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# THE UNIVERSITY OF OKLAHOMA <br> GRADUATE COLLEGE 

## TWO SONATAS FOR SOLO TUBA AND PIANO

A DISSERTATION
SUBMITTED TO THE GRADUATE FACULTY

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## APPROVED BY



DISSERTATION COMMITTEE

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# TWO SONATAS FOR SOLO TUBA AND PIANO 

## CHAPTER I

## EDUCATIONAL APPLICATION

The purpose of writing two sonatas for solo tuba and piano is two-fold. First, the sonatas are designed to add to the literature for solo tuba. Second, they are designed to be useful as teaching aids for secondary school and col-' lege tuba stwidents.

The first purpose of these sonatas presupposes that the area of tuba literature is in need of additions. As a performer on the instrument, I have become familiar with much of the literature now available for solo tuba and piano. This literature is of high quality but very limited in quantity. This limited quantity often forces the performer to search for arrangements and transcriptions of literature from other instruments. This practice, while exposing the performer to good literature, often does not fully exploit the capabilities of the tuba.

In these sonatas, the widest range of the capabilities of the tuba is exploited. There are heavy ponderous passages, light airy passages, legato and staccato passages.

There are sections requiring the fullest technical abilities of the performer, trills, grace notes, double tongued passages, as well as the greatest flexibility of dynamic range from pianissimo to fortissimo. Both sonatas make use of the muted tuba.

The use of these sonatas as a teaching aid lies in their being an introduction to twentieth century style, technique and sound. They will be very useful in helping develop the analytical abilities of the younger student.

Sonata \#1 is written in a free harmonic framework. This sonata will give a student an introduction to the use of sounds as sonorities unto themselves. The student will learn that sounds do not have to fall within any preset harmonic system.

Sonata \#2 is written using the twelve-tone technique. This sonata will introduce a technique of composition that is peculiar to the twentieth century alone. In his association with these sonatas the student will become familiar with some of the sounds of twentieth century music.

For these sonatas to be used to their greatest advantage, they will have to be used for analytical purposes. The student will gain a much greater insight into the inner construction of these sonatas after a close analysis. In such analysis, the student will become familiar with the theme and variation technique, the ostinato, the fugue and the use of a tone row as a basis for composition. He will
also gain insight into the use of the tuba as a solo instrument, as an accompanying instrument and as an integral part of a contrapuntal texture.

In the preparation of these sonatas for performance, the student will learn the discipline of concentration needed to perform a long work. This will include maintaining a drive throughout each individual movement plus sustaining the interest in the entire sonata as a whole.

Certainly not to be overlooked is the development of the student's technical abilities on the instrument in the preparation of these sonatas.

## CHAPTER II

## SONATA \#1: GENERAL CONSIDERATIONS AND FORMAL ANALYSIS

Sonata \#1 is a freely composed sonata, not restricted by any preset harmonic or melodic designs. It is in three movements: (1) Moderato-- Theme, Variations and Fugue, (2) Lento -- Legato, (3) Andante con Moto-- Ostinato.

The means of holding these three movements together in one sonata is three-fold, one esthetic and two theoretical. One theoretical means is that of satisfying the tradition of movement association. This tradition in a three movement work is a fast movement, a slow movement and a fast movement. This tradition also includes quality of content in these movements, a serious movement, a smooth, lyric second movement and a less serious third movement. These patterns are followed in this sonata.

Another theoretical method of holding these movements together is the use of contrapuntal devices in all three movements. These are the fugue in the first movement, the canon in the second and the canons in the third movement.

The esthetic cohesion of these three movements is the complementary aspects of these movements. This complement is by way of contrast rather than similarity. The strict formal structure of the first movement is in contrast to the slow, unsectioned second movement. The rhythmically driving third movement is in contrast to the slow, less rhythmic second movement.

