.e. in movement I the rhythmic motive () common to sections A and A¹ is reversed () in the last two returns (A² and A³). Likewise, the rhythmic diminution of the latter figure produces the identifying rhythm of section B (), whereas in the return the pattern is again reversed (). Similarly, the short-long, two-note rhythm () characteristic of section C is reversed () in the repeat (C¹). Rhythmic

¹⁵A rhythm found in the transition sections of other works by Webern, i.e. 1905 String Quartet and Op. 5 Five Movements for string quartet.

diminution is also evident in the reduction of the two-note semitone motive in sixteenths () in section C to thirty-second notes () in section C¹.

Uneven two-note rhythmic cells play a prominent role in the formal structure of movement II, appearing in the following variations (, , , ). Here, again, the technique of diminution is reflected in the gradual shortening of the second note.

Summary

The techniques which are used by Webern in his choice of and variation of motivic material in Op. 20 may be summarized both melodically and rhythmically. Melodic variation is produced by:

- 1) melodic inversion
- 2) rhythmic variation
- 3) change in octave register for entire motive or specific notes therein
- 4) change in mode of performance, specific notes
- 5) dynamic changes

The element of rhythm as it applies to motivic material reveals a process which may be described as "variations of variations". Motivic rhythms may be related through the process of diminution, and rhythmic motives themselves are subjected to variation by means of a rhythmic retrograde. The result of these melodic and rhythmic procedures is a motivic structure which is closely integrated, yet has continuous variation.

TABLE NO.1

Summary of
Form, Meter, Rhythmic Motives
and Textural Features

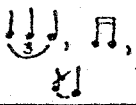
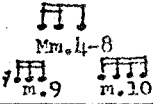
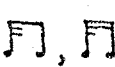
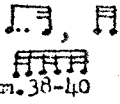
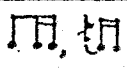
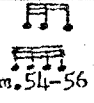
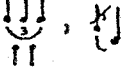
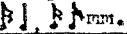
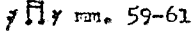
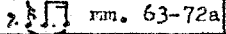
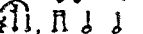
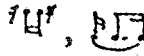
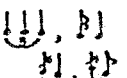
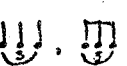
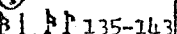
MOVEMENT I			
Formal Unit	Meter	Rhythmic Fig.	Textural Feature
<u>Introduction</u> Mm. 1-3	2, 5, 2 4 4 4		Beginning measure 2, beat 3: retrograde of series, rhythm, dynamics (γ instead of ξ, end of measure 2)
<u>A</u> Mm. 4-9½	Alternation of 2, 3 4 4		Motives R,S and T
<u>B</u> Mm. 10-15	2, 2, 2, 2, 3 4 8 4 8 8		Imitation of rhythmic motive
<u>A¹</u> Mm. 16-21	3, 2, 3, 2, 5 4 4 4 4 8	 Mm. 20-21	Motives R,S and T
<u>C</u> Mm. 22-30	Alternation of 3, 5 8 16		Entrances of instruments in close succession: mm. 22, 24, 26 and 27
<u>C¹</u> Mm. 31-40	Alternation of 3, 5 ; 3 16 16 8 Mm. 36-40		Entrances of instruments in close succession: mm. 36, 37 Rhythmic doubling, m. 38 climax reached in m. 40
<u>Introduction</u> Mm. 41-43	3, 5 16 16		Pointillistic style Uniform rhythmic figure throughout
<u>A²</u> Mm. 44-50½	Alternation of 3, 2 4 4		Motives R,S and T (variation)
<u>B</u> Mm. 50½-56	2, 3, 2, 3 4 8 8 8		Rhythmic clarity Increased rhythmic activity beginning m. 54 Motivic imitation
<u>A³</u> Mm. 57-65	3, 2, 3, 2, 4 4 8 8 3, 2, 2, 3, 3 4 4 8 8 4		Motives R,S and T (variation)

TABLE NO. 1 - continued

MOVEMENT II

Formal Unit	Meter	Rhythmic Figure	Textural Feature
<u>Introduction</u> mm. 1-9	Alternation 1 of 3 8 16	 mm. 1-7  m. 8  m. 9	Variations of semitone motive Gradual rhythmic diminution leads to climax in m. 9
<u>Exposition</u> A mm. 10-25	2 4		A theme, violin Homophonic texture
transition mm. 26-39	2, 3, 2 4 4 4	 mm. 26-29 1/2  mm. 30-39	Unison rhythm
B mm. 40-59	2 4		B- Motives x, y and z, mm. 40-44 B ¹ - var. x, y and z, mm. 50-54 Rhythmic doubling; mm. 55-56 leads to climax in m. 59
closing section mm. 60-73a	2 4	 mm. 59-61  mm. 63-72a	Played col legno; Imp. Motive see B above
Development 1st section mm. 73b-87		 mm. 73b-81  m. 83  mm. 84-87	motivic counterpoint
2nd section mm. 88-101	2 mm. 88-100 4 3 4 m. 100		cpt. of diverse rhythmic elements; rhythmic doubling rhythmic diversity; rhythmic doubling, m. 101 and climax; Return th. A, mm. 95-98
3rd section mm. 102-117	2 4		Wide leaps, vln; changes from arco to pizz. Pedal point, mm. 113-117
Recapitulation A mm. 118-130	2 4		Return of A(A ²); integrated texture; diverse rhythms; wide leaps, esp. vln. part
transition mm. 131-143	2, 3 mm. 131-143 4 4 2, 3 Alt. 4 4 135-143	 mm. 131-134  mm. 135-143	Unison rhythm Imitative; wide intervals
B mm. 144-162	2 4		B ² - var. of x, y, z mm. 144-148 B ³ - " " " mm. 154-158 Var. introductory motive (a, b, c)
closing section mm. 163-171 1/2		 mm. 163-166 	Col legno; rhythmic diversity; rhythmic doubling, m. 170; motive x, m. 174-5; pedal pt., 179
Coda mm. 172-179 mm. 180-183 mm. 184-193	2, 2 4 4 4	 mm. 180-3 	" " "

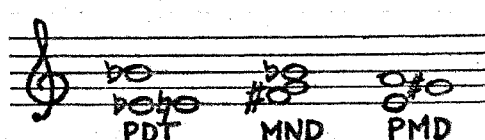
C. Vertical Application

While tone row music cannot be subjected to the traditional methods of harmonic analysis, it is possible to undertake a study of the intervallic structure of chords, the frequency of chord change and cadential chord patterns. The basis for this analysis is that of Howard Hanson.⁶ By this method, all possible interval combinations within chord structures are expressed by the following symbols:

- P Perfect fifth, or its inversion, a perfect fourth
- M major third, minor sixth
- N minor third, major sixth
- S whole stop, minor seventh
- D half step, major seventh
- T tritone

Vertical structures in the Op. 20 Trio are almost entirely the result of the interplay of motivic material. The frequent overlapping of motivic figures among the three instruments produces momentary two- and three-voiced vertical structures. Triads are the most frequent type of vertical sonority (TABLE No. 2), with PDT, MND and PMD structures occurring in decreasing order of frequency. These three chords are constructed as follows:

EXAMPLE 21



⁶As outlined in his book, Harmonic Materials of Modern Music (New York: Appleton-Century-Crofts, Inc., 1960).

Four-member chords are rare in movement I, but frequent in movement II. The most common of these structures is the P2MSDT.⁷ Only one six-member chord is present in the entire work.⁸

2. Cadences

The most frequent cadence formula in this work is that of a vertical dyad immediately followed by a single note. In this analysis, the cadential structure will include all three notes due to their close aural proximity. A summary of cadences⁹ shows a frequency of Eb-E and Bb-B in both movements, but their momentary presence does not imply a "key" feeling of any kind. The most frequent cadential structures are PMD and PDT triads. Both movements terminate with PDT triads, if the final G# of movement II is considered together with the preceding D-G dyad. Moreover, the penultimate triads are also identical; in movement I, the viola sustains the note A throughout the final measure (EXAMPLE 22a) while in movement II, the violin sustains an F# for the first two beats (EXAMPLE 22b). The cadential pattern for both is: Perfect 4th dyad- PMD- PDT.

EXAMPLE 22

- tempo molto rit. . . .

a)

b)

⁷See EXAMPLE 29.

⁸See EXAMPLE 25.

⁹See TABLE NO. 2.

TABLE NO. 2

Cadence Chord Structures In
Webern's Trio, Op. 20

Movement	Measure	Cadential Structure
I	3	(AbEEb) ¹⁰ PMD
	10	(ACD) PNS
	21	(BbFB) PDT
	24	(EBbD) MST
	30	(BbEbE) PDT
	36	(FCEbD) PN2S2T
	43	(DDb) ---
	56	(BbGF#) MND
	65	(AD) Pl4th- (G#EA) PMD- G#EbA) PDT
II	9	(DEbCDb) NS2D3
	25	(ABE) P2S
	44	(EbFE) SD2
	68	(F#C#D) PMD
	73a	(FE) ---
	101	(ABbC#DFGb) P3M6N3D3
	117	(EbEBb) PDT
	130	(BBb) ---
	148	(AAbBb) P2S
	171	(F#BG) PMD
	179	(C#EFA) PM3ND
	193	(C#F#) Pl4th- (E#GD) PMD- (G#) ---

¹⁰Notes included in cadential structure.

TABLE NO. 3

Tabulation of Chord Structures, Showing Type And
Frequency Of 3, 4 And 6 Member Chords

<u>3 Member Chords</u>	<u>I</u>	<u>II</u>	<u>Total Frequency</u>
PDT	7	23	30
SD2	1	2	3
NSD	1	2	3
MND	4	10	14
PMD	6	7	13
P2S	2	3	5
MST	3	1	4
PNS	2	1	3
MS2	1	-	1
MNS	-	1	1
PND	-	1	1
M3	1	-	1
			<u>79</u>

4 Member Chords

P2MSDT	-	11	11
P2D2T2	2	3	5
PMNSDT	-	3	3
NS2D3	-	3	3
PM2ND2	-	3	3
P2MD2T	-	2	2
P2D2T2	-	3	3
PMN2DT	-	1	1
PM3ND	-	1	1
PN2SDT	-	1	1
MNS2D2	-	1	1
			<u>34</u>

6 Member Chord

P3M6N3D3	-	1	1
----------	---	---	---

Total 114

In the final measure of the introduction to movement II (m.9),¹¹ linear semi-tone motives in the viola are punctuated by three four-member pizzicato chords. The first and third chord structures are identical (NS2D3), both constructed of four-note chromatic scale segments. The intervening chord (PNM2D2) is somewhat less dissonant, due to its inclusion of the perfect and major third intervals. Thus, the cadence formula is that of dissonance, lesser dissonance, with a return to dissonance.

EXAMPLE 23

NS²D³ PNM²D² NS²D³

Repeated chord structures are restricted to two climax points in movement II. A climax at measure 59 culminates in a repeated PDT triad in which spacing of the uppermost interval expands to nearly $2\frac{1}{2}$ octaves. The preceeding chord structures in measures 57 and 58 reveal a gradual shift in interval emphasis from the major third to the tritone.

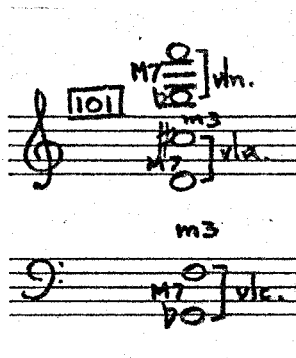
EXAMPLE 24

PMD MND P²MDT PDT

¹¹See also EXAMPLE 20.

The repeated six-member chord in measure 101 climaxes section 2, the approximate midpoint of the development. Carefully balanced spacing of major 7ths and minor 3rds produces a chord of striking vibrance and sonority. Its structural classification, P3M6N3D3, reveals a pre-dominant number of major 3rd intervals balanced by equal numbers of perfect 5ths, minor 3rds and semitones.

EXAMPLE 25



3. Chord Movement

Chord structures are momentary occurrences, often within small fractions of beats. The interweaving of rhythmically independent instrumental parts produces an ever changing succession of dyads, triads and four-member chords. An analysis of these vertical structures reveals constant changes of chord type, vertical intervals and spacing.¹² The tritone interval, not particularly stressed melodically, assumes importance as a frequent vertical interval (PDT, P2MSDT). In the introductory measures (mm. 1-3) of movement I it occurs at the end of measure 1 (cello G, violin C#), twice in measure 2 (violin F, viola B) and as a linear interval (F#-C in the cello) and at the beginning of measure 3, between the violin (D) and cello (Ab). In measure 2, the tritone is expressed as a vertical dyad (F-B) by the violin and viola,

¹²See EXAMPLE 24.

and as a linear interval (F#-C) by the cello. Chord movement, beginning with an N2T (diminished triad) and followed by PDT triads which resolve to a PMD in measure 3, is from three tritone triads toward a "resolution" to a less dissonant, incomplete major-major 7th chord. In the following phrase (mm.4-10), a succession of PDT triad is briefly interrupted by two chords stressing half and whole step intervals (SD2,NSD) with a cadence (PNS) devoid of the tritone interval (see EXAMPLE 26a).

A longer chord progression is shown in EXAMPLE 26b which begins with a PMD triad, progresses through a series of less dissonant triads (MST: M3, an augmented triad; PMN, a major triad;) to three MND structures. A return to PMD structures (mm.29-30) is followed by a cadence on a PDT triad. Aurally, this section is heard as a pattern of dissonance - mild dissonance - much greater dissonance - mildly dissonant cadence.

EXAMPLE 26c shows a phrase which opens and cadences with the same two vertical structures, a procedure also followed in EXAMPLES 27b and 27d. The similar, dissonant, PDT triads of measures 59 and 61 which contain minor 9th intervals are interspersed with milder dissonances in measures 60 (PNS) and 62 (MND). The cadence chord, also a PDT structure, is less dissonant due to the milder perfect 4th and tritone intervals.

The opening measures (10-25) of section A of movement II is characterized by three and four-member chords formed by the solo violin part and its chordal accompaniment. EXAMPLE 27a begins and ends with similar chord movement: a sustained note in the violin is accompanied by parallel 4th movement down a semitone "resolving" to P2S chords.

EXAMPLE 27

Vertical Structures, Webern Trio Op. 20
Movement II

(a)

(b)

EXAMPLE 27 - continued

(c)

135 136 137 139

M6 P5 P4 m6 P4 M7 P4 M7

PMS P'S PDT MND PHD SD² #² PMSDT

(d)

139 140 141 142

M7 M7 M7 P4 M7 M7 T P4 M7 m2 M7

PDT PMSDT PMND PMNSDT MND PDT PDT PMSDT

In the opening measure, the dissonant minor 9th interval "resolves" to a less dissonant major 7th in measure 11. Here, the falling minor 3rd melodic interval in the violin part is similar to the opening measure of movement I. An analysis of the chord structures reveals the following:

- 1) Except for the penultimate measure, all four-member chords contain at least one (and usually two) perfect 4th one minor 2nd and one tritone.
- 2) The cadence chord is constructed of two perfect 4th intervals; the tritone is absent.
- 3) Frequent P2D2T2 (PDT) and P2MSDT chord structures; rare repetition of chords at beginning of mm.20-21.

A comparison of chord movement between corresponding transition sections in the exposition and in the recapitulation may be observed in EXAMPLES 27b and 27c. Both examples, which begin and conclude with the same two chords (PDT-P2MSDT), follow a procedure found earlier in EXAMPLE 27a, i.e. in mm. 34-35 and 139 a common tone is held as the two remaining parts move downward in parallel motion. Chord structures of the following measures (36-37 and 140) are identical, although there are differences both in vertical intervals and in voice leading. In both examples, a series of perfect 4th and major 7th dyads precede the cadential chords. The penultimate and final chords in the cadence measures (38 and 142) have the tritone as the uppermost interval and the perfect 4th interval between the two lowest parts in the final chord.

The cadence in EXAMPLE 27d is, again, a P2MSDT structure as in the two previous examples. Here, each chord is of a different construction, but through common tone relationships and semitone voice leading, they may be grouped in pairs. The PNS (incomplete 7th chord)

in measure 135 "resolves" to a more consonant P2S structure (two perfect 5ths); the PDT triad in measure 136 "resolves" downward a half step to an MND (incomplete 7th chord in root position). In measure 137 chord movement from a PMD to the more dissonant SD2, although interrupted by intervening dyads, retains two common tones (G,Ab). This dissonance then "resolves" to the more consonant P2MSDT chord.

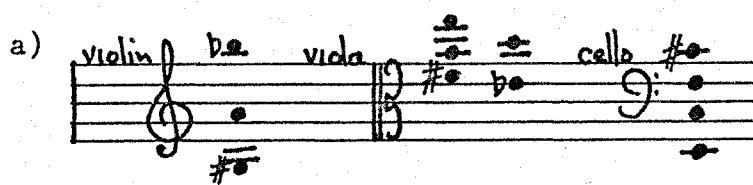
The suspension of harmonic movement is evident at four points within movement I, despite the fact that a change in row forms takes place.¹³ This temporary lack of harmonic movement is accompanied by a shift in emphasis to the interplay of rhythmic motives in an imitative manner. These periods of harmonic stability serve as either: 1) a contrasting section to those of perpetual harmonic variation, as section B (mm. 10-15, EXAMPLE 5) and its return (mm.51-56, EXAMPLE 6) or 2) as a cadential preparation (mm.20-1, EXAMPLE 7 and mm.40-3, EXAMPLE 3). EXAMPLE 28 a-d shows the notes played by each instrument during these four sections of static harmony. The twelve notes are divided into various groupings:

- a) Unequal division among the three instruments. The violin plays three notes (G#ABb), the viola five notes and the cello, four notes.
- b) Unequal division. Five notes each for the violin and viola and two notes for the cello. The note Bb is played only once by the violin.
- c) and d) Equal division of four notes played by each instrument; two pairs of semitones.

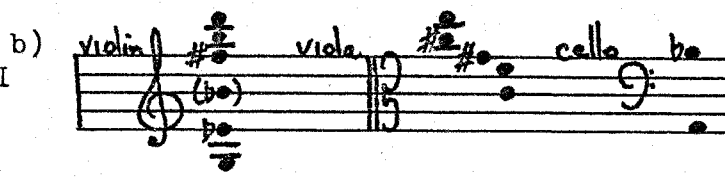
¹³Mentioned also by Kolneder in Anton Webern, p. 100 concerning Op. 17. He describes it as "harmonic 'strata'".