## Formal Analysis

The formal designs of the three movements of Sonata \#1 are each very different. (See Appendix A.) The first movement is a theme, four variations and fugue. The theme, a twenty-seven measure, wandering melodic line, begins after a two measure introduction and lasts until measure twenty-nine. There is an eight measure interlude leading to variation one. This variation, beginning in measure thirty-nine, combines a $3 / 4$ time signature in the tuba part with a $9 / 8$ time signature in the piano part. The piano accompaniment is arpeggiated throughout. The three measure interlude beginning in measure sixty-five leads to variation two.

Variation two is a sprightly 6/8 alteration of the theme in the tuba, accoupanied chordally by the piano. This variation is followed by an eight measure interlude leading to the next variation.

Variation three is for piano solo, in $3 / 4$ time, consisting of an arpeggiated embellishment of the theme. In
measure 118, the theme is extended four measures before the six measure interlude.

Variation four is in $3 / 2$ time and utilizes the muted tuba. This variation is slower than previous variations. The accompaniment here is a "lilting" chordal accompaniment. There is a four measure cadence formula at the close of this portion of the movement.

The fugue follows with a sudden increase in tempo and dynamics. It is a four voice fugue with the tuba taking the lowest voice. It is divided into three sections, the first of which begins in measure 152. This section is based on the fugue subject in its original form. The second section begins in measure 189 and is based on the subject, inverted. Section three begins in measure 219 and combines the two forms of the subject.

The second movement is a through-composed exposition of melodic ideas. There are no sectional divisions in this movement. There is a change of style for five measures, beginning in measure thirty. The change in style here is an outgrowth of the previous six measures and is the climax of this movement. In measure thirty, the highest point in the tuba line is reached, a $\mathrm{c}^{\prime}$, and from this point to the end there is a continuous lessening of tension and dynamics.

The form of the third movement is a modified rondo form, with a coda. The form is: A B A' Al C Coda. The rondo modification is the displacement of section $C$ to
appear after two hearings of section $A$. The coda is a short cadenza for tuba alone.

The divisions of this movement are made with regard to the melodic structure of the tuba part. Section $A$ has a widely skipping melodic line running to measure twenty-six. Section B, beginning in measure twenty-seven, is characterized by a jerky rhythmic motive at the beginning of the section. This rhythmic motive is the Lombard rhythm.

Section A' begins in measure thirty-seven and is marked by the tuba taking the ostinato pattern. The piano part is a canon based on the opening melodic line. Section $A^{\prime \prime}$ is delineated by the tuba taking the melodic line once again. In this section, the melodic line is rhythmically varied.

Section C begins in measure sixty. This section may be considered as a part of section $A^{\prime \prime}$ but the melodic contours here are different from those in section A". Here, they are mainly scalar and descending. The Coda begins in measure seventy-one and concludes the movement in measure seventy-six.

## SONATA \#1: HARMONIC ANALYSIS

Before the harmonic basis of Sonata \#1 can be meaningfully discussed, it will be necessary to establish a brief background for this analysis. This background will help in clarifying the premise that will be used in the analysis of this sonata.

Even the most amateur musician is familiar with the C major scale and could reproduce it with the correct series of whole and half steps. The construction of this scale is nothing more than a projection of seconds, major and minor, in a very specialized order. This order of major seconds between notes 1 and 2, 2 and 3, 4 and 5, 5 and 6, 6 and 7, and minor seconds between notes 3 and 4 and 7 and 8 , could be projected on any of the notes of the chromatic octave; $C$ major is used only for ease of examples.

This method of projecting the notes of a major scale is not the only method of arriving at the seven notes of a major scale. Another method of achieving these notes is by projecting the interval of a perfect fifth, beginning on $F$ for a C major scale. If this projection is continued for
six notes, a seven note projection will be the result, the seven notes of the $C$ major scale. (See Example 1.)

Example 1.


If the notes of the $C$ major scale are to be used in a musical composition, they will necessarily be rearranged and used in many of the possible relationships to one another.

The traditional harmonic foundation of music written up to the end of the nineteenth century is the use of tertian harmonies, projections of thirds. The most traditional chord, a major chord, is nothing more than a projection of a major third and a minor third. A minor chord is a projection of a minor third and a major third.

Using the $C$ major scale and beginning on the tonic note $C$, this special projection of thirds will give the $C$ major triad, C-E-G. This three note projection, because of its special construction, wili have the familiar tertian sound no matter what the position or spacing of this chord. (See Example 2.)

A continued projection of thirds will not always result in a vertical structure of tertian sounds. If the projection of thirds, using only the notes from the $C$ major scale, is continued twice more, the chord formed will have a
tertian structure when spaced as is the chord of Example 3a. However, this chord, if put into varying positions and spacings, will cease to have the familiar tertian sound, as in Example 3b.

Example 2.


Further projections of thirds will create taller chords and more possibilities of evading tertian sounds. Even when all seven notes of the $C$ major scale are used in a root position projection, tertian sounds are still evident, although this quality will disappear when the chord members are re-arranged. (See Example 4.)

Example 4.


Example 5.


Example 3.
evaded and a new type of projection is created, the simultaneous projection of thirds from two differing root notes. Further, if these notes were to be freely mixed in a single chord structure, the resulting chord will cease to have any sounding tertian origin. (See Example 5.)

Still working with only notes from the $C$ major scale one other possibility of evading tertian effect awaits. This requires adding extra notes to a basic projection. The addition of notes at the intervals of a second and a fourth above the root note will accomplish this task most effectively. (See Example 6.) The addition of a note a sixth above the root note does not evade the tertian effect, since this chord may be confused with a projection of thirds from that note. This chord will be heard as an inverted chord. (See Example 7.)

Example 6.


Once the fullest range of possibilities of the C major scale have been exhausted, it will be necessary to look to other types of added tones for variation in the harmonic vocabulary. If the $C$ major chord is used in conjunction with a D major chord, one new note will be added to the tones already present in the $C$ major scale, the $F$ sharp. (See Example 8.). This type of combined chords can be extended to
the degree that all the notes of the chromatic octave will be possible. As an example of this, if the $C$ major chord has an F sharp major chord superimposed on it, the result will be'a strongly dissonant poly-chord when both chords are. in root position. However, if the notes of these two chords were freely mixed and irregularly spaced, the result will be a sound that is far removed from the poly-chordal origins of these notes. (See Example 9.)


Example 8.


Example 9.

This technique of projecting chords from various roots, adding notes at random from other chords and adding projections from other roots is the basis of the harmonic analysis of Sonata \#1. (See Appendix B.)

## Harmonic Analysis

When this sonata was composed, little attention was paid to the systematic use of the projection of fifths and the variations of these projections. For the most part, the harmonic support of the melodies was improvised at the piano, wịth the aural effect being the primary concern of the harmonies chosen.

In this sonata, the interval of projection is that of a perfect fifth. The addition of notes to the basic projection is by random selection of those notes and the addition of second projections is also at a random selection of the projections. The selection of these additions was determined by the dissonant relationship they had to the basic projection.

First Movement. The first movement is a theme, variations and fugue. The theme is a twenty-seven measure, wandering melodic line that uses all twelve notes of the chromatic scale, although it is not a twelve-tone theme. The jerky characteristic of this theme is due largely to the irregular phrasing and unexpected meter changes within it.

The harmonic foundations for the theme section are based mainly on the use of projected fifths, on varying roots, with the addition of an extra tone or tones. In few measures can a projection from one root note without added tones be found.

The opening measure uses a three-note projection of fifths on $E$ with an added $B$ flat major triad. Measure two is based on a single projection of fifths for seven notes from the root $G$. This chord is one of the few single projections used in this sonata. In measure three the tuba enters with the theme. The harmonic foundation here is a three-note projection on $D$ with an added note $F$ on beats one and two. On beat three, there is a two-note projection
on A flat with an added diminished triad on B. The next measure has three chords; the first, a four-note projection on $F$ with an added two-note projection on A flat; the second, a five-note projection on $D$; the third, a two-note projection on A and a two-note projection on $F$ sharp plus an added note G.