EXAMPLE 28

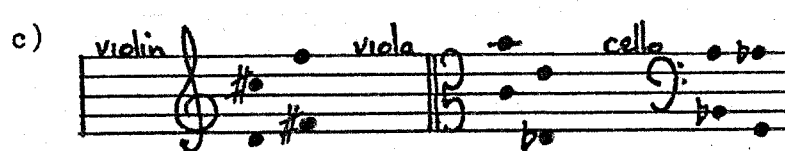
Movement I
mm. 10-15



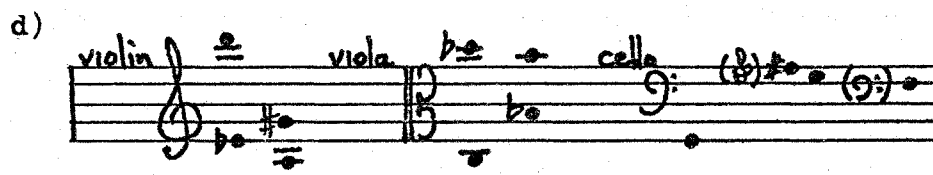
Movement II
mm. 51-56



Movement I
mm. 40-43



Movement I
mm. 20-21



4. Intervals and spacing

The size and arrangement of vertical intervals varies from chord to chord; a particular chord type, i.e. P2MSDT may appear in a variety of ways:

EXAMPLE 29

(a)	(b)	(c)	(d)	(e)
P4-T-M3	M7-T-M2	M7-T-M9	P4-P4-T	P4-M7-T

Structures with dissimilar intervals (EXAMPLE 29, a,b,c,c) are more frequent than those with two similar intervals (EXAMPLE 29d). The most frequent vertical intervals are the major 7th, perfect 4th and tritone while the major and minor 3rd (major and minor 6th) and minor 9th are less frequent. Minor 7ths, major and minor 2nds and perfect 5ths (perfect 4ths) are rare, and octaves and unisons are totally absent. Thus, it may be noted that Webern's usual preference is for the milder dissonance of the major 7th rather than the biting sound of the minor 2nd or minor 9th. The most frequent dyad intervals are the perfect 4th and major 7th and infrequently, the major or minor 3rd.

Frequent transposition of notes to another octave produces constant change in spacing from open to close position. Compound intervals occur in either, or both intervals of a triad. In four-member chords, large intervals produced by transferring a note one or two octaves higher occurs usually between the highest parts; the interval of the middle dyad, conversely, rarely exceeds an octave. Dyads are spaced within one octave (EXAMPLE 27b,m.38), with one note transposed two octaves higher (EXAMPLE 27b,m.37) or four octaves higher (EXAMPLE 27c,m.138).

D. Rhythmic complexity in overall texture

The overall texture of the Trio, a constant momentary exchange of brief motives in which one instrument rests shortly after another enters, is contrapuntal. The only exceptions are the two brief solo passages in movement I (mm. 23 and 32) and the homophonic texture of the exposition of theme A in movement II. Occasionally, the style approaches that of pointillism (mm. 41-43, mov. I; m. 166, mov. II).

Division of the beat into smaller triplet and duplet figures among the three instruments often produces complex polyrhythmic structures. Hans-Klaus Metzger¹⁴ makes the following comment concerning the free association of rhythm and meter and the importance of rests in Webern's music:

. . . we find in his (Webern's) works, for the first time. . . rests which, just like notes (with which they share the characteristic of exact duration), form component elements within a rhythmic structure and at the same time dynamic values (value zero, and describable as such in their dynamic context). The rhythmic element, particularly the relationship between rhythm and meter, was also taken in hand in Webern's composition. In traditional music, despite everything, the relationships of vertical or horizontal note-complexes and the metric-rhythmic relationships had themselves been related. . . Webern developed a technique of rhythmic cells (which) he used. . . rather like a counterpoint to a meter which itself hardly ever appears, and which he understood as a temporal 'cantus firmus'.

An example of the above may be found in the return of section A, movement II, where a totally integrated texture replaces the earlier homophonic treatment (see EXAMPLE 13 and 15). A composite of the overall rhythm of these opening measures (119-126) may be constructed by recording individual rhythms within a common meter, 6/8 (see ILLUSTRATION NO. 1). Thus, we find identical rhythms present between mm. 120 and 121, 122 and 125, 124 and 126; rhythmic retrogrades take place within mm. 120, 121, 122 and 125. Hence, the rhythmic retrograde which takes place in measures 1-3 of movement I (EXAMPLE 2) is now condensed into a single measure.

The melodic doubling of parts does not occur in the Trio. However, rhythmic doubling in two or more instruments does take place in the transition sections, (EXAMPLE 30a) section B and in the development. Here, rhythmic doubling is often combined with shorter note values

¹⁴In Die Reihe No. 2, pp. 44-45.

ILLUSTRATION NO. 1

Rhythmic Counterpoint Reduced to a Composite
of Overall TextureWebern Trio Op. 20, Movement II

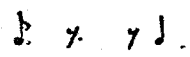
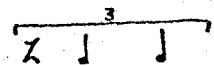
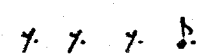
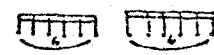
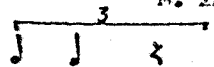
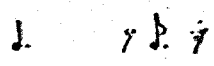
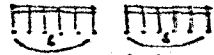
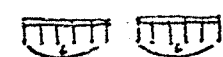
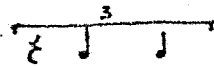
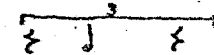
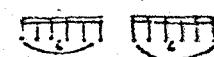
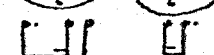
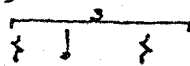
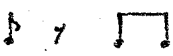
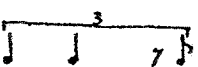
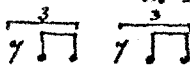
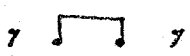
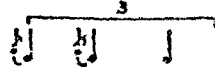
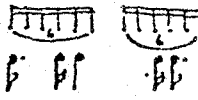
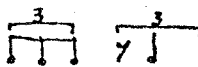
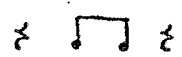
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m. 121 Violin  Viola  Cello  Composite meter  Composite rhythm 	m. 122     

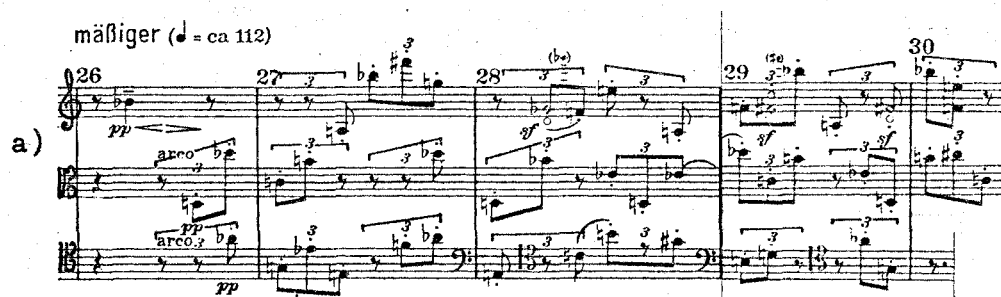
ILLUSTRATION NO. 1 - continued

m. 123 Violin  Viola  Cello  Composite meter Composite rhythm 	m. 124    
m. 125 Violin  Viola  Cello  Composite meter Composite rhythm 	m. 126    

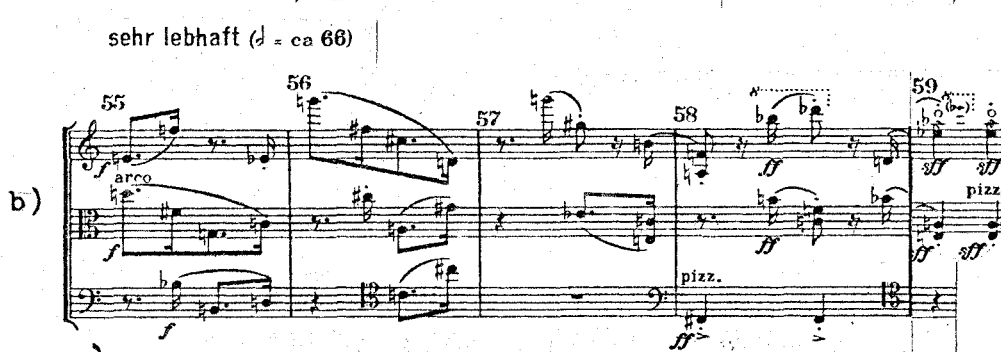
in the drive toward a cadence point. A number of examples may be cited using this procedure. At the sehr lebhaft of section B (mm. 55ff) doubling of the () and () rhythmic figures produces a chordal rhythm leading to the two cadence chords in measure 59 (EXAMPLE 30b). Likewise, in measure 101 the gradual doubling of the () rhythmic figure culminates in the two cadence chords on the final beat (EXAMPLE 30c).

EXAMPLE 30

a) mäßiger (♩ = ca 112)



b) sehr lebhaft (♩ = ca 66)



c)



E. Form

The Trio was followed by two other works in two movements, the Symphony, Op. 21 and the Saxophone Quartet, Op. 22. The difficulty in

tracing motives within individual parts due to octave change of certain notes, crossing of parts, wide leaps and frequent changes in mode of playing results in a form which is rather obscure. As Stravinsky remarked:

The Schoenberg, Berg and Webern of the 1920's were regarded in those days as the most extreme of innovators, but today it appears that they used musical form 'historically' . . . they carefully concealed it. Take for example the Rondo of Webern's Trio: the music is marvellously interesting, but no one could recognize it as a rondo.¹⁵

Thus, even in the case of the literal repeat of the exposition in movement II it seems reasonable that the composer saw little danger that the material would lose its spontaneity through repetition.

A phrase structure which is governed by the closely integrated relationship of horizontal and vertical elements is not easily grasped by the listener. The beginnings and endings of phrases are largely determined by the following: a) tempo deviations, i.e. rit.--a tempo, b) beginning of a new rhythmic motive, or c) change of tempo, occasionally combined with a dynamic change. Overlapping of phrases and sections produces few definitive cadences, although phrase endings are sometimes indicated by simultaneous rests, the cesura (∩) or the barline fermata (⏹).

2. Tempos, dynamics and overall proportions

The opening tempo (♩ =ca 42) is retained throughout movement I, while in movement II, three main tempo indications are given: 56, 60, 66 = ♩. Subdivision into smaller units are indicated in movement I beginning with section C (♩ =84) and in the transition sections of movement II

¹⁵Kolneder, Anton Webern, p. 112.

where the quarter note becomes the basic beat ($\text{♩} = 122$, $\text{♩} = 132$). Further variation of tempos takes place through indicated ritards (rit. . . a tempo). Each section of movement I ends in a ritard; an exception is at the end of section B¹ where this time, an accelerando leads to the final return of A (A³). Generally, tempo changes and ritards become more prevalent in the latter half of both movements. For example, in movement II, section A of the exposition ends with a ritard; in the recapitulation, each of the three overlapping phrases is separated by rit.--a tempo markings.

In summary, tempos do not fluctuate appreciably from section to section; rather, Webern relies on further subdivisions of the beat as a means of increasing forward motion. Meter changes are used to ensure the free flow of motivic material, while ritards help to shape the phrase units.

Meticulous attention is given to dynamic markings. Although Webern has sometimes been referred to as "the master of the pianissimo" dynamics in the Trio range from ppp to FF. Movement I, muted throughout begins and ends quietly; the general piano dynamic level is maintained until the crescendo immediately preceding the climax of the movement (m. 40). The use of dynamics as another variation technique was mentioned earlier (see A, A¹, A², A³ of EXAMPLE 4). Again, in the introduction to movement II, variation of dynamics is evident in the opening violin (F- p) motive imitated in the cello (p-F). Momentary, often subtle dynamic changes are most characteristic of this work, but several passages at a sustained fortissimo (FF) dynamic level should be observed in performance: the second half of the transition

sections of movement II, the conclusion of section B and beginning of the closing section, the end of the second part and beginning of the third part of the development, the first half of the closing section and the entire coda, except for the final measure which closes at a piano dynamic.

In both movements, careful balance is maintained between those sections whose length remains constant with each repetition, and those whose length varies with each return. In movement I, $(ABA^1CC^1A^2B^1A^3)$, B^1 remains its original length (B) while each return of A (A^1 , A^2 , A^3) becomes successively longer. The climax of the movement is contained within section C^1 , the longest. In movement II, also, a balanced form in which the exposition and recapitulation sections are approximately equal in length is achieved by combining sections of both similar and dissimilar length. The transition and B sections are of similar length in both exposition and recapitulation, while the A section and closing sections fluctuate.

The coda is described as beginning in measure 172 in the printed commentary to the score, but this author prefers to consider it beginning in measure 180 with the return of the material from the introduction.

3. Levels of transposition

In both movements the row series is treated as a unit. Moreover, in movement I, the same row forms (P, R, I, RI) and transposition levels (0-11) occur within repeated sections (see TABLE NO. 4). Again in movement II, row forms with their corresponding transposition levels in section A and the beginning of the transition are identical in both exposition and recapitulation. This is seen as a conscious effort to utilize an organized substructure within an overall form. Although

TABLE NO. 4

Set Substructure

First movement - Webern Trio, Op. 20

<u>Introduction</u>	(mm.1-3)	<u>Introduction</u>	(mm.40-43)
	P-0 R-0		P-0 R-0
<u>A</u>	(mm.4-10)	<u>A</u>	(mm.44-50)
	RI-6 I-11 P-0 I-1 RI-4 I-10		RI-6 I-11 P-0 I-1 RI-4 I-10
<u>B</u>	(mm.10-15)	<u>B</u>	(mm.51-56)
	P-11 P-3 RI-10 R-8 R-3		P-11 P-3 RI-10 R-8 R-3
<u>A</u>	(mm.15-21)	<u>A</u>	(mm.57-63)
	RI-6 I-11 P-0 I-1 RI-4 I-10 P-11		RI-6 I-11 P-0 I-1 RI-4 I-10
<u>C</u>	(mm.21-30)	<u>Codetta</u> R-0	(mm.64-65)
	RI-0 R-1 I-8 RI-4 R-2 R-4 P-4		
<u>C¹</u>	(mm.31-40)		
	RI-0 R-1 I-8 RI-4 R-2 R-4 P-4		

Second movement - Webern Trio, Op. 20

<u>Introduction</u> (mm.1-9)	<u>Development</u> (mm.73b-117)
P-0	<u>Section I</u> (mm.73b-87)
R-6	<u>RI-I</u>
R-5	I-1
I-6	P-8
RI-3	RI-1
P-11	I-9
P-1	RI-11
	P-10
	<u>Section II</u> (mm. 88-101)
<u>Exposition</u>	I-11
<u>Theme A Area</u> (11-39)	RI-2
P-0	RI-4
P-5	R-9
RI-2	P-10
P-1	R-5
R-6	RI-6
R-0	P-4
I-7	RI-5
RI-2	RI-0
<u>Transition</u> (mm.26-39)	R-0
P-6	<u>Section III</u> (mm.102-118)
I-11	R-10
I-6	P-3
P-1	I-0
P-3	P-7
RI-8	RI-9
P-7	I-4
R-2	I-2
RI-1	P-0
P-0	<u>Recapitulation</u>
I-6	<u>Theme A Area</u> ¹⁶ (mm.118-143)
<u>Theme B Area</u> (mm.40-59)	(P-0)
RI-8	P-5
P-9	RI-2
RI-8	P-1
I-6	R-6
R-7	R-6
P-11	R-0
P-9	I-7
RI-4	RI-2
I-5	
I-3	

¹⁶Return of P-0 series actually begins with cello double-stop G# G in measure 115.

TABLE NO. 4--Continued

<u>Closing section</u> (mm.59-73a)	<u>Transition</u> (mm.131-143)
(I-3)	P-6
RI-0	I-11
R-10	I-6
R-2	P-1
I-1	RI-6
R-10	RI-1
R-2	P-0
I-10	R-7
RI-8	RI-6
	P-5
	I-11

Recapitulation

<u>Theme B Area</u> (mm.144-179)
RI-1
P-2
RI-1
I-11
R-0
P-2
P-4
RI-9
I-10
R-5
RI-5 (<u>Closing section</u>) (mm.163-179)
R-3
R-7
I-6
R-3
R-7
I-3
RI-1
P-6
P-4
I-2
I-6
I-4
<u>Coda</u> (mm.180-193)

I-5
I-8
P-0
R-5
R-6
P-10
R-0

TABLE NO. 5

Beginning Pitches Of Rows In
Set Substructure

Movement I

IntroductionD#-(C)¹⁷ C-(D#)A, A², A³

C D D# E A# C#-(E)

B, B¹

D F# E G# D#-(F#)

A¹

C D D# E A# C# D-(B)

C, C¹

F# C# B A# D E G-(E)

Codetta

C-(D#)

Movement II

Introduction

Ab F E D G# G A-(C)

ExpositionA

Ab C# G A F F B D# G-(A)

Transition

D G D A B C# D# C# F# Ab D-(B)

¹⁷Notes in parenthesis are final notes of these rows.

TABLE NO. 5--Continued

B

C# F C# D F# G F A C#-(B)

Closing section

B F A C# A A C# F# C#-(E)

Developmentsection 1

F# A E F# F E-(G)

section 2

F# G G A G# G E E B C A# F B-(Ab)

section 3

A B Ab D# D C A# Ab-(B)

RecapitulationA

Ab C# G A F F B D# G-(A)

Transition

D G D A B F# Ab F# B C# G-(E)

B

F# A# F# G B A# C D F# E-(C#)

Closing section

A# D F# D D F# B F# D C A# D C-(A)

Coda

C# E Ab E F F# B-(Ab)

EXAMPLE 31

Exposition: theme B area, closing section (mm.40-73a)

F C# A

Recapitulation:

(mm.144-179)

A# F# D

EXAMPLE 32

Movement II

Exposition: transition (28-39), B section (40-52)

I-6	P-1	P-3	RI-8	P-7	R-2	RI-1	P-0	I-6	RI-8	P-9	RI-8	I-6	R-7	P-11
(B)	¹⁸	(C#)	(Eb)	(C#)	(F#)	(Ab)	(D)	(Db)	(F)	(C#)	(D)	(F#)	(G)	
(B)		(F#)	(Ab)	(F#)	(B)	(C#)	(G)	(Gb)	(Bb)	(F#)	(G)	(B)	(Pb)	
I-6	P-1	RI-6	RI-1	P-0	R-7	RI-6	P-5	III	RI-1	P-2	RI-1	III	R-0	P-2

Recapitulation: transition (131-143), B section (144-153)

¹⁸Beginning note of row.

specific rows or transposition levels are not emphasized, a table of the beginning pitches of each row series of the substructure (TABLE NO. 4) shows a frequency of certain notes. Movement I begins and ends on D# and the frequency of rows beginning on D and E reveals a row substructure that revolves about a D-D#-E axis. Movement II begins and ends on G# (Ab). In the B and closing sections of the exposition, C# (subdominant relationship) is the most frequent beginning note with F and A often used as initial notes; this suggests that rows on C# are a central axis with those beginning a major 3rd above and below (F and A) considered of secondary importance (EXAMPLE 31). In the recapitulation of this material beginning notes a fifth lower predominate; thus, row series beginning on F# become a central axis which also includes row series beginning on A# and D. Of even greater significance is the fact that within the transition and B sections (EXAMPLE 32), identical row forms have been transposed a perfect 5th lower in the recapitulation. Thus, Webern has followed a practice commonly found in the sonata forms of tonal compositions, i.e., the transposition of the second theme down a perfect 5th in the recapitulation.¹⁹

F. Performance aspects

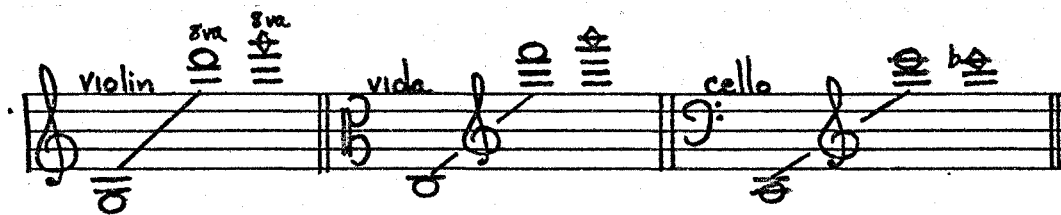
1. Range of instruments

The upper positions of all three instruments are used freely. The violin spans $3\frac{1}{2}$ octaves, the viola nearly $3\frac{1}{2}$ octaves and the cello over 4 octaves. Harmonics extend these ranges somewhat higher, except

¹⁹See Stroh, Anton Webern (Göppingen: Verlag Alfred Kummerk, 1973), pp. 196-199.

for the cello (EXAMPLE 33). Alto and treble clefs are utilized in the viola part and the bass, tenor and treble clefs for the cello part.

EXAMPLE 33



2. Melodic skips

Large melodic leaps necessitate utilization of the following techniques by the performer: a) a stretch beyond an octave of fingers on adjacent strings, b) a quick movement of the bow to a non-adjacent string (G to A, D to E, etc.) often combined with a shift in the left hand and c) a long shift with the left hand, usually combined with a change of string. The choice as to which technique is needed for a particular melodic skip must be made by the individual performer.

Examples of a, b and c follow with suggested fingerings and position changes.

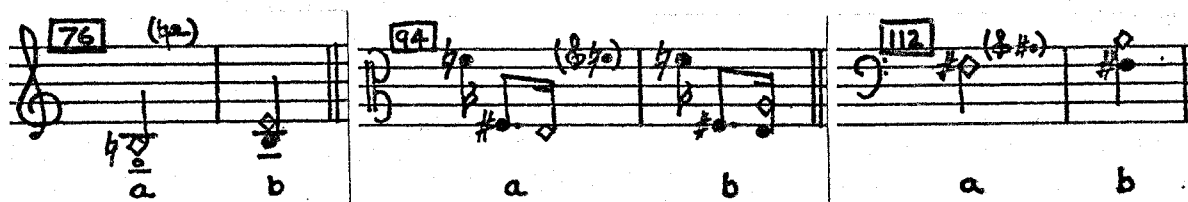
EXAMPLE 34

3. Special effects

a. Harmonics

Intermittent artificial and natural harmonics are used as a means of transferring one or more notes into another octave. Three methods are indicated in order to reproduce these artificial harmonics: a) by lightly touching a major 3rd above the open string, b) by touching lightly a perfect 4th above a stopped note and c) by lightly touching a perfect 5th above an open string. Since it is sometimes difficult to reproduce harmonics clearly by method a, it is suggested that method b be substituted wherever practical, as in the following examples.

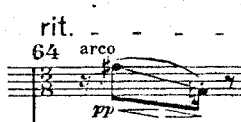
EXAMPLE 35



b. Glissando

Left hand, finger glissandos are indicated three times within movement I. At A² (EXAMPLE 4) it occurs as an emphasis of the major 7th interval, characteristic of motive S; in section B (EXAMPLE 5) it again emphasizes the major 7th interval within the principle rhythmic motive in the viola part. A final example (EXAMPLE 36) occurs in the penultimate measure, violin part, where the falling minor 9th interval is emphasized by a downward glissando.

EXAMPLE 36



c. Pizzicato

A frequent motivic figure throughout movement I is that of two slurred notes, arco, followed by an immediate change to one or two notes, pizz. In this instance, wherever practical, it is advisable to begin the slurred notes up bow (V) in order to facilitate the quick change to pizzicato. In certain instances the performer may find it to his advantage to play a left hand pizzicato.

EXAMPLE 37

In movement II, periodic pizzicato chords appear as rhythmic and harmonic accompaniment to a solo line (b) or as a separate entity (c).

Articulation of pizzicato notes is indicated by: 1) a dash (-), 2) a dot (•) or 3) a combination of these two (-•).

d. Special bowing effects

Two special bowing effects are indicated, am steg (on the bridge) and col legno (with the wood of the bow). In movement I am steg is indicated for the ensemble as a variation of performance manner at the return of section C (C¹) and at the return of the introduction (EXAMPLES 8, m.31 and 3, m.43). Col legno is an identifying characteristic of the two-note motive which opens the closing section of movement II (EXAMPLE 19).

4. Bowings

The most frequent types of bowing are those requiring short strokes, usually as an off-the-string bowing. It occurs as a single rebound in the nature of a spiccato (), or as a rebounding stroke in which two or more notes are taken in one direction of the bow (). Legato and slurred bowings are infrequent; slurred bowings occur mainly in the dotted rhythm of section B in movement II. (EXAMPLE 30b). A frequent bowing indication in both movements is that of a pair of slurred notes with a dot over the second note (), signifying a bow release following the second note. Both the loure bowing which calls for a slight articulation of each note, without stopping the bow (), and the more detached articulation which indicates an actual stop to the bow () are encountered in movement II. Precise articulations indicated by the composer require a high level of bow control on the part of the performers.

5. Ensemble

Major problems in the performance of this work are found in its rhythmic complexity, its frequent and often large melodic leaps and its fine distinctions of nuance and articulation. It requires professional level performers with a high level of technical facility at their command. The intricate texture of interwoven motivic fragments demands precise timing on the part of the entire ensemble, and it is suggested that each player read from a large score.

III. SCHOENBERG: STRING TRIO, OP. 45

A. Row Structure

The compositional basis for Op. 45 is not a twelve-note series unit, but rather, two six-note segments or hexachords. Moreover, each hexachord within the set structure possesses a special relationship with one other hexachord, known as semi-combinatoriality. This special feature is constructed in the following manner: the inversion (I-O,I) of the first six notes of the original row (P-O,I) a fifth below produces the second six notes of the original row (P-O,II), but in a different order. Likewise, the inversion of the second six notes of the original row beginning a semitone lower (I-O,II) produces the same notes, rearranged, as the first six notes of the original row. The advantage of the semi-combinatorial row, is that melodic phrases may be formed from the first six tones with harmonies formed from the second six tones, without pitch duplications.

EXAMPLE 38

The musical notation for Example 38 consists of two staves. The top staff, labeled 'P-O', contains a 12-note row. The first six notes are grouped under the label 'I' and the last six under 'II'. The notes are: 1 (C), 2 (Bb), 3 (B), 4 (A), 5 (G), 6 (F#), 7 (E), 8 (D#), 9 (D), 10 (C#), 11 (B), 12 (A). The bottom staff, labeled 'I-O', contains the inverted row. The notes are: 1 (F), 2 (E), 3 (D#), 4 (D), 5 (C#), 6 (C), 7 (B), 8 (Bb), 9 (Ab), 10 (G), 11 (F#), 12 (F). Dashed arrows show the relationship: from note 6 of the top staff to note 7 of the bottom staff, and from note 12 of the top staff to note 6 of the bottom staff, illustrating the semi-combinatorial property.

Conflicting opinions are held as to the actual number of hexachords used in this work.¹ The composer is reported to have said that it is based upon three hexachords (I, II, III) together with their inversions (see APPENDIX D). It should be noted that hexachord III is a rearrangement of the notes in hexachord I; moreover, in the course of the composition, notes within hexachords I and II are each reordered three times, producing a total of eight hexachords. Thus, hexachords III, V and VII are rearrangements of hexachord I; hexachords IV, VI and VIII are rearrangements of hexachord II.² The combination of semi-combinatoriality and reordered hexachords greatly expands the possibilities of the row technique.

A comparison of the two hexachordal units within the twelve note series reveals the following characteristics:

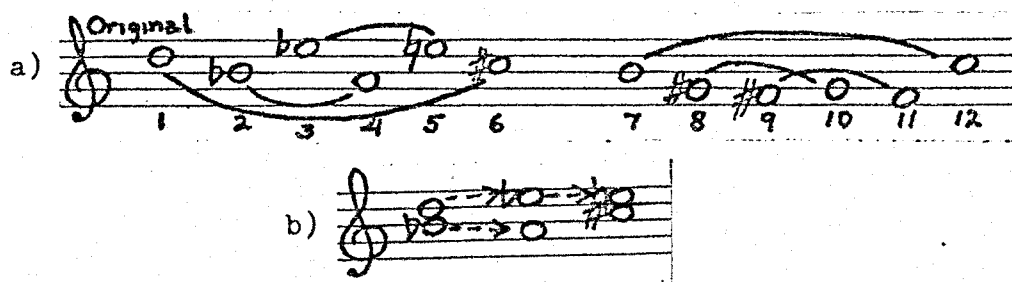
1. Both hexachords contain identical symmetrical semitone relationships.
2. Notes 1 and 6 of hexachord I and 7 and 12 of hexachord II form a chromatic sequence, i.e. B C C# D.
3. Notes 4, 5 and 6 of hexachord I form an A major triad.
4. Presentation of notes 1 to 5 as vertical dyads (hexachord I) produces an interval sequence of a major 3rd, augmented 4th and minor 3rd. The semitone interval predominates in the voice movement (EXAMPLE 39b).

¹See O. W. Neighbour, "Dodecaphony in Schoenberg's String Trio", *Music Survey*, Vol. 4, June, 1952, pp. 489-490 and Richard S. Hill, "Arnold Schoenberg: String Trio, op. 45", *Notes*, Vol. 8, Dec. 1950, pp. 127-129.

²A reordered version of RI-8, I (IV) appears near the beginning of 1st Episode. In 2nd Episode, four additional hexachords are formed through a restructuring of earlier ones: V is derived from hexachord P-8, I (measure 184), VI from P-8, IV (measure 185), VII from RI-8, VI (measure 186) and VIII from RI-8, V (measure 187). Also see Appendix B for set forms.

5. Notes 8 to 11 of hexachord II form two major second intervals, a semitone distance apart.

EXAMPLE 39



B. Melodic application

Motivic material for the Trio is derived from semitone relationships within the basic series. Motives, usually four notes in length, assume a different shape and character through variations of tempo, rhythm, inversion, and octave displacement. The work opens with a presentation of semitone combinations in all instruments. Wide intervals in the rhythmic figures in the cello are created through transfer of the semitone interval two and three octaves. A fluttering background is produced by the semitone finger tremolos in the violin and viola. In measure 2, b. 1 an important motive (A) is presented by the viola against the continued finger tremolo background in the violin and cello. A variation of this motive, inverted, rhythmically changed and with octave transposition follows immediately, again played by the viola.

EXAMPLE 40

1 ♩ = 60

Violin

Viola

Cello

quasi trill

simile

pp

sfpp

p

f

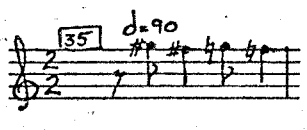
pp

sf

p

Motive A reappears later in Part 1, once again in the viola. Transposed two octaves higher, it retains the original rhythm, but with changes in tempo and meter.

EXAMPLE 41



In part 2, this same motive provides the basic material for the Moderato section (mm. 148-154). Muted and at a slower tempo than previously, all three instruments join the interplay of variations of this motive. These variations are produced by rhythmic changes, octave transfer and melodic inversion (EXAMPLE 42). In the following example, 1a and 1b are rhythmically identical; the change in melodic contour of 1b is accomplished through melodic inversion combined with a change of octave for notes 2 and 3. Although rhythmically identical, 2b is a melodic inversion of 2a. Examples 3a, 3b and 3c reveal a rhythmic change from the original short-long-short-long figure to equal or more nearly equal (3a) note values. Again, the melodic contour of 3b is a melodic inversion of the original motive combined with octave changes; 3c is a rhythmic variation of 3b. Example 4a is a return to the original rhythm, but with note repetition and an appoggiatura-like resolution to the final note. Final reference is made to motive A by the viola in measure 285 of Part 3. Here, it follows the melodic contour of EXAMPLE 42, 3b, but rhythmically changed and played in harmonics.

EXAMPLE 42

1a) Moderato ♩ = 104
p con sordino

1b)

2a) p con sordino

2b)

3a)

3c)

3b)

4a)

EXAMPLE 43

At the beginning of the ma cantabile section (m. 159ff) of Part 2 a longer theme of four measures is formed by combining two statements of motive A (Bb C B C# and F Eb E D), freely arranged and with the occasional transfer of a note to another octave. This haunting, waltz-like melody in 9/8 is twice interrupted; it resumes only to become gradually fragmented.

EXAMPLE 44

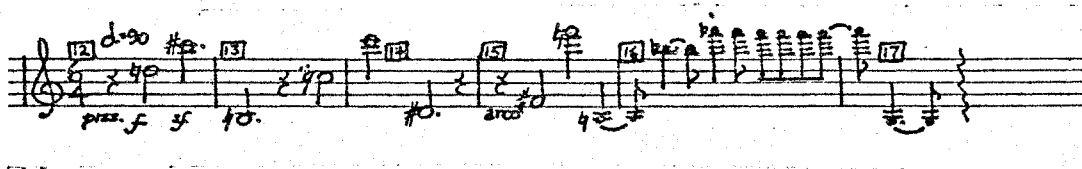
This theme is recalled later in Part 3 (m. 282ff.) where it is melodically inverted, centered about the notes Ab, F#, G and Db Eb D E. Played by the violin in its higher register, muted and pianissimo, it lends a distant quality to the theme.

EXAMPLE 45



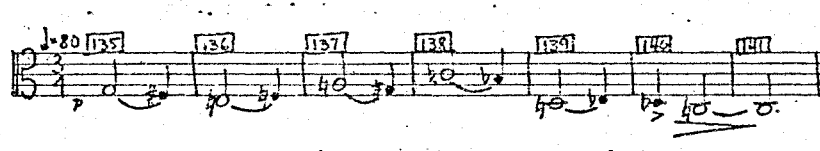
Beginning in measure 12, a new motive (B) played pizzicato by the violin, is characterized by a descending semitone and whole tone followed by an ascending semitone (DC#BC). As the violin continues, rhythmic variety is accomplished through constantly changing note values, interspersed rests, syncopation and progressively shorter notes. Melodic variation, brought about through changes of octave register, results in a gradual expansion of melodic intervals.

EXAMPLE 46



A legato variation of motive B, played by the viola, appears near the beginning of Part 2. The continuous half note, quarter note rhythm ($\text{♩} \text{♩}$) now transforms this motive into the character of a slow waltz. Octave transpositions are omitted here, thereby producing a smooth-flowing melodic line in the lower register of the instrument.

EXAMPLE 47



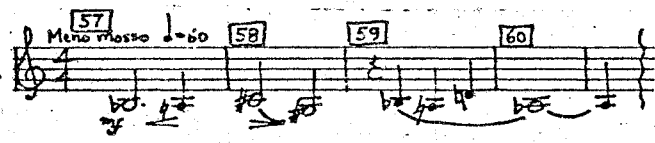
This motive again returns in the violin in Part 3, played pizzicato in a constant rhythmic pattern of eighth note, eighth rest ($\text{♩} \text{ } \text{♩} \text{ } \text{♩} \text{ } \text{♩}$). Three melodic versions of this four-note motive are presented: its original form (a) and two variations which employ free melodic inversion (b,c).

EXAMPLE 48



Presentation of a new motive consisting of two half-phrases (C^1, C^2) appears in the violin in measures 57-60 of the First Episode. A comparison of the two half-phrases reveals an expansion of the major 3rd, perfect 4th melodic intervals in measures 57-58 to a perfect 4th, augmented 4th in measures 59-60.

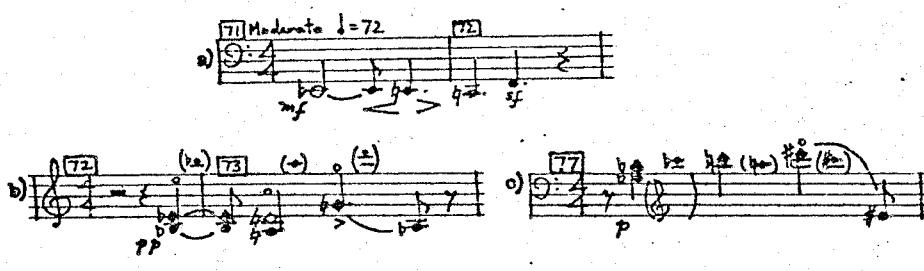
EXAMPLE 49



Both motives (C^1, C^2) appear frequently throughout section A of the First Episode (mm. 52-80). Motive C^1 , rhythmically syncopated and

melodically inverted, is played by the cello (EXAMPLE 50a). Shortly thereafter these motives are played as variations which begin with harmonics in the high register, and end with large leaps to a lower register (EXAMPLE 50 b,c).

EXAMPLE 50



Another variation of C^1 , in harmonics, col legno tratto is played by the viola as in EXAMPLE 51. Here, melodic inversion produces a new linear contour; the rhythmic pattern $\text{♩} \cdot \text{♩} \text{♩} \text{♩}$ is a retrograde of the previous cello variation of EXAMPLE 50a. In measures 79-80 motive C^1 again appears in the cello in its original melodic form, played pizzicato and in quarter and eighth note rhythm. Periodic doubling of this motive occurs in the sixteenth notes of the violin.

Expansion of the initial interval of motive C^2 (semitone) to a major 3rd ($C\sharp-A$) transforms it melodically into a new motive (D), played by the violin in measure 81 (Quasi Recitativo). This motive, formed from notes 1-4 of hexachord 0-5,1, is accompanied by the viola and cello playing vertical dyads formed from notes of its paired hexachord, 1-5,1 (EXAMPLE 52).

EXAMPLE 51

78 *ponticello* 79

p arco *p* col legno tratto *p* pizz. *p* arco *p*

EXAMPLE 52

81 Quasi Recitativo 82

p sul G sul D *pizz.* *sf* *colla parte* *arco colla parte* *p*

Motive D returns in its original form, transposed a semitone higher in measure 105. Therefore, this motive acts as a returning element (B) which separates the following section (C) from the earlier returning section (A), indicating a rondo form (ABCBA) for the First Episode.

Although a melodic relationship is not readily apparent, section C (m. 83) commences with a variation of motive D (EXAMPLE 52), introduced by the violin and followed imitatively by the cello in melodic inversion. With a change in octave of the third note of this motive (Ab), the leap up of a perfect 4th becomes a leap down of a perfect 5th, thus creating a directional change in the line. The faster tempo indication (*poco più mosso*) together with the incisive repeated rhythmic pattern,



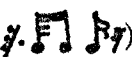
gives a sprightly character to this motive.

EXAMPLE 53

The return of motive D in Part 3 (EXAMPLE 54) follows a procedure also found in other works by Schoenberg,³ i.e. an exchange of the row series between the principle part and its accompaniment together with a reversed direction of the latter portion of the melodic line.

EXAMPLE 54

³For example the return of the opening theme in the Phantasy, Op. 47.

A variation of motive D appears at a climatic point near the end of Episode 2, played in unison. Disjunct intervals are combined with a brief, incisive rhythm () which in turn becomes further intensified by even greater disparity between short and long notes, ().

EXAMPLE 55 198



A waltz-like theme (E) is announced by the violin beginning with the up-beat to measure 86 (EXAMPLE 56). This lilting theme is comprised of two one-measure half-phrases, whose melodic lines are complimentary; the final notes of both measures (86,87) reflect a change in octave, i.e. by a leap upward in measure 86 and a leap downward in the following measure. Shortly thereafter, a variation of this theme by the viola, is a melodic and rhythmic retrograde of the previous violin statement, beginning a minor 10th lower.

EXAMPLE 56



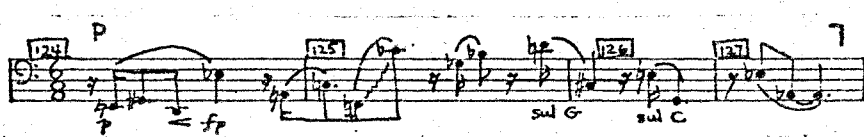
In Part 3, the recapitulation of theme E by the cello is a melodic inversion of the violin statement in measures 86-87 (EXAMPLE 57). The rhythm in the cello (mm.263-64) is identical, in the first half of each measure, to that of the violin in measures 86-87; rhythmic figures in the latter halves of these two measures, however, have been exchanged. A restatement of this theme in measures 265-66 is, again, a melodic retrograde inversion of the preceding cello statement of measures 263-64, but with a new rhythmic pattern.

EXAMPLE 57



Near the conclusion of the First Episode (EXAMPLE 58) a variation of theme E played by the viola retains the essential characteristics of the original, but with an inverted melodic shape. The slower tempo indication and quieter dynamic level (pp) mark the beginning of the gradual disintegration of this theme. The cello statement which follows becomes more and more fragmented until its conclusion in measure 127.

EXAMPLE 58



In summary, the principal motives and themes reveal a similarity of construction in that they are: 1) based on either four or eight note

units and 2) comprised of various symmetrical arrangements of semitone pairs (see TABLE 6). The larger intervals between semitone pairs in motive D and theme E, as compared to motives A and B, and the combining of half-phrases into larger units (motives C and E) illustrates a motivic growth in melodic compass and in length.

TABLE 6
SUMMARY OF MOTIVIC MATERIAL

<u>Motive</u>	<u>Melodic Pattern</u>	<u>Description</u>
A	G# F# G F	interlocking semitone intervals. Two whole steps separated by semitone.
B	D C# B C	semitone pairs descending and ascending. Separated by whole step.
C	Bb A C# G# Bb A D G# C ¹ C ²	Two half phrases, each beginning with semitone. Expansion of major 3rd to perfect 4th interval, notes 3-4.
D	G Eb Ab D	interlocking semitone intervals. Expansion of major 3rd to dim. 4th (notes 1-2, 3-4)
E	Bb Gb F A D C# G Ab	a) semitone pair in symmetrical arrangement; two major 3rds separated by a semitone. b) semitone pairs descending, ascending. Two semitones separated by tritone.

Thus, these five motives/themes might be considered as developmental variations of pairs of semitones. Each of these motives is then subjected to further change in both melodic shape, through inversion and displacement of one or more notes into another octave, and character and mood, through variation of rhythm and tempo.

C. Vertical application

In serial writing, besides the harmonies created by combined contrapuntal voices, chords are made by presenting fragments of the series as vertical instead of horizontal sonorities, a procedure not unknown to conventional tonal music. These harmonic sounds may be accepted by the composer as they happen to come in numerical order, or they may be rearranged in spacing and inversion according to the composer's wishes. On the other hand, the composer may manipulate the series so that notes become available to create harmonies decided upon in advance. . . It goes without saying that ordinarily the chords are not chosen for their tonal relationships, but for qualities such as tension, relaxation, colour, dynamic effect, and so forth.⁴

As the above quote points out, the choice of vertical sonorities from the row series may be determined by the composer. In the Trio, the series is a source of both linear and harmonic material; both motives and row segments appear as vertical structures. The following examples (EXAMPLE 59, a,b,c) illustrate three techniques used in the presentation of motivic material as vertical dyads. In EXAMPLE 59a the whole-step dyads, E-D and Eb-Db, of motive A are presented simultaneously as finger tremolos in the viola and cello, while in EXAMPLE 59b, the four notes (F, Db, F#, C) comprising motive D are arranged as vertical dyads in the viola and cello. Here, the initial minor 6th (major 3rd) interval in stopped notes progresses to the tritone interval, played as harmonics. In the latter half of the measure these two vertical intervals are repeated by the violin, played as double-stops. In EXAMPLE 59c, motive B unfolds as each new note is added in the following succession of double-stops.

⁴Walter Piston, Journal of Music Theory, Vol. 9, p. 47.

EXAMPLE 59

101 *Meno mosso* $\text{♩} = 120$ *P* *arco* *sul D*

a) *arco*

b) *P* *arco* *sul C* (8) *gliss.* *ff* *sul G* *gliss.* *arco* *sul C* *gliss.* *ff*

c) 142 *P* $\text{♩} = 104$ *ff*

The interval progression of major 3rd, tritone, minor 3rd, between note pairs of hexachord I has been mentioned earlier.⁵ As a consequence of the semi-combinatorial feature, paired hexachords (i.e. P-5, I and I-5, I) produce a series of three 4-note symmetrical chords (EXAMPLE 60), a characteristic chord progression in the Trio.

EXAMPLE 60

P-5, I

I-5, I

PM²N²D N²T² PM²N²D

In Part 3 it is the harmonic basis for a series of block chords, played by the violin and viola (EXAMPLE 61a). In the final measure of First Episode, this progression provides the harmonic material for the chord structures produced on the last half of each beat, between the violin pizzicato double-stops and the sustained melodic lines of the viola and cello (EXAMPLE 61b). In an earlier example (see EXAMPLE 52) this

⁵See p. 59.

progression appears as a linear motive in the violin accompanied by vertical dyads in the two lower instruments.

EXAMPLE 61

A tabulation of chord structures (TABLE NO. 7) shows that from a total of 108, nearly one-half (51) are 3-member chords. Following in order of descending frequency are 6-, 4-, 5- and 8-member structures. The most frequent triad is that of an incomplete 7th chord, a PMD (EXAMPLE 62a). Following in order of decreasing frequency are the PNS, P2S and PMN triads (EXAMPLES 62b, c, d).

EXAMPLE 62

The most frequent 6-member chords are vertical arrangements of all notes within one hexachord. Since both hexachords I and II may be arranged in similar interval patterns (hex. II is RI of hex. I) all such structures are classified as P3M2N2S2D4T2 (EXAMPLE 63).

EXAMPLE 63

TABLE NO. 7

Tabulation Of Chord Structures, Showing Type And
Frequency of 3, 4, 5, 6 and 8 Member Chords

<u>3 Member Chords</u>	<u>Frequency</u>	<u>6 Member Chords</u>	<u>Frequency</u>
PMD	10	P3M6N3D3	2
MST	9	P3M2N2S2D4T2	24
PNS	8	P5M2N3S4D	4
PMN	7	P5M2N3S5	2
P2S	7	P3M2N2S3D3T2	1
NSD	4		
MSD	2		<u>33</u>
SD2	2		
PDT	1		
MS2	1		
	<u>51</u>		
<u>4 Member Chords</u>	<u>Frequency</u>	<u>8 Member Chords</u>	<u>Frequency</u>
P2MD2T	3	P5M5N5S5D5T3	1
PMSDT	2	P5M6N5S4D6T2	1
PM2ND2	2	P5M5N5S5D6T2	1
P2SD2T	2		<u>3</u>
P2M2ND	1		
PN2SDT	1		
MN2SDT	1		
PM2N2D	4		
N4T2	2		
	<u>18</u>		
		Total <u>108</u>	
<u>5 Member Chords</u>	<u>Frequency</u>		
PMN2S3D3	1		
P2M2NSD3T	1		
P2MNS2D3T	1		
	<u>3</u>		

Four-member chords show structural variety, all occurring with nearly the same frequency. Five- and eight-member structures rarely occur.

2. Cadences

Of a total of 17 cadences, 11 are triads as evidenced at the final cadence, at the conclusions of the 2nd Episode and Part 1. Moreover, a slight preference is shown for the PMN (major) triad, followed by PDT and PMD structures; P2S, PNS and MST each appear once. The relative frequency of major, minor, diminished and augmented triads at or near a cadency is of particular interest. While not serving in a functional manner, traditional structures are an integral part of Schoenberg's harmonic language. For example, the concluding chord of the 2nd Episode is a bb minor triad (C#-Db).

EXAMPLE 64



Likewise, in measure 202, shortly preceding the above example, the close proximity of the G preceding the B-D double stop at the cadence implies a G major triad (PMN).

TABLE NO. 8

Cadence Chord Structures In
Schoenberg's Trio, Op. 45

	<u>Measure</u>	<u>Cadence</u>	<u>Structure</u>
<u>Part 1</u>	51	(EDBb)	MST
<u>First Episode</u>	85	(EBF)	PDT
	121	(DEbG#)	PMD
	132	(BbDbF#A)	PM2N2D
<u>Part 2</u>	141	(CEEbG)	PM2N2D
	144	(Hexachord)	P3M2N2S2D4T2
	147	(EGD)	PNS
	154	(ADBb)	PMD
	158	(EFB)	PDT
	179	(EbBAbBbD)	P2M2N2SD2T
<u>Second Episode</u>	183	(Hexachord)	P3M2N2S2D4T2
	196	(Hexachord)	P3M2N2S2D4T2
	202	(GBD)	PMN
	207	(BbDbF)	PMN
<u>Part 3</u>	228	(C#EG#)	PMN
	262	(A#C#E)	N2T
	293	(AbGbC#)	P2S - D#

EXAMPLE 65

Although the chord progression V to I associated with cadences in traditional harmonic practice does not occur, the characteristic falling perfect 5th interval between the penultimate and final chords may be present. The following example illustrates three such occurrences. In EXAMPLE 66a the cello line drops a perfect 5th interval (plus two octaves) from the penultimate to final chord, while the violin and viola are sustaining a tritone interval. A somewhat different procedure is followed in EXAMPLE 66b. Here, the high F# in the violin "resolves" down a major 7th (plus two octaves) to the open G string, forming a perfect 5th interval (plus one octave) between the violin and viola parts. A more direct application of this principle may be observed in EXAMPLE 66c, where it occurs between the final chord of Part 2 and the beginning of the 2nd Episode. The low Eb of the final chord in measure 179 is also present as the upper note of a minor 10th double stop in the following measure. If Eb is considered as a momentary tonic pedal, the four-member vertical structure formed by double stops in the violin and viola is heard as an incomplete dominant ninth chord (BbD(F)AbCb) on Bb resolving to a vague "tonic" in measure 180.

In the final cadence (EXAMPLE 66d), movement of the bass line down a perfect fifth occurs somewhat earlier. The cadence formula shows the mildly dissonant penultimate triad (MS2) "resolving" in the final measure to a concluding triad containing two perfect intervals (P2S). The melodic pattern of the violin in the final measure is identical to the opening of 1st Episode, but with the final note (D#) transposed down an octave.

EXAMPLE 66

Example 66 consists of four measures of music, labeled a, b, c, and d. Measures a and b are in treble and bass clef, showing a cadence. Measures c and d are in treble and bass clef, showing a cadence. Measure d includes a tempo marking 'molto rit. e dim.' and a structural analysis of the chords: PMIN a minor, NSD, PMIN e minor (NSD), MS², and P²S.

Six-member chords comprised of notes within one hexachord appear at three internal cadence points. Identical in structural classification,⁶ variety is achieved through chord spacing, time lapse between entrances of chord members and mode of performance. These three

⁶See EXAMPLE 63.

procedures are shown in the following examples. In EXAMPLE 67a, simultaneous double stops in all three instruments in different registers results in a widely spaced chord. The high register of the chord in EXAMPLE 67b is produced by having the ensemble play in harmonics; the "terraced" effect is a result of the staggered entries of instruments. The fluttering, dissonant sound produced in EXAMPLE 67c (beats 3 and 4) is the result of simultaneously sounding minor 9ths and minor 2nds, played as fingered tremolo, ponticello.

EXAMPLE 67

Example 67 consists of three musical excerpts labeled a), b), and c).
 a) Measures 196-197. The first staff (violin) is marked *rit.* and *sul G*. The second staff (viola) is marked *sul C*. The third staff (cello) has a *p* dynamic. The notes are widely spaced across the registers.
 b) Measures 198-199. The first staff has a *pp* dynamic. The second staff has a *pp* dynamic. The third staff has a *pp* dynamic. The notes are staggered, creating a "terraced" effect.
 c) Measures 183-184. The first staff is marked *pp ponticello*. The second staff is marked *pp ponticello*. The third staff is marked *pp ponticello*. The notes are played as fingered tremolo, creating a fluttering, dissonant sound.

3. Repetition of cadence chord structures

Frequently, harmonic connections are made between the end of one phrase or section and the beginning of a new phrase or section; they may occur as repetition of either the cadence chord structure or of notes within the cadence chord. Repetition of the cadence chord structure takes place between the end of Part 1 and the 1st Episode, EXAMPLE 68. At the cadence in measure 51, notes 1-3 of hexachord P-O,III form an MST structure, played as a pizzicato chord by the violin. In measure 53 of the following section an MST structure is again formed from the remaining notes (4-6) of the same hexachord.

Earlier, in EXAMPLE 61b, three 4-member chords in the concluding measure (132) of the 1st Episode are repeated at the beginning of Part 2, arranged as melodic lines which move in contrary motion. In EXAMPLE 65 (see above) the connection between phrases takes place through repetition of the cadential D-B double stop an octave higher in harmonics by the viola and cello.

EXAMPLE 68

1st EPISODE

51 pizz. 52 53 54 55 56

f *p dolce* *p dolce* *p dolce* *p dolce* *p dolce*

MST *p dolce* MST - - - - -

4. Chord movement

From a total of 108 chords sampled (see TABLE NO. 7), 24 or nearly 26% are 6-member P3M2N2S2D4T2 structures. Next in frequency is the PMD triad, appearing 10 times or nearly 13% of the total number. Two examples (EXAMPLE 69a,b) illustrate how the mildly dissonant PMD is used both as a point of departure and as a point of return. In EXAMPLE 69a a two measure half-phrase (motive C¹) begins with a PMD in measure 57. Downward chromatic movement in the viola and cello on beat three forms a dissonant P2S triad. Chromatic movement downward in the violin (Bb-A) on beat four implies a "resolution" to an F major triad (in 2nd inversion), a PMN. A dissonant NSD triad at the melodic high point of this progression on beats one and two of measure 58 is

"resolved" to a less dissonant PMD structure on beat three. Thus, within this series of four chords an aural pattern of mild dissonance-consonance-greater dissonance-mild dissonance may be detected. Chromatic voice leading plays an important role in chord movement. A similar progression is illustrated in EXAMPLE 69b, but incorporating syncopated rhythms. Here, the PMD in measure 71, beat one, moves through chromatic voice leading to a first inversion c# minor triad (PMN) on beat four. Again, as in the previous example, the widely-spaced NSD triad on beat one of measure 72 "resolves" to a less dissonant PMD structure on the second half of beat two.

EXAMPLE 69

a) *Meno Mosso*

b) *Moderato*

5. Parallel movement

Parallel motion within a series of chord structures, a technique frequently found in the music of Claude Debussy, occurs briefly in the

Trio (EXAMPLE 70). Here, a series of four 6-member chords is comprised of the repetition of two different structures. The symmetrical interval arrangement, P5th, M3rd, P4th, M3rd, P5th of the chord in measure 37 moves up a whole step in measure 38. Parallel motion continues, altered somewhat, in measures 39 and 40. The resonant sound of the chord in measure 40 is the result of a succession of perfect 4th double-stops in the violin and viola and a perfect 5th double-stop in the cello. The succession of perfect 5th double-stops in the cello from measures 37-40 is in parallel motion, by whole steps.

EXAMPLE 70

The musical score for Example 70 shows four measures (37-40) for violin and viola. Each measure contains a chord with specific intervals labeled. Below the staves, the interval sequences are written as P⁵ M³ N³ D³ and P⁵ M³ N³ S⁵.

6. Chord structure repetition

Repetition of alternate chord structures is characteristic of the harmonic movement preceding the final cadence and the cadence at the conclusion of Part 1. Structural repetition at this point serves to highlight movement between the penultimate and cadence chords. In EXAMPLE 67 above, minor triads (PMN) alternate with more dissonant NSD triads in the penultimate measure. A similar procedure is followed in measures 45-50 preceding the conclusion to Part 1 (EXAMPLE 71a). Here, changes in tessitura (high and low registers) and manner of playing

(ponticello), provide added contrast between these two alternating chord structures. Variation is made in the repetition of the P2S triad by a change from close spacing and doubling (c) in measures 46-47 to open spacing of the triad in measures 49-50.

EXAMPLE 71

Poco meno mosso $\text{♩} = 60$

Similarly, repetition of alternating chord structures is followed in the penultimate measure of the final cadence (EXAMPLE 66d) where conventional triads on the first and third beats (a minor, e minor) alternate with more dissonant triads on the second and fourth beats.

Expansion of chord structure repetition to a series of chords may be observed in EXAMPLE 72. Two measures preceding the cadence in measure 154, a succession of ten chord structures in measure 152 is repeated in the measure which follows (153).⁷ Momentary major and minor triads (PMN), A, b, and f# in the first half of the measure and f and Eb in the last half of the measure suggest eleventh chords in each

⁷The twelve tones in each of these measures are contained in paired hexachords; they also originate from notes 1 and 6 of hexachords P-0 I, II, III and their inversions. Semitone material with similar treatment occurs elsewhere (i.e. mm. 37-38, 39-40).

half of both measures with B and F as their roots. Forward movement is created by contrary melodic motion between all parts, a gradual intervallic expansion within the violin and viola parts, and a chromatic rise in the highest notes of the violin part.

EXAMPLE 72

7. Static harmonic movement

Suspension of harmonic movement takes place at several points, lasting from one to nine measures in length (EXAMPLES 73-75). During these moments emphasis is placed upon increased rhythmic activity. The momentary buildup of dissonance is particularly effective in creating harmonic tension immediately preceding a cadence. In EXAMPLE 73a, preceding the cadence in measures 146-47, harmonic tension begins with a minor 9th double-stop in the lowest register of the cello, soon joined by the viola playing a major 7th double-stop in rhythmic alternation with the cello. The violin enters shortly thereafter with a melodic major 7th interval. The climax, reached in the second half of the measure is the result of increased rhythmic activity combined with a shift of the entire ensemble to a higher tessitura and closer spacing (EXAMPLE 73b).

EXAMPLE 73

a)

b)

In a similar manner, a gradual rise in harmonic and rhythmic tension occurs in measures 117-119 (EXAMPLE 74a). In the six-member structure following the eighth rest at the beginning of measure 117, the cello begins with the same minor 9th double-stop as in the previous example (EXAMPLE 73). The viola enters simultaneously with a major 7th double-stop while the violin plays a minor 3rd interval as a fingered tremolo. During these three measures rhythmic diminution takes place in the reiterated chords played by the viola and cello while the violin plays a gradually rising series of finger tremolos in minor 3rds and major 6ths. When the climax is reached in measure 119, the interval span between lowest note of the cello and the highest note of the violin reaches over three octaves (EXAMPLE 74b). A gradual rise in tessitura takes place in mm.118-119.

EXAMPLE 74

Example 74 consists of two parts, a) and b), showing measures 117, 118, and 119. Part a) is a three-staff arrangement (treble, alto, and bass clefs) with forte (fff) dynamics. It features complex rhythmic patterns and chromatic movement. Part b) is a two-staff arrangement (treble and bass clefs) showing a different texture. The bass line includes a chromatic scale labeled P-N-H-S-D-T.

A long section (measures 24-33) within Part 1 is based exclusively on the two hexachords, P-0 I and P-0 II. Measures 24-25 (beats 1,2) 28-30 and 32 are based on the hexachord in EXAMPLE 75a while measures 25 (beats 3,4), 31 and 33 are based on the hexachord in EXAMPLE 75b. Schoenberg's originality is evident in his manner of sustaining tension through changes in chord member arrangement in rhythmic variation and in manner of performance technique and special effects. The alternation between two different arrangements of the same chord (measures 28-29) is a technique frequently used in the Trio (EXAMPLE 75c). Again, these vertical structures reveal Schoenberg's preference for symmetrical arrangements of chord members, for reasons of balance and sonority for chromatic voice leading and for contrary motion.

EXAMPLE 75

Part a) shows a single staff with a chord labeled P-O II. Part b) shows a single staff with a chord labeled P-O I. Part c) shows a two-staff system with measures 28, 29, and 30. Measure 28 has a treble staff with a half note G4 and a bass staff with a half note B2. Measure 29 has a treble staff with a half note A4 and a bass staff with a half note C3. Measure 30 has a treble staff with a half note B4 and a bass staff with a half note D3.

Tension is sustained through a gradual increase in harmonic rhythm combined with rhythmic variation. The buildup of rhythmic tension begins with a change from the quarter note rhythm (♩ ♩ ♩) of measures 26-27 to the eighth-note rhythm of measures 28-29. This change is accompanied by a series of rising minor 9th and major 7th double-stops in the violin, whose notes are interchanged. A new harmonic rhythm is introduced in measure 31, ♩ ♩ ♩ . The manner of performance is varied throughout by different combinations of bowed tremolo, col legno, pizzicato, ponticello, col legno tratto, col legno battuto and col legno ponticello. The driving rhythms and harsh, dissonant sound are further intensified by a continuous fortissimo (ff) dynamic level.

8. Spacing and register

Wide variation in chord spacing and changes in register reflect a wide range of contrasts sought by the composer. Widely spaced chords are used both as a means of achieving an expansive sonority at a climax (EXAMPLE 77) and as a release at the cadence point (see EXAMPLES 66a,b) from a previous buildup of dissonance (see EXAMPLES 73 and 74). In measures 9-11 the wide separation in register between the two sound bodies produces a sense of increased tonal intensity and expansion in support of the indicated crescendo. Reiterated chords produced by

EXAMPLE 76

25 *ponticello* *)

26 *on the bridge* *)

27 *col legno tratto*.....

28 *col legno battuto*.....

29 *col legno battuto*.....

30 *col legno tratto*.....

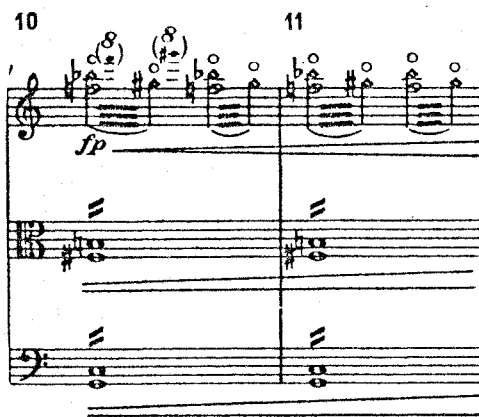
31 *col legno tratto*.....

32 *col legno tratto*.....

33 *col legno tratto*.....

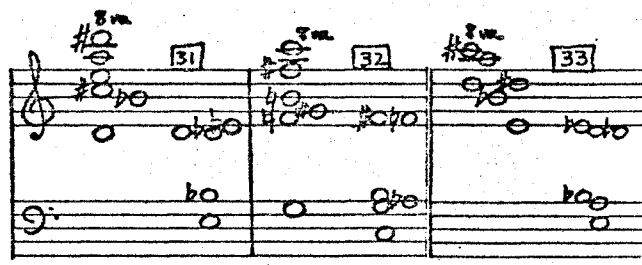
double-stops in the viola and cello in their lower registers are contrasted by a fingered tremolo in the upper register of the violin. The interval between the lowest note of the cello and the highest note of the violin exceeds five octaves.

EXAMPLE 77



Spacing is somewhat dependent upon the level of dissonance desired. In EXAMPLE 78, the open spacing of chords in a higher register are contrasted with more closely spaced chords containing semitones in a lower register.

EXAMPLE 78



D. Texture

Variety of textures and special effects found throughout the work reflects Schoenberg's knowledge of the numerous possibilities for color and expression in the string trio medium. Although three-part homophonic texture predominates, five-part texture sometimes occurs whenever a fuller, more complete sonority is desired in the accompaniment. Six-part texture, produced by all instruments playing double-stops,

is reserved for dramatic moments to provide a maximum of dissonant sound. It is found most extensively in Part 1; in succeeding sections it occurs at brief climactic moments. At times the number of instruments is reduced to two or, occasionally, a single instrumental line. In addition to homophony, both chordal and contrapuntal textures are present. Changes in number of parts and type of texture may take place suddenly. An example from the First Episode (EXAMPLE 79) illustrates four changes in number of parts and type texture, following in close succession: two-part contrapuntal texture, single instrumental melody, chordal texture and homophonic treatment. In the concluding four measures contrast between motivic material played by the cello and the background harmony played by the violin and viola is provided by differences of performance manner (harmonics, flautando) and widely separated registers (cello, high; violin and viola, low).

Schoenberg's interest in counterpoint is felt throughout the work; occasionally, it becomes a prominent element in the texture. Invertible, triple counterpoint may be observed in measures 41-44 of Part 1. Measure 42 (EXAMPLE 80) is an inversion of measure 41, with an exchange of parts. Similarly, measure 44 is an inversion of measure 43, in triple counterpoint. The descending triplet arpeggio of the violin in measure 43 is identical to that of measure 41, but changed rhythmically. A change of octave in the cello part and the exchange of the final notes in the cello and viola in measure 44 are a variation of measure 43. Contrapuntal texture becomes a predominant feature within 2nd Episode. An imitative section, measures 184-187, is based upon three motives, which are varied melodically through inversion and

exchanged among all three instruments. A strict, three-voice canon begins in the cello in measure 188, beat 2, followed by the viola and the violin. The pianissimo (ppp) dynamic and the constant rising and falling sixteenth notes are reminiscent of the beginning of the last movement of Bela Bartok's Concerto for Orchestra.

EXAMPLE 80

EXAMPLE 81

E. Form

Composition with twelve notes can, but need not, lead to new forms. . . In fact we find in some of Schoenberg's works, composed over a period of about twenty-five years, new, "free" forms. . . either within a work or shaping a work as a whole - forms which are only vaguely similar to those we have known up to now. These defy formal analysis of a traditional kind. . . (They) are new, free forms, which were not consciously worked out in advance, but, like the old forms, grew out of the music itself, through the innate laws of logical coherence, clarity and comprehensibility.⁸

Both the Trio and the final instrumental work, the Phantasy, Op. 47 for violin and piano, are free, one movement forms. The Trio

⁸Rufer, p. 169.

is comprised of five large sections: Part 1 (implied, but not indicated), 1st Episode, Part 2, 2nd Episode and Part 3. While the work as a whole does not follow a rigid pattern, the recapitulation in Part 3 of material from Part 1, 1st Episode and Part 2, and the development of previous material in Part 2 and 2nd Episode lead to its consideration as a type of sonata form. Furthermore, a rondo form is readily discernable within the 1st Episode.

Each of the five sections is comprised of several smaller units, formed from phrases of unequal length, linked together. Smaller units and phrases are separated from one another by means of a simultaneous rest for all three instruments, a cesura (✓) or a fermata at the barline (). ILLUSTRATION NO. 3 shows that the greater portion of Part 1 is comprised of a long chain of connected phrases; from measure 12 to 44 continuity is achieved through similarity of harmonic material and a sustained fortissimo (ff) dynamic level. Within the 1st Episode, (A B C B A), section C contains the longest phrases whereas section B and B¹ are short phrases. In the return of both B and A sections, however, considerable changes in length take place. Section B is extended to more than twice its former size whereas section A is condensed to less than half of its former length. Section C, the midpoint of the movement, is balanced on either side by an almost equal number of measures: A - B, 31 mm. and B - A - coda, 28½ mm. In Part 2, three long units of phrases joined together (units 1, 3 and 5) containing the main motivic material (variation of motive B, variation of motive A and ma cantabile waltzlike theme) are linked together by two shorter units (2 and 4). 2nd Episode is comprised of two main ideas (contrapuntal

interplay based on three contrasting motives leading to a strict three-voiced canon and a unison variation of motive D) followed by a codetta. Longest of the five sections, Part 3 contains the largest number of small phrases due to the telescoping of material from Part 1, 1st Episode and Part 2. The restatement of material is sometimes exact, although considerably condensed; usually, however, it is a) rhythmically varied, b) melodically inverted, c) transposed or d) played by a different instrument.

2. Dynamics, tempos and texture

Contrasts in dynamics, tempos and textures are an important factor in conveying the emotional content of this work. Nonetheless, an overall balance is maintained (TABLE NO. 8). All sections begin in a piano (p) dynamic with the exception of 2nd Episode, in many respects the high point of the work as a whole, which begins at a fortissimo (ff) dynamic. The overall dynamic range is from pppp to fff, with extreme dynamic changes often performed subito. Crescendos and diminuendos usually take place within a relatively short time span. Indicated accents, sforzandos and fortepianos provide added stress for the purpose of emphasizing a particular rhythm stressing an important note of a phrase or emphasizing a certain vertical sonority.

Tempo and meter changes are frequent, occurring most often in 1st Episode and Part 3; seldom during the long, uninterrupted buildup of rhythmic and dynamic tension in Part 1. Tempo changes often occur at the beginnings of phrase units, frequently accompanied by corresponding changes in meter. Upon occasion, however, meter changes are used as a means of phrase extension or contraction.

ILLUSTRATION NO. 3

The Linking Of Phrases Into
Larger Units⁹Part 1 51 measures

4, 7 + 5½ + 4 + 2½ + 4 + 3 + 3 + 3 + 4 + 4, 7

1st Episode 80 measures5 + 6(5+1) + 2(1+1), ^A2 + 4, 3 + 4 + 3, ^B2, 3 + 7 ^C+ 8 + 4^B2½ + ^A2½, 6(4+2) + 5, ^{Coda}6 + 5(4+1)Part 2 46 measures19(2+7), 24 + 2, 37(6+1), 44(1+3), 54 + 7, 64(1+1+2), 73 + 32nd Episode 27 measures14, 24 + 7(4+3), 33(1+2), 44½(2½+2), 55½(3½+2)Part 3 85 measures3 + 3 + 8 + 7, 4 + 5 + 4, 4(1+1+2), 2, 3, 2½, 3½ + 2½ + 3½,
4 + 9(6+3), 4, 3, 4 + 8

⁹Commas indicate a separation by either a cadence or cesura.

TABLE NO. 9

Phrase Lengths, Meters, Tempos, Performance Techniques
And Phrase DescriptionSchoenberg Trio, Op. 45

<u>Measure Number</u>	<u>Phrase Length</u>	<u>Tempo, Meter</u>	<u>Performance Technique</u>	<u>Phrase Description (dynamics, rhythm, etc.)</u>
<u>Part 1</u>				
1-4	4	♩ -60 4/4	finger trem. inter. harm.	pp; brief ff outbursts; dim. <u>motive A</u> .
5-11	7	♩ -90 2/2	finger trem.	increased rhythm, activity m. 5; arpeggios in con- trary motion; reiterated chords. Cresc., f; cresc.
12-17½	5½	♩ -90	pizz., harm., fingered & bowed trem.	cresc. to ff. <u>motive B</u> .
17½-21½	4	♩ -90 2/2	bowed trem.	 rhythmic fig. freq. arpeggiated fig.
21½-23	2½	same	bowed trem.	ff dynamic level.
24-27	4	same	bowed trem., pont., pizz.	ff dynamic level; begin. of rhythm. & harm. tension.
28-30	3	same	Col legno tratto, Col leg. battuto Col leg. tratto pont.	ff. cont. of rhythm. & harm. intensity.
31-33	3	same	Col leg. tratto pont. (all instr.)	ff. dynamic level. syncopation.
34-36	3	same	-----	rhythmic cpt., con- trary motion.
37-40	4	same	-----	reiterated chords, arr. as overlapping double stops.
41-44	4	♩ -120	-----	triple cpt.; climax in m. 44; cesura.

TABLE NO. 9-Continued

Measure Number	Phrase Length	Tempo, Meter	Performance Technique	Phrase Description (dynamics, rhythm, etc.)
45-51	7	Poco meno mosso; $\frac{J}{272}$ $\frac{60}{8}$	2 meas. arco/ 2 meas. pont.	subito ppp. Alt. of high & low tessitura; pizz. chord at cadence.
<u>Episode I</u>				
52-56	5	$\frac{J}{272}$ 60 (con't) $\frac{2}{2}$		Introduction. piano w/ cresc. Vertical sonority consists of M3rd & P4th superimposed. (MST).
57-62	6(5+1)	Meno Mosso $\frac{J}{272}$ 60, $\frac{4}{4}$		motives c^1 , c^2 two half-phrases, with one meas. extension. A section.
63-64	1+1	Lento $\frac{J}{272}$ 54		Separated ideas, one meas. each. Thinning of texture to single instrument.
65-66	2	$\frac{3}{4}$	finger trem.	subito ff. One meas. idea repeated; Trem. dissonance low reg. followed by chord.
67-70	4	$\frac{4}{4}$	Col leg. tratto pont.; flautando, harm.	fpp, subito dynamic change; Three-note row segments played by cello.
71-73	3	Moderato $\frac{J}{272}$ 72, rit.	harmonics	Variation of motives c^1 , c^2 .
74-77	4	a tempo	harmonics	Motive c^1 , m. 77 cello; sustained chords in vln. & vla., marcato arp. in cello.
78-80	3	same	finger trem. ponticello; harm., col leg. tratto, pizz.	Inversion motive c^1 , viola, motive c^2 by vln & cello.
81-82	2	Quasi Rec.		B section: Motive D, vln.
83-85	3	Poco piu mosso, $\frac{J}{272}$ 84, poco rit. $\frac{4}{4}$, $\frac{6}{8}$	saltando	C section. f dynamic, dim. & rit.

TABLE NO. 9-Continued

Measure Number	Phrase Length	Tempo, Meter	Performance Technique	Phrase Description (dynamics, rhythm, etc.)
86-92	7	<u>a tempo</u>		Waltzlike theme E; two meas. idea in vln., then vla, then cello w/one meas. extension.
93-100	8	same		Gradual increase in dynamics and tempo; motive moves from instr. to instr.
101-104	4	<u>Meno mosso</u> ♩-120	Gliss. to harmonics pizz.	Variation of <u>motive D</u> if dynamic.
105-107½	2½	-120(con't) <u>Quasi Rec.</u>	Gliss., arp. pizz.	Return of <u>motive D</u> .
107½-110	2½	<u>a tempo</u> ♩-72	<u>saltando</u>	Single instrumental line passed from vln. to vla followed by marcato double-stop chords in cello, forte.
111-116	6(4+2)	♩-72	harmonics, bowed trem.	Return section A, var. c ¹ . with two meas. extension, sudden cresc.pppp to fff.
117-121	5	same	finger trem.	Reiterated harmonic dissonance fff with gradual increase in rhythmic activity to climax.
122-127	6	<u>Very Quiet</u> ♩-104	double harmonics	Homophonic texture; theme E, variation.
128-132	5(4+1)	<u>Meno mosso</u>		Coda. Molto piano, calando, ritard.
<u>Part 2</u>				
133-141	9(2+7)	♩-80		Intro. two meas.; <u>Motive B</u> , var. Homophonic texture; cesura.
142-145	4	♩-104 6/8	bowed trem. double harm.	ff subito; cesura.

TABLE NO. 7-Continued

Measure Number	Phrase Length	Tempo, Meter	Performance Technique	Phrase Description (dynamics, rhythm, etc.)
146-147	2	♩ -72		cesura.
148-154	7(6+1)	Moderato ♩ -104 6/8, 9/8	con sordino	Motive A, var.; change to chordal texture.
155-158	4(1+3)	Very quiet- rit. 6/8	con sordino pizzicello	Transitional. ppp-cesura; cresc. to ff, cesura; pp subito.
159-162	4	ma cantabile ♩ -52 9/8	con sordino	Theme based on motive A, vln.
163-169	7	"	"	Previous material freely inverted, in cello.
170-173	4(1+1+2)	"	"	Two meas. interruption; theme cont. two meas., fragmented; cesura.
174-176	3	" 9/8	senza sordino	Continuation of theme, fragmented.
177-179	3	" 6/8	saltando	"Dissolving" section; disintegration of theme into reiterated chords, interspersed a/motivic frag. Cadence, cesura.
<u>Episode 2</u>				
180-183	4	♩ -60 4/4	martellato, double harm., finger trem., pizzicello	ff subito; broken chords, incisive rhythm; dim to pp cadence.
184-188, b.1	4	♩ -60 12/8		Contrapuntal section. Three motivic ideas interchanged inverted.
188, b.2- 194	7(4-3)	"	slow gliss. on one string, vln., vla.	ppp. strict 3-voiced canon; Cresc. to glissandos out-lining m9th, two-voice tex. Ends w/ solo cello pp.

<u>Measure Number</u>	<u>Phrase Length</u>	<u>Tempo, Meter</u>	<u>Performance Technique</u>	<u>Phrase Description (dynamics, rhythm, etc.)</u>
195-197	3(1-2)	<u>Piu mosso</u> rit. J-60	double stops, finger trem., double harm.	ff, one meas., dim. to cadence b.l, meas 196. Two meas. "link".
198-202	4 $\frac{1}{2}$ (2 $\frac{1}{2}$ -2)	 8/8		Unison. Variation <u>motive D</u> . Augmentation and rit. of motive. Cadence, fermata.
202-207	5 $\frac{1}{2}$ (3 $\frac{1}{2}$ -2)	<u>Lento</u> J-44		Cadential dyad repeated (D-B) Falling intervals in vln. Transition to return <u>Pt. 1</u> .
<u>Part 3</u>				
203-210	3	<u>Lento</u> J-60	finger trem., intermittent harmonics	Return of material of <u>Part 1</u> , condensed (m. 3 omitted). <u>Motive A</u> .
211-213	3	accel. J-90	<u>col legno</u> <u>battuto</u>	Cres. to f. Condensation of m.5-9 (mm.6-7 omitted).
214-221	8	"		Subito p. Material from <u>Pt. 1</u> w/parts inter- changed. Two meas. extension.
222-228	7	"	<u>col legno</u> <u>tratto</u>	Variation of mm.31-40 of <u>Pt. 1</u> ; mm.37-40 condensed. Cesura
229-232	4	<u>Poco meno</u> <u>mosso</u> J-60	bowed trem. <u>ponticello</u>	Condensation of mm. 45- 51, <u>Pt. 1</u> .
233-237	5	"		Corresponds to mm. 52- 62, <u>Episode 1</u> ; same trans. level.
238-241	4	<u>Meno mosso</u> J-60 4/4	pizz., <u>col legno</u> <u>battuto</u>	Condensed from <u>Episode</u> <u>1</u> . Cesura.
242-245	4(1-1-2)	<u>Lento</u> J-54		Corresponds to mm.63,64, 79, 80 of <u>Episode 1</u> . MM. 65-78 omitted Variation <u>motive c</u> ¹ .

<u>Measure Number</u>	<u>Phrase Length</u>	<u>Tempo, Meter</u>	<u>Performance Technique</u>	<u>Phrase Description (dynamics, rhythm, etc.)</u>
246-247	2	<u>quasi rec.</u>		Corresponds to mm. 81-82; rows exchanged, <u>motive D</u> inverted.
248-250	3	<u>Poco piu mosso</u> ♩-34 12/8, 6/8		Corresponds to mm. 83-85. Order of entry of instruments changed.
251-253	2½	(♩-84?) 4/4, 5/4		Variation motive B; transposed. Material mm 86-104 (theme E) omitted.
253-257	3½	5/4, 4/4	<u>saltando, harmonics</u>	Corresponds to mm. 103-111; parts interchanged, transposed.
257-259	2½	"	bowed trem., <u>ponticello</u> , double harm.	Material from mm. 170-171; trans. var. Arpeggios, trem. chords
259-262	3½	" 6/8	finger trem.	Subito ff.; cesura. Intense dissonance w/ gradual dim. and thinning of texture.
263-266	4	(<u>a tempo?</u>)		Corresponds to m. 122 et al. Var. theme E in cello, violin.
267-275	9(6-3)	♩-80 2/4	<u>pizz.</u> then <u>arco</u> , all instr.	Gradual cresc.
276-279	4	♩-104	bowed trem. double harm,	Material from mm. 145-147. Dissonant cadence, m. 279, cesura. Subito p var. theme E. (m. 122).
279-281	3	"	<u>con sordino</u>	Corresponds to m. 155; changed instrumentation. Cesura.
282-285	4	♩-52 2/8	" harmonics	Material from m. 159 et al. Var. of motive A. High tessitura all inst. Accompaniment in harm. Homophonic texture.
286-293	8	"	" "	Gradual ritard and dim. final note D#.

Texture, as tempo and meter, frequently changes at the start of subsequent phrase units, as a further means of variation and contrast.

3. Hexachords and transposition levels

The relationship of form, levels of transposition and hexachords is shown in TABLE NO. 9. The key of a phrase, motive or section in a tonal composition is somewhat analagous to the transposition level in a twelve-tone work; transposition levels, like tonalities, are used as an element of unity and of diversity. For example, motives A and B of Part 1 return at their original transposition level (P-0) in Part 3. Similarly, motives C¹, C² (P-8), D (I-5,P-5) and theme E (P-8) return at these same transposition levels. Within 1st Episode, just as sections in a rondo form often return in a different key, here motives reappear at new transposition levels; motive C¹, C² returns a whole tone below its original transposition level (T.L) while motive D returns a semi-tone higher than its original T.L.

An examination of transposition levels within each of the five main sections reveals that some sections remain at one T.L. while others tend to move freely to different levels. Part 1, the return of this material in Part 3 and the coda of the latter section are based almost exclusively on the original row, together with its inversion and retrograde forms. Within 1st Episode, section A is predominantly at transposition level 8, with brief digressions to T.L. 5. Section B, mostly at T.L. 5 is followed by section C, which begins at T.L. 5 and then returns to T.L. 8; the remainder of this section is predominately at T.L. 9 and 6. Following a return of both B and A at T.L. 6, a

TABLE NO. 10

Set Substructure Transposition
Levels And HexachordsSchoenberg Trio, Op. 45Part 1 (mm.1-51)

A motive (m.2) P-O I, I-O I ----¹⁰
P-O I, II ---- P-O II, I-O II ----
P-O I; P-O II
RO-II, I; RI-O II, I
P-O I; I-O I
I-O I; RI-O I; R-O I --
I-O I

B motive (m.12) P-O I, II
P-O III
RI-O III
RI-O II; RI-O I ---
P-O II
P-O III; RI-O III
R-O II, I; RI-O II, I
P-O I; I-O I -----
I-O II; RI-O II ---
P-O II ---
P-O I ---
P-O II -----
P-O I, II (alternate)
P-O I, I-O I
P-O II; I-O II
P-O I; RI-O I

(mm. 37-40) notes 1 and 6 of hexachords PO and I-O I, II, III¹¹
P-O I; I-O I ----
P-O II
I-O II
P-O III (notes 1-3)

Episode 1 (mm.52-132)

Sec. C¹ motive P-O III (notes 4-6)
A C² motive P-8 I
(mm.52-80) P-8 IV
P-8 I
P-8 IV
R-8 IV; R-8 I -----
P-8 I

¹⁰Dashes indicate repetition.¹¹These notes indicated by double stems in Appendix D.

TABLE NO. 10-Continued

	P-8 IV
	R-8 IV
	R-8 I
	P-5 I; P-5 IV
	P-5 I; P-5 IV
	I-8 I
	I-8 IV; P-8 I
	P-8 IV
	P-5 I; P-5 II
	P-5 I; P-5 IV
	P-8 I; I-8 I
	P-8 IV; I-8 IV
	R-8 IV
	P-8 IV
	R-8 IV; I-8 IV
	RI-8 IV
	RI-8 I
Sec. D motive	P-5 I; I-5 I
B (mm. 81-82)	P-5 IV; I-5 IV
Sec.	P-5 I; I-5 I ---
C (mm. 83-104)	R-5 I
	I-5 I
<u>E theme</u>	P-8 I; I-8 I
	P-8 IV; I-8 IV
	R-8 IV; RI-8 IV
	R-8 I; RI-8 I
	RI-8 IV; R-8 IV
	R-8 I; RI-8 I
	P-5 I
	P-5 IV
	P-9 I
	P-9 IV
	RI-9 IV
	RI-9 I
	RI-0 II; RI-0 I
	I-9 I
	RI-9 II --
	R-9 II
	P-9 I
	P-9 IV
	P-6 I
	I-6 I
	I-6 IV; P-6 IV
	P-3 I; I-3 I
	I-6 I; P-6 I
	R-6 II; I-6 IV; P-6 IV; I-6 II

TABLE NO. 10-Continued

Sec. D motive	P-6 I; I-6 I
B (mm.105-110)	P-6 IV; I-6 IV
	RI-6 IV
	R-6 IV; RI-6 IV (rows alternated)
	R-6 I; RI-6 I
Sec. C ¹ motive	I-6 I
A C ² motive	I-6 IV
(mm.111-121)	R-6 IV
	P-6 I
	P-6 I; P-6 IV
	P-3 IV
Coda (mm.122-132)	I-8 I; RI-8 IV
	R-8 IV; RI -8 IV
	R-8 I; RI-8 I
	R-8 I; P-8 IV---
	P-8 IV; RI-8 II----
	I-11 I; R-11 I----
	P-2 I
	P-5 I; I-5 I
Part 2 (mm.133-179)	I-5 I; P-5 I (rows alternate) ---
	I-5 II; P-5 II
	P-5 III; I-5 III
	P-5 III; I-5 I
	R-5 III; P-5 II
	RO-5 I; RI-5 I
(mm.152-53)	Notes 1 and 6 of hexachords P-0 and I-0 I, II, III
	P-5 I
	I-5 I
	P-5 I
	P-7 II
	I-7 IV---
(Moderato)	I-9 II; P-9 II ---
	I-7 II; P-7 II--
	P-7 I; R-7 II
	I-1 I; P-1 II---
	R-5 II, I--- (rows alternate)
	P-3 I,II (hexachords alternate)
	RI-6 III; R-6 III
	I-5 I; P-5 'III---
(ma cantabile)	P-9 I; I-9 I--
	P-9 II; I-9 II---
	I-9 I; P-9 I
	P-9 II; I-9 II; I-9 III
	I-7 I; I-7 IV
	P-10 I; I-10 I
	I-10 I; P-10 I
	RI-6 III; R-6 III

TABLE NO. 10-Continued

R-9 III; RI-9 III
 R-9 III; RI-9 III
 RI-9 III---
 RI-9 II---
 P-9 I
 I-9 I
 I-6 I--- I-6 II

Episode 2 (mm.180-207)

(Lento)

R-11 I; RI-11 I---
 P-11 IV---
 R-11 III
 P-8 V---
 P-8 VI---
 I-8 V; RI-8 VI
 P-8 VII---; P-8 VIII
 I-11 V, VI, VII, VIII
 P-2 V, VI, VII, VIII
 R-5 VIII; I-5 VI
 P-5 I; P-5 IV
 RI-5 IV; RI-5 I
 P-5 I
 P-5 IV; P-5 VII
 P-5 VIII
 P-9 I; I-9 I--
 I-9 IV
 P-6 I; I-6 I
 P-6 I
 RI-6 I; I-6 I
 P-10 I; I-10 I
 P-10 IV; R-10 I
 I-10 IV; P-10 IV
 RI-10 IV; R-10 IV

Part 3 (mm.208-293)

A motive
 (m.208)

P-0 I, I-0 I---
 P-0 II, I-0 II---
 P-0 I; P-0 II
 R-0 II, I; RI-0 II, I
 I-0 I; R-0 I; RI-0 I

B motive
 (m.214)

P-0 I, II---
 P-0 III---
 RI-0 III---
 P-0 I,II (hexachords alternate)
 I-0 I; P-0 I
 P-0 II
 P-0 III

TABLE NO. 10-Continued

<u>C¹</u> motive (m.238)	P-8 I
<u>C²</u> motive (m.240)	P-8 IV
	P-8 I
	P-8 IV
	R-8 IV
	R-8 I
	P-8 I
	P-8 IV
	I-8 IV
	RI-8 IV
	RI-8 I
<u>D</u> motive (m.246)	I-5 I; P-5 I
	I-5 IV
	P-5 IV
	I-5 I--; P-5 I--
	I-6 I; P-6 I
	R-6 I; RI-6 I
	R-6 I; R-6 IV
	R-6 II
	P-6 IV
	R-6 IV; P-6 III
	I-6 I
	I-3 I; P-3 I
	I-8 I
	I-8 II
<u>E</u> theme (m.263)	P-8 I; I-8 I
	I-8 IV; P-8 IV
	R-8 IV; RI-8 IV
	R-8 III
	P-0 I, II--
	P-0 III
	I-0 VII
	RI-0 II, I
	I-5 IV; P-5 IV (hexachords alternate)
	I-9 I; I-9 II; I-9 III; P-9 III
	P-5 I
	I-5 I--
	P-7 IV
	R-8 IV; RI-8 IV
	RI-6 III; R-6 III
(<u>Cantabile</u>)	I-0 I; P-0 I--
	I-0 II--; P-0 II; I-0 II
	P-0 I; I-0 I
	P-0 II; I-0 II
	I-0 III; P-0 III; I-0 III
	P-0 III; R-0 II
	P-0 I; I-0 I
	P-0 II; I-0 II
	P-0 III; I-0 III

TABLE NO. 10a

Summary Of Hexachord Forms

Part 1	I,II,(III)
1st Episode	I,IV
Part 2	I,II,III
2nd Episode	V,VI,VII,VIII,I,IV
Part 3	I,IV,II,III

brief coda again returns to T.L. 8. Thus, in the preceding succession of transposition levels, procedures similar to those found in traditional compositions may be detected in: 1) the movement away from and return to a particular key or transposition level (T.L. 8) and 2) the repetition of material (A,B) in a new key or different transposition level (T.L. 6). Similar transposition levels between the ends and beginnings of each of the five large sections is a method used for assuring smooth transitions. A summary of the relative frequency of transposition levels in decreasing order is as follows: 0 (original), 5 (P 5th below), 6 (tritone) 8 (minor 3rd below) and 9 (major 3rd below). A tabulation of intervals between transposition levels reveals that the P 5th is most frequent followed by levels a minor 3rd distance (i.e. between T.L. 5, 8 or T.L. 3, 6 and 9). Levels a major 2nd distance (between T.L. 5, 7 and 9) are least used.

A summary of hexachords used in each of the five sections shows that only hexachord I occurs throughout the work. New hexachord arrangements (III,IV) are gradually introduced in Part 2 and 1st Episode. In accordance with Schoenberg's intention that deviations in the normal order of notes occur late in a composition, hexachords V through VIII

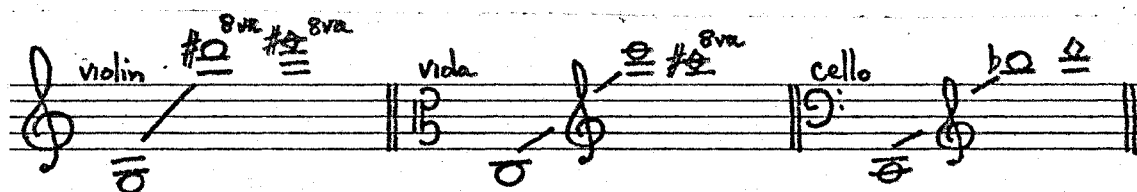
are not introduced until 2nd Episode¹². In the section following, Part 3, a return is made to the four most frequent hexachords, I, II, III and IV.

F. Performance aspects

1. Range of instruments

Ranges of the ensemble are shown in EXAMPLE 82. The range of the violin extends beyond three octaves and frequently utilizes the upper positions of the instrument. Likewise, the range of the viola is over three octaves with an extension to four octaves in artificial harmonics; both alto and treble clefs are used. The cello range of nearly four octaves requires knowledge of bass, tenor and treble clefs.

EXAMPLE 82



2. General technique

Considerable technical facility of both left hand (fingering, shifting) and right arm (bowing) is required of each player in undertaking a performance of this work. Left hand techniques require quick shifts and rapid finger movement as a result of wide melodic leaps, double stop playing (double stop 9ths and 10ths for the violin, double-stop 9ths for the viola) and una corda playing. Two brief examples (EXAMPLE 83a,b) illustrate the high level of left hand accuracy and

¹²Rufer, p. 119.

and right arm bow control required of the violinist. In EXAMPLE 83a, the wide leaps between double stops in the high and low registers require fast position changes together with alterations in finger spacing between major 7th and minor 9th double stops in the upper register and perfect 4th and major 7th double stops in the lower register. The wide melodic leaps of EXAMPLE 83b involve a quick change of position combined with rapid movement of the bow from the E string to the G string.

EXAMPLE 83



Bowings include a wide variety of strokes, both short and long, on and off the string. These include slurred legato, short detache, spiccato and short, hammered strokes at the frog. Saltando is indicated, denoting a light, rebounding stroke with several notes to be played in one direction of the bow. It is sometimes indicated for two accompanying instruments playing repeated chords (EXAMPLE 84a) or for repeated chords played by the ensemble (EXAMPLE 84b). At several points its scherzando character provides a lighter moment, as it is passed from instrument to instrument (EXAMPLE 84c).

EXAMPLE 84

The image shows three musical examples labeled a), b), and c).
 a) and b) are finger tremolos. a) is marked '179 rit.' and b) is marked '249'. Both show rapid oscillations between two notes on the same string (a) or between two adjacent strings (b).
 c) is a saltando effect. It is marked 'a tempo' with a quarter note equal to 72, and '107'. It shows a rapid movement between two strings, marked 'p saltando'. The score continues with measures 108 and 109, showing further variations of the saltando effect, marked 'p saltando sf'.

3. Special effects

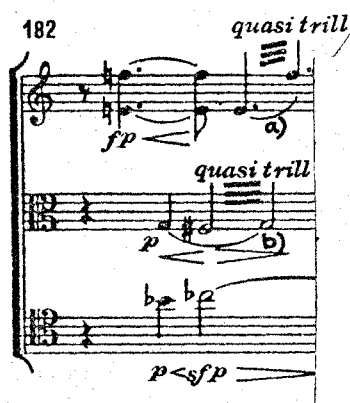
The great variety of contrasting moods conveyed in this work are largely due to special left hand (fingering) and right arm (bowing) effects used separately and in combination. Special left hand techniques include finger tremolo, single and double harmonics, glissandos and una corda playing. Bowing techniques include bowed tremolo, ponticello, flautando, col legno tratto (drawn with the bow stick) and col legno battuto (tapped with the bow stick). The muted effect of con sordino in all instruments is sometimes called for.

a. Finger tremolo

Indicated finger tremolos are produced by either a) a rapid movement between two fingers on the same string or b) a rapid motion by the bow between two fingers placed in a double stop pattern on adjacent strings. Finger tremolo is used sometimes as a background effect. In the opening measures (1-2) half-step finger tremolos played

by the violin and viola immediately set the tense background mood which prevails throughout much of the work (EXAMPLE 40). When used as an ensemble effect, it can produce a complete change of mood. For example, the rhythmic, rather bombastic opening measure (m.180) of 2nd Episode soon disintegrates into quiet, fluttering sounds of finger tremolos in measure 182 (EXAMPLE 85); methods a) and b) described above are employed by the violinist and violist, respectively.

EXAMPLE 85



b. Harmonics

Both single and double stop harmonics are used, which greatly expand the range and timbre possibilities of the individual instruments and of the ensemble. Each instrument is called upon to produce both artificial and natural harmonics.¹³ For the convenience of the performer, actual pitches produced by these harmonics are notated in parenthesis. Harmonics are used in a variety of ways either entirely or as part of a linear motive, or as a vertical chord structure. Melodically, they occur as a means of transferring a single note into a higher octave (EXAMPLE 40 m.1, cello), as a fingering convenience within a melodic line played in stopped notes (EXAMPLE 56 m.86, violin) or as a motivic variation (EXAMPLE 50, b, c; EXAMPLE 43; EXAMPLE 51). Accompaniments in harmonics appear in homophonic textures at three

¹³Artificial harmonics include those produced by touching the string lightly a major third or perfect fourth above the stopped note.

different points. A comparison of these accompaniments reveals interesting differences in spacing, methods of performance and tessitura between the two opposing sound bodies. In EXAMPLE 86a, linear semitones played in harmonics by the viola and cello are in contrast to the sharp, brittle sound of the violin pizzicato. In EXAMPLE 86b, fragmentary melodic material played by the cello in its lower register is accompanied by a high, flutelike background in harmonics played by the violin and viola. The wide interval distance between the two sound bodies adds both clarity and atmosphere to the melodic line. In the coda to Part 3 (EXAMPLE 86c) the melodic line played by the violin in a high register is matched in tessitura by the harmonics played by the viola and cello. The effect produced by the entire ensemble playing in a high register, muted and at a pianissimo (pp) dynamic level, has an ethereal quality to it.

EXAMPLE 86

Chords in harmonics appear at brief moments as a contrast to the prevailing texture and momentary points of repose (EXAMPLE 66a,b). At two internal cadences within Part 2, momentary changes in register through use of harmonics illustrates great flexibility in chord spacing. In EXAMPLE 87 the chords formed in the penultimate and final cadence measures are comprised of combinations of harmonics and stopped notes. The linear semitone interval is expanded three octaves in the cello, two octaves in the viola and four octaves in the violin.

EXAMPLE 87

The musical score for Example 87 consists of three staves: Violin (top), Viola (middle), and Cello (bottom). The Violin staff begins with a 'rit.' marking and a tempo change to '♩ = 72' at measure 148. It features a harmonic marked with a natural sign and a 'p' dynamic. The Viola staff has a '4' marking and a 'mf' dynamic. The Cello staff has a 'f' dynamic and a 'sp' (sustained) marking. The score concludes with a 'morendo' marking and a final measure marked '147' with a '(8)' above it.

Schoenberg also exploits other possibilities for harmonics, using fingering and bowing variations. Fingered tremolo harmonics¹⁴ in the violin provide contrast both in register and playing manner to the viola and cello (EXAMPLE 77). Variation in bowing of harmonics includes bowed tremolo, sometimes also indicated to be played ponticello. The excitement generated by rapid motions of the bow is particularly effective when combined with a crescendo. In EXAMPLE 88, the dynamic level increases from pppp to fff within a single measure. Further

¹⁴For alternatives to these difficult fingered harmonics see no. 1 in APPENDIX C.

EXAMPLE 88



tone color variations are made possible by special bowing techniques, i.e. col legno tratto, flautando and ponticello col legno tratto. For example, in EXAMPLE 79 (mm.67-70), intermittent motives played in stopped notes and harmonics by the cello flautando and ponticello col legno tratto¹⁵ are accompanied by bowed and fingered tremolos performed col legno tratto ponticello. Again, in EXAMPLE 51, the principle motive, played col legno tratto in harmonics and stopped notes by the cello is accompanied by the violin playing finger tremolo, ponticello.

c. Glissandos

Glissandos are indicated at intermittent points; they are closely identified with the tritone interval of motive D (EXAMPLES 52, 54). Upward (EXAMPLE 54,59b,86b) and downward (EXAMPLE 52,89) glissandos are present, at both moderate and fast tempos. The three-part canon of 2nd Episode culminates in a series of slow downward glissandos emphasizing the minor 9th interval. The performer must precisely time

¹⁵According to Schoenberg's direction, it should be played at the bridge with the wood of the bow. However, a portion of bow hair is needed so that the harmonics may be heard.

the left hand finger movement; this type of glissando is reminiscent of those used by Bela Bartok in his Third String Quartet.

EXAMPLE 89

192

ff *gliss. slowly*

f *ff* *sul D* *gliss. slowly*

ff *3* *3* *feroce, ad libitum*

Most glissandos are indicated to be played une corda; where no indication is given it may be more practical to start the glissando from the adjacent string.

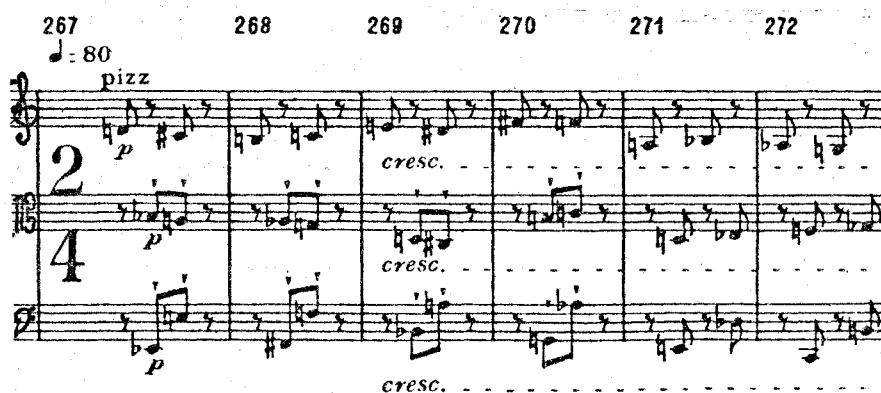
d. Pizzicato

Pizzicato effects are employed in various ways: as a motivic statement, as a chord punctuation or as a chordal accompaniment. These effects range from single notes played pizzicato by one instrument to the entire ensemble performing in this manner. A single pizzicato triad is played by the violin at the close of Part 1. Arpeggiated chords appear as an accompaniment (EXAMPLE 89a) figure, or as part of a motive (D) as in EXAMPLE 52. Here, the three pizzicato notes are plucked with the index finger of the right hand, moving in a direction from left to right → . In Part 3, measure 246 (EXAMPLE 54), however, the arpeggiated chord is melodically inverted, resulting in a changed plucking motion from right to left ← (from E string toward D string). This necessitates a change in the plucking technique to

either a) plucking with the nail side of the index finger to the left, the right thumb placed behind the plucking finger or b) a combination of right hand (R) and left hand (+) pizzicato, R,+,R (see EXAMPLE 54).

In EXAMPLE 90, the pizzicato semitones outlining motive B in the violin are matched by the short, staccato bow strokes by the viola and cello. The eighth-note () rhythm of measures 271-72 is in the nature of a hocket between the violin and the lower two instruments.

EXAMPLE 90



e. Bowing effects

Schoenberg's genius at creating new and unusual sound effects is evidenced by the variety and combinations of bowing techniques found in the Trio. The more usual bowing effects of tremolo and ponticello take on a new sound color when combined with col legno tratto. The sharp, percussive sound produced by striking the string with the wood of the bow, Col legno battuto, adds a new sound dimension and rhythmic emphasis to the bowed viola part in EXAMPLE 91a. Both pizzicato and col legno battuto are combined in EXAMPLE 91b. Cross rhythms created between the duple eighths in the violin part

and triplet eighths in the lower two instrumental parts results in an unusual "pattering" effect.

EXAMPLE 91

col legno battuto arco $\text{♩} = 90$

a) (arco!) *P*

col legno battuto arco *pp*

b) 62 pizz.

col legno battuto *p*

col legno battuto *p*

In EXAMPLE 76, measures 28-29 this drumming, brittle sound in a continuous eighth-note rhythm in the lower instruments is pitted against the strident dissonance of major 7th and minor 9th double stops in the violin, played col legno tratto. In measure 30 the lower instruments make a momentary change to bowed tremolo chords, col legno tratto ponticello, followed immediately by sustained chords in syncopated rhythms. This entire passage is one of particular harshness both in dissonance and in timbre.

IV. CONCLUSION

These two works, both written in the twelve-note technique, for the same medium, differ in both melodic and harmonic application of the method. The result is two compositions which differ considerably in melodic style, vertical sound and emotional content. The nineteen years which separate their dates of composition are reflected particularly in the application of the row technique. The strict application of complete rows in Webern's Op. 20 Trio is characteristic of the serial technique in its early stage of development; by the time of Schoenberg's Op. 45 Trio, it had undergone a considerable amount of experimentation and change. The strict rules observed earlier were loosened; both reordered hexachords and the special semi-combinatorial features of Op. 45 are evidence of this fact.

The semitone is an important interval of motivic construction in both works. In Op. 20, the row itself is constructed of paired semitones, whereas in Op. 45 a symmetrical arrangement of semitones occurs within both hexachords. The tritone interval is particularly significant in Op. 45 where it is prominent both melodically and harmonically; in Op. 20 this interval is restricted to vertical structures. The motives of Op. 45, four or more notes in length, are similar in their basic shape; the variation process includes change of octave for specific notes, rhythmic alterations, melodic inversions, variety in mode of playing and changes in transposition

levels. In Op. 20, motives two to four notes in length are not easily identified melodically, due to the constant interchanging of parts and the perpetual variation of material. Motives are identified more readily by their rhythmic rather than their melodic characteristics. Rhythmic variation is accomplished through diminution and rhythmic retrograde; melodic variation includes the octave transfer of one or more notes and inversion as in Op. 45, and the addition of grace notes. Further variation is produced by changing the manner of performance, dynamics and instrumentation.

In both works, the most frequent vertical structures are triads. Six-member chords, produced by double stops being played by all three instruments are called for frequently throughout Part 1, at later climaxes and cadence points of Op. 45; a single instance in Op. 20 is reserved for an important climax point in the development section of movement II. A sampling of triadic types in both works finds equal diversity but unequal frequency. While PMD, MST, PNS, PMN and P2S structures appear with nearly equal frequency in Op. 45, the PDT alone accounts for over 1/3 of the triads in Op. 20. All of the triadic types in Op. 45 except the P2S may be classified in conventional harmony as either a major or minor triad, or an incomplete 7th chord. By contrast, conventional triads (PMN) are totally absent in Op. 20; only the PMD, an incomplete 7th chord, is present. The mild dissonance of this chord may account for its presence at the beginning and end of phrases in both works, although in Op. 20, the more dissonant PDT is used more frequently as a point of departure and return. Of the four-member chords in Op. 20, movement II, the P2MSDT is most frequent at phrase

beginnings and endings. Six-member chords in Op. 45 are usually a verticalization of one hexachord within the set.

Chord progressions in Op. 45 occur as 1) an alternation of two different chord structures, 2) movement away from and return to similar chord structures at the beginning and end of a phrase or, 3) a section in which harmonic movement is suspended. In Op. 20, repetition of a vertical structure is limited to climax points. As in Op. 45, movement from and a return to similar chord structures at the beginning and end of a phrase is characteristic, but the repetition of two or more different structures within a chord succession does not occur. Sections of suspended harmonic movement occur both as a contrast between formal units and as a preparation of an important cadence.

Chromatic voice leading is characteristic of the chord movement in Op. 45; in Op. 20, common tones are sometimes present in successive vertical structures. The most frequent vertical intervals of Op. 45 are P4ths, P5ths, M3rds (m6ths), m3rds, tritones, M7ths and M9ths. Minor 2nds and m7ths are infrequent and both M2nds and M9ths are rare. The sizes of vertical intervals in Op. 20 are equally diverse, although M7ths, P4ths and tritones predominate. In both works, chord members tend to be arranged with symmetrical spacing, similar intervals in the outer voices. Chord members are occasionally doubled in Op. 45, but not in Op. 20. Chord spacing varies in Op. 45, and the use of harmonics presents practically unlimited possibilities. Spacing and tessitura are often combined to achieve a particular dramatic effect: close spacing in the lower register for a dark, dissonant sound, wide spacing at climax points and cadences for expansive sound and wide separation

between sound bodies in homophonic textures for effective contrast.

In Op. 20, spacing changes momentarily with each successive chord formation. Open spacing frequently occurs with compound intervals between either or both outer voices; in four-note chords, the interval of the innermost voices rarely exceeds an octave.

Repeated chords occur in both works, but with different frequency and treatment. In Op. 45, the repetition of vertical structures is often accompanied by a rearrangement of chord members, a transposition of chord members to another octave, rhythmic variation or a change in manner of performance. In Op. 20, repeated chords are limited to two climax points. The suspension of harmonic movement in two sections of movement I is produced by the repetition of note groups in each instrument. This results in sections characterized by harmonic stability in contrast to the constant harmonic movement of the surrounding sections. Harmonic stability preceding the recapitulation in movement II is provided by the pedal point.

Most cadence chords in Op. 45 are triadic: PMN, MST or PDT; cadences in Op. 20 nearly always terminate on a single note, immediately preceded by a dyad. This latter procedure is followed only once in Op. 45, at the final cadence, where the final note is preceded by a triad. When more sound is desired at the cadence point, the number of chord members is increased to four or six in Op. 45 and to four in movement II of Op. 20. In Op. 45, movement in the bass part of a falling perfect 5th interval at or near the cadence is characteristic; on the other hand, in Op. 20, the downward leap of a major 3rd (minor 6th or major 10th) is frequent between the penultimate and final chords. While

neither work may be considered to be centered about a "key", the notes E, Eb and B, Bb are frequently found in the cadence chords of both works.

A variety of textures are present in Op. 45: solos, ensemble unisons, counterpoint, homophony and chordal sections are represented. The number of parts within these textures ranges from one to six, and occasionally to eight. In contrast to this, the texture of Op. 20 is predominantly contrapuntal, with frequent variation between two and three parts. The frequent rests and constant entering and dropping out of instruments within the texture suggests a pointillistic style. Movement II contains both homophonic and chordal textures, the latter occurring as a consequence of rhythmic doubling. While an integrated texture is maintained throughout most of Op. 20, sudden contrasts in texture are characteristic of Op. 45.

Rhythm serves as a means of motivic variation in both works. In Op. 45, rhythmic variation, rhythmic counterpoint between two opposing sound bodies and diminution of note values are combined to sustain forward motion. Webern employs rhythmic doubling and rhythmic diminution to generate tension toward a climax or a "drive to the cadence". Rhythmic complexity in Op. 20 is the result of constant rhythmic variation of each part within a contrapuntal texture. A composite of these rhythms often reveals a rhythmic retrograde in the latter half of a measure.

Op. 45 is a type of one movement sonata form. Phrases constructed from short motives linked together are joined to form the five larger sections. Phrases are well defined, varying in length from one to five measures. Successive phrases and sections frequently reflect a contrast in mood and character. Op. 20 is based on the traditional forms

of the rondo and the sonata, but the smaller divisions within these forms are not easily discernable. The constant overlap of both motives and phrases produces few definitive internal cadences. The result is a phrase structure which is much less distinct than that of Op. 45. Phrase endings are mainly determined by a fluctuation in tempo, i.e. rit---a tempo, a direct change of tempo, the introduction of a new rhythmic motive, or an overall dynamic change. In Op. 20 and Op. 45, separation of phrases and sections is often indicated by a cesura, a barline fermata or a simultaneous rest for the ensemble.

A balance of elements within the overall form may be observed in both works. In Op. 45, the quiet beginning is matched by the quiet ending. The balanced, returning sections of the rondo form in the 1st Episode and the return of important motivic material at the unison climax preceding the recapitulation (Part 3) illustrate that despite the many divergent moods presented, an overall cohesiveness is maintained through repetition of motivic ideas at strategic points. Similarity in the basic shape of the motives ensures unity while, at the same time, their gradual increase in tonal compass and length as the work progresses produces a sense of motivic growth. Throughout Op. 45, dynamic changes are often abrupt and extreme. Tempo and meter changes usually coincide with the beginning of a new phrase or section; sometimes meter changes are interpolated as a means of phrase extension. A wide range of dynamics is also present in Op. 20 but sustained crescendos are restricted to a few climax points; dynamic markings combined with bowing articulations are used as yet another means of motivic variation. Tempo changes in Op. 20 are minimal; Webern relies upon the diminution of note

values to quicken the pace. In general, tempo variations (rit.---a tempo) become more frequent during the latter half of the movement.

A comparison of transposition levels within sections of the sonata form of Op. 45 reveals that most motives and themes return at the same level of transposition in the recapitulation as in the exposition. However, when this is the case, paired hexachord notes are exchanged and inverted, resulting in the inversion of the original motive, played by a different instrument. The more rapid changes in transposition levels during the "development section" correspond to the free modulation process which often takes place during this section in a traditional tonal work. Recurrence of one or more transposition levels may be detected within sections of Op. 45, whereas this characteristic is not evident in Op. 20¹. In movement I of Op. 20, the set substructure follows a pattern determined by the formal outline. In movement II, the set substructure of the recapitulation coincides with that of the exposition up to a point approximately equidistant between theme A and theme B. From this point until the restatement of theme B, transposition levels are a fifth lower, a procedure which may be compared to the transposition of the second theme down a perfect fifth in the recapitulation of a conventional sonata form. The most frequent transposition levels occurring in Op. 45 are the original (0), the 5th below (5), a major or minor third below (8,9) and the tritone (6); interval distance between adjacent levels is most often a major or minor third, or a perfect fifth. In Op. 20, slight preference is shown for transposition

¹However, within the set substructures of these two movements a preference for rows beginning on D# in movement I and G# in movement II may be detected.

levels which lie a distance of either a major third or a major or minor second apart.

Both works are technically and musically demanding. Left hand technical facility is required for long, quick shifting and the ability to produce accurately and clearly both single and double harmonics. Bowing techniques require a mastery of all basic bow strokes, i.e. legato, spiccato, etc. at fast tempos, and the ability to cross strings quickly with the bow. Op. 45 calls for several additional bowing techniques. Both works use the special effects of pizzicato and con sordino.

Some of the major technical problems may be outlined as follows:

1. Melodic leaps

In the performance of these works, the three string players are often required to negotiate large melodic leaps; this necessitates a choice on the part of the performer of: a) a wide stretch between two fingers of the left hand placed on adjacent strings in the same position, b) placement of left hand fingers two strings apart and quickly skipping a string with the bow, or c) shifting quickly up or down on the same string or the adjacent string. The performer should base his choice on both practicality and musical taste.

2. Harmonics

As an aid to the performer, both scores notate in parenthesis the actual pitch of each harmonic. Momentary change in octave for one or more notes by means of a natural or an artificial harmonic is a frequent indication in both trios; it requires rapid adjustment of the

fingers of the left hand together with controlled bow pressure in the right arm. Double harmonics and harmonics performed with special bowing techniques are required in the performance of Op. 45. When performing either work, it is suggested that wherever possible artificial harmonics be produced by playing a stopped note two octaves below the desired pitch, lightly touching a perfect fourth higher.

3. Finger tremolos and glissandos

The fluttering sound produced by left hand finger tremolo is encountered only in Op. 45. Glissandos occur for two brief moments in Op. 20, while in Op. 45, this technique is more fully exploited in upward and downward glissandos, double-stop glissandos and long glissandos which require careful timing by the performers.

4. Pizzicatos

This special effect occurs as single plucked notes in the motivic figures of Op. 20, and as a two-note motivic figure, usually outlining a major seventh or minor ninth interval. Pizzicato is encountered in diverse ways in Op. 45: as a motive, as a variation of a motive, as an arpeggiated melodic figure within a motive and as a harplike accompaniment figure.

5. Mutes (con sordino)

Entire movements or sections of movements in both trios are indicated to be played with mute. The entire first movement of Op. 20 is muted, further adding to its subdued, quiet character. In Op. 45, it lends an added quietness to the tender, legato motives of Part 2 and contributes to the ethereal sound created by the numerous harmonics in the final coda.

6. Bowings

Although there are brief periods of legato playing in Op. 20, the general bowing style is that of short strokes off the string, played either as single notes, spiccato, or as groups of two or more notes in saltando style. The frequent indication of two notes slurred with a dot over the second note requires a lift of the bow after the second note. Brief references are also made to the loure and slurred staccato bowings. The special bowing effect of am steg appears as a manner of motivic variation in movement I; col legno is a bowing effect characteristic of the closing theme in movement II. Additional bowing techniques appear in Op. 45: bowed tremolo, ponticello, flautando, saltando and the special effects of col legno tratto and col legno battuto. Generally, special bowing effects are reserved for motivic variation in Op. 20, and for their unusual sound quality in Op. 45.

Both works make great demands upon the technical facility and the musicianship of all three instrumentalists: a fact which undoubtedly accounts, in part, for their rather infrequent performance. It is suggested that each player perform these works from score in order to gain a better understanding of each part in its relation to the entire ensemble. Differing in style, treatment of texture and emotional impact, each should be recognized for its intrinsic musical value. It is hoped that more frequent performances of these works will be undertaken so that they may be better understood.

APPENDIX A

WEBERN - Trio, Op. 20

First Movement Set Complex¹

P												R
0.	D#	E	Ab	B	D	C#	A	Bb	F	F#	B	C
1.	E	F	A	G#	Eb	D	Bb	B	F#	G	C	C#
2.	F	F#	Bb	A	E	D#	B	C	G	G#	C#	D
3.	F#	G	B	Bb	F	E	C	C#	G#	A	D	D#
4.	G	G#	C	B	Gb	F	C#	D	A	Bb	D#	E
5.	G#	A	C#	C	G	F#	D	Eb	Bb	B	E	F
6.	A	Bb	D	C#	G#	G	Eb	E	B	C	F	F#
7.	A#	B	Eb	D	A	G#	E	F	C	C#	F#	G
8.	B	C	E	D#	Bb	A	F	F#	C#	D	G	G#
9.	C	C#	F	E	B	A#	F#	G	D	Eb	G#	A
10.	C#	D	F#	F	C	B	G	G#	Eb	E	A	Bb
11.	D	Eb	G	F#	C#	C	G#	A	E	F	Bb	B

I												RI
0.	Eb	D	Bb	B	E	F	A	G#	C#	C	G	F#
1.	E	D#	B	C	F	F#	Bb	A	D	C#	G#	G
2.	F	E	C	C#	F#	G	B	A#	Eb	D	A	G#
3.	F#	F	C#	D	G	G#	C	B	E	D#	Bb	A
4.	G	F#	D	Eb	G#	A	C#	C	F	E	B	A#
5.	G#	G	D#	E	A	Bb	D	C#	F#	F	C	B
6.	A	G#	E	F	A#	B	D#	D	G	F#	C#	C
7.	Bb	A	F	F#	B	C	E	D#	G#	G	D	C#
8.	B	A#	F#	G	C	C#	F	E	A	C#	Eb	D
9.	C	B	G	G#	C#	D	F#	F	Bb	A	E	D#
10.	C#	C	G#	A	D	Eb	G	F#	B	A#	F	E
11.	D	C#	A	Bb	Eb	E	G#	G	C	B	Gb	F

¹Based on the R-4 transposition of the manuscript prime set-form.
See analysis by George Pearle, Serial Composition, pp. 125-126.

WEBERN - Trio, Op. 20Second Movement Set Complex²

P												R
0.	Ab	G	D	C#	F#	F	A	Bb	Eb	E	C	B
1.	A	G#	D#	D	G	F#	A#	B	E	F	C#	C
2.	A#	A	E	D#	G#	G	B	C	F	F#	D	C#
3.	B	A#	F	E	A	G#	C	C#	F#	G	D#	D
4.	C	B	F#	F	A#	A	C#	D	G	G#	E	D#
5.	C#	C	G	F#	B	A#	D	D#	G#	A	F	E
6.	D	C#	G#	G	C	B	D#	E	A	A#	F#	F
7.	D#	D	A	G#	C#	C	E	F	A#	B	G	F#
8.	E	D#	A#	A	D	C#	F	F#	B	C	G#	G
9.	F	E	B	A#	D#	D	F#	G	C	C#	A	G#
10.	F#	F	C	B	E	D#	G	G#	D#	D	A#	A
11.	G	F#	C#	C	F	E	G#	A	D	D#	B	A#

I												RI
0.	Ab	A	D	D#	A#	B	G	F#	C#	C	E	F
1.	A	A#	D#	E	B	C	G#	G	D	C#	F	F#
2.	A#	B	E	F	C	C#	A	G#	D#	D	F#	G
3.	B	C	F	F#	C#	D	A#	A	E	D#	G	G#
4.	C	C#	F#	G	D	D#	B	A#	F	E	G#	A
5.	C#	D	G	G#	D#	E	C	B	F#	F	A	A#
6.	D	D#	G#	A	E	F	C#	C	G	F#	A#	B
7.	D#	E	A	A#	F	F#	D	C#	G#	G	B	C
8.	E	F	A#	B	F#	G	D#	D	A	G#	C	C#
9.	F	F#	B	C	G	Ab	E	D#	A#	A	C#	D
10.	F#	G	C	C#	G#	A	F	E	B	A#	D	D#
11.	G	G#	C#	D	A	A#	F#	F	C	B	D#	E

²Prime set-form taken from Wildgans, Webern, p. 139. Twelve-tone rows listed in Wildgans' book are taken from manuscripts.

APPENDIX B

SCHOENBERG - Trio, Op. 45

Set Complex

I

P						
0.	D	Bb	Eb	A	E	C#
1.	Eb	B	E	Bb	F	D
2.	E	C	F	B	F#	D#
3.	F	Db	Gb	C	G	E
4.	F#	D	G	Db	Ab	F
5.	G	Eb	Ab	D	A	F#
6.	G#	E	A	Eb	Bb	G
7.	A	F	Bb	E	B	G#
8.	Bb	Gb	Cb	F	C	A
9.	B	G	C	Bb	Db	Bb
10.	C	Ab	Db	G	D	B
11.	C#	A	D	Ab	Eb	C

II

					R
B	G#	F#	G	F	C
C	A	G	G#	F#	C#
C#	A#	G#	A	G	D
D	B	A	Bb	Ab	Eb
Eb	C	Bb	B	A	E
E	C#	B	C	Bb	F
F	D	C	C#	B	F#
F#	D#	C#	D	C	G
G	E	D	D#	C#	G#
Ab	F	Eb	E	D	A
A	F#	E	F	Eb	Bb
Bb	G	F	F#	E	B

I

0.	G	B	F#	C	F	Ab
1.	Ab	C	G	C#	F#	A
2.	A	C#	G#	D	G	Bb
3.	Bb	D	A	Eb	Ab	B
4.	B	D#	A#	E	A	C
5.	C	E	B	F	Bb	Db
6.	Db	F	C	F#	B	D
7.	D	F#	C#	G	C	Eb
8.	Eb	G	D	G#	C#	E
9.	E	Ab	Eb	A	D	F
10.	F	A	E	A#	D#	F#
11.	Gb	Bb	F	B	E	G

RI

Bb	Db	Eb	D	E	A
B	D	E	Eb	F	Bb
C	Eb	F	E	F#	B
C#	E	F#	F	G	C
D	F	G	Gb	Ab	Db
Eb	Gb	Ab	G	A	D
E	G	A	Ab	Bb	Eb
F	Ab	Bb	A	B	E
F#	A	B	Bb	C	F
G	Bb	C	B	C#	F#
G#	B	C#	C	D	G
A	C	D	Db	Eb	Ab

SCHOENBERG - Trio, Op. 45

III

P						
0.	E	D	A#	A	C#	D#
1.	F	D#	B	A#	D	E
2.	F#	E	C	B	D#	F
3.	G	F	C#	C	E	F#
4.	G#	F#	D	C#	F	G
5.	A	G	D#	D	F#	G#
6.	Bb	G#	E	Eb	G	A
7.	B	A	F	E	G#	Bb
8.	C	A#	F#	F	A	B
9.	C#	B	G	F#	Bb	C
10.	D	C	G#	G	B	C#
11.	Eb	C#	A	G#	C	D

I						
0.	F	G	B	C	Ab	Gb
1.	F#	G#	C	C#	A	G
2.	G	A	C#	D	Bb	G#
3.	G#	Bb	D	Eb	B	A
4.	A	B	Eb	E	C	Bb
5.	Bb	C	E	F	C#	B
6.	B	C#	F	F#	D	C
7.	C	D	F#	G	Eb	C#
8.	C#	Eb	G	G#	E	D
9.	D	E	G#	A	F	Eb
10.	D#	F	A	Bb	F#	E
11.	E	F#	Bb	B	G	F

V

P						
0.	D	D#	A	A#	E	C#
2.	E	F	B	C	F#	D#
8.	Bb	B	F	F#	C	A
I						
0.	G	F#	C	B	F	G#
5.	Cb	B	F	E	Bb	C#
8.	Eb	D	Ab	G	C#	E
11.	F#	F	B	Bb	E	G

IV

						R
F#	F	G#	B	G		C
G	F#	A	C	G#		C#
G#	G	A#	C#	A		D
A	G#	B	D	Bb		Eb
Bb	A	C	D#	B		E
B	Bb	C#	E	C		F
C	B	D	F	C#		F#
C#	C	D#	F#	D		G
D	C#	E	G	Eb		Ab
D#	D	F	G#	E		A
E	D#	F#	A	F		Bb
F	E	G	Bb	F#		B

						RI
D#	E	C#	Bb	D		A
E	F	D	B	D#		Bb
F	F#	Eb	C	E		B
F#	G	E	C#	F		C
G	G#	F	D	F#		C#
G#	A	F#	Eb	G		D
A	Bb	G	E	G#		Eb
Bb	B	Ab	F	A		E
B	C	A	F#	Bb		F
C	C#	Bb	G	B		F#
C#	D	B	Ab	C		G
D	D#	C	A	C#		Ab

VI

						R
F#	G#	B	F	G		C
Ab	Bb	Db	G	A		D
D	E	G	Db	Eb		Ab
D#	C#	A#	E	D		RI
Ab	F#	Eb	A	G		A
B	A	F#	C	Bb		D
D	C	A	Eb	C#		F
						Ab

SCHOENBERG - Trio, Op. 45

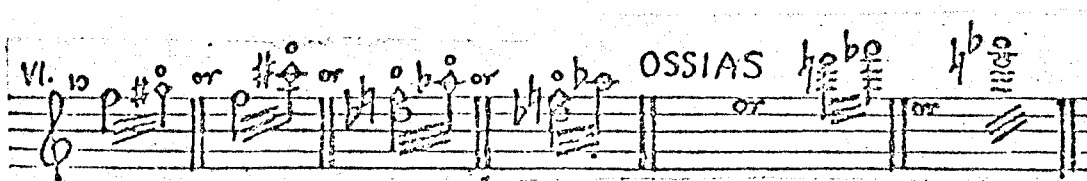
	VII						VIII					
P												R
0.	A	A#	C#	D	E	D#	G#	C	F#	F	B	G
2.	B	C	D#	E	F#	F	Bb	D	Ab	G	C#	A
5.	D	Eb	F#	G	A	Ab	Db	F	B	Bb	E	C
8.	F	F#	A	Bb	C	B	E	Ab	D	Db	G	Eb
I												RI
0.	C	B	G#	G	F	F#	C#	A	D#	E	A#	D
11.	B	Bb	G	F3	E	F	C	Ab	D	Eb	A	C#

APPENDIX C

SCORE ERRORS AND ADDENDA

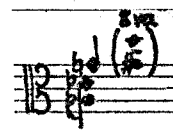
String Trio, op. 45

1. Ossias in original manuscript³ for measures 10-11, violin part:



2. Measure 142 should read 

3. Measure 144, viola part, should read



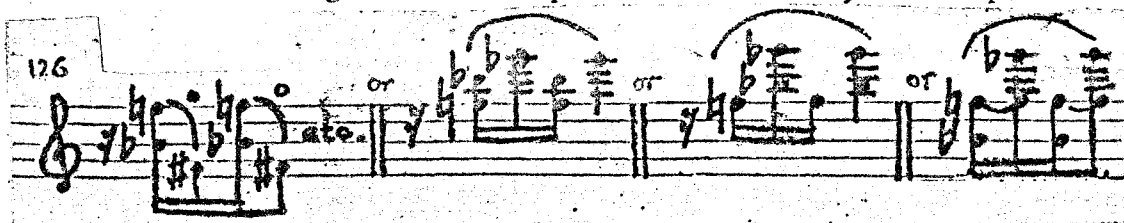
4. Measure 154 (9/8), cello part, should have bass clef beginning with 7th note (E_b).

5. Measure 154, cello part, note 8 should read D₄.

6. Measure 188, viola part, note 9 of canon should read A₄.

7. Measure 281, cello part, should have tenor clef added.

8. Ossias in original manuscript for measure 126, violin part:



9. Measure 12, cello part, final harmonic should be E to conform with the return in measure 214.
10. Measure 171, violin part, third double stop should be D_b, F in accordance with the row.

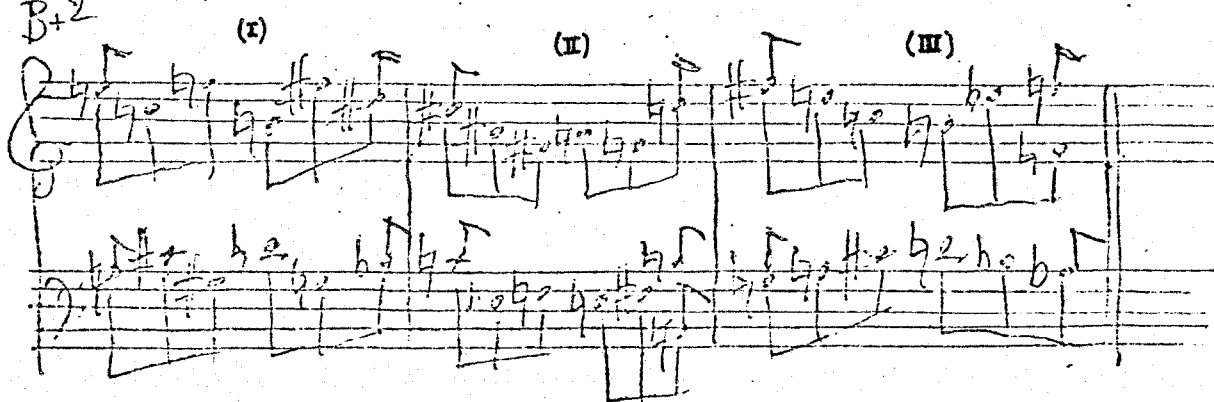
³From a photostat of the original manuscript, courtesy of Mr. Levin.

APPENDIX D

ROW OF STRING TRIO, OP. 45 AS
INDICATED BY THE COMPOSER⁴

3 parts in D

B⁺2



S+3 Acyl F
{ B^b

⁴Exhibited at the Schönberg Gedenkausstellung in Zurich, 1974.
By courtesy of Mr. Levin.

APPENDIX E

CHAMBER MUSIC FOR STRINGS

Arnold Schoenberg

Op. 4	<u>Verklarte Nacht</u> for string sextet	1899	Birnbach, Berlin
Op. 7	<u>String Quartet No. 1</u> in d minor	1904-05	Birnbach, Berlin
Op. 10	<u>String Quartet No. 2</u> in f# minor	1907-08	Universal Edition
	with soprano voice		
Op. 30	<u>String Quartet No. 3</u>	1936	Universal Edition
Op. 37	<u>String Quartet No. 4</u>	1937	G. Schirmer
Op. 45	<u>String Trio</u>	1946	Bomart, N.Y.
Op. 47	<u>Fantasy</u> for violin and piano	1949	Peters

without opus number:

<u>Suite for Strings</u> in G major	1934	G. Schirmer
<u>String Quartet</u> in D major	1897	

Anton Webern

Op. 5	<u>Five Movements for String Quartet</u>	1909	Universal Edition
Op. 7	<u>Four Pieces for Violin and Piano</u>	1910	Universal Edition
Op. 9	<u>Six Bagatelles for String Quartet</u>	1913	Universal Edition
Op. 10	<u>Three Small Pieces for Cello and Piano</u>	1914	Universal Edition
Op. 20	<u>String Trio</u>	1927	Universal Edition
Op. 28	<u>String Quartet</u>	1938	Universal Edition

without opus number:

<u>Langsamer Satz</u> for string quartet	1905	Carl Fischer
<u>Quartet</u>	1905	Carl Fischer
<u>Quartet in a minor</u> , sketches		
<u>Rondo</u> for string quartet		
<u>Minuet and Trio in a minor</u> for string quartet		
<u>Satz fur Streichtrio</u>	1925	Universal Edition
<u>String Trio</u> , sketch	1925	
<u>Quintet</u> for string quartet and piano	1906	Boelke-Bomart
<u>Extensive piece</u> for violin and piano		
<u>Two Pieces</u> for cello and piano	1899	
<u>Sonata</u> for cello and piano	1914	

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