This type of random selection of chord projections, added projections and added notes continues throughout this section. The use of projections is not systematic with regard to the placement of these projections on the staff. In the opening measure, the bass note of the written chord is analyzed as one of the added notes to the basic projection in this measure. In measure two, the bass note is the sixth note of the projection. In measure three, the bass note, in the tuba part, is the added note in the first chord and the bass note in the second chord is the root note of the basic projection. This type of bass note analysis as a random selection of a note from the basic chord projection is typical of this entire sonata.

The distinctive feature of this section of this movement is the spacing of the chords. In the theme section, the chords are, for the most part, widely spaced. This spacing allows for an "open" sound in much of the accompaniment. For much of this section, the top-most interval of the chords used is an open fifth or fourth. Few measures
have intervals less than fourths. Measures seven and nine have thirds as the top interval.

The bottom intervals are not as regular as those on top. The bottom intervals vary from seconds, measure twentyfour, to ninths, measure twenty. The most prominent intervals are thirds, fourths and fifths.

In measures twenty-six to thirty-one, the wide spacing is abandoned in favor of chord clusters, which serve to close this section of the movement.

This is followed by an interlude built on a random selection of notes in arpeggios. These notes were selected for their dissonant relationship to the notes around them. There are no readily recognizable projections used in this interlude.

Variation \#1 is a simple change from the chordal accompaniment in the theme section to an arpeggiated accompaniment. The basis for these arpeggios is the same as that used in the theme section. The chief difference in the use of these chords is the addition of some notes to the arpeggios. These added notes serve a technical function rather than a harmonic one. This function is to facilitate the execution of the arpeggios without unnecessary leaps or awkward passages.

In measure forty-three, the notes $C$ and $B$ are added to the basic structure of the chords found in measure eight. This addition does not change the basic structure of the
projection of fifths in this chord. This type of addition does not alter any of the projections in the measures to come.

Another difference in the use of the chord projections from the theme section is the omission of notes from the chord structure as found in the theme section. In measure thirty-nine, the C and F from the first chord in measure four are not used. This omission does not alter the basic projection of fifths in this measure or in any measures where notes are omitted.

In this variation, slight changes are made in the phrasing and rhythm of the theme. The rhythmic alterations are made in measures thirty-nine, forty-one and forty-nine, where dotted note patterns are substituted for the even note patterns in the theme. The most striking change in rhythmic pattern occurs in measures fifty-nine and sixty. Here, the rhythm is changed to a series of syncopated notes in place of the more regular half note, quarter note pattern from the theme.

The spacing of the highest and lowest notes in the arpeggios is generally the same as in the chords from which they were derived.

Variation \#2 begins in measure sixty-eight, after a three measure interlude of descending arpeggios that completes the first variation. This new variation makes the most radical changes in the theme. It is in $6 / 8$ time and
there is extensive use of auxiliary notes. These auxiliary notes are of two types, neighboring tones and arpeggiated tones. The center passage of the theme, measures sixteen through measure nineteen, is maintained in nearly original form in measures seventy-seven through eighty.

The harmonic foundation for this variation is basically the same as that used in the previous sections of this movement. In this variation, the projections are altered with the addition of extra notes, usually at the interval of a major or minor second to notes in the basic projection. In many instances, both intervals are used. The basic projections used in this variation are three note projections.

The spacing of the chords in this variation is more compact than in the theme section. Also, in this variation, the chords are used in the middle register of the piano rather than the higher register used in the theme section.

In this variation the piano makes more general use of a melodic accompaniment in the form of short sections of free imitation of the melodic line from the tuba part. In measures seventy and seventy-one, the tuba part has a descending arpeggio on beat one, answered by the piano part with a free imitation of this arpeggio on beat two. In measure seventy-seven, for four measures, the piano part has an independant melodic line. The right hand has a pattern of arpeggiated eighth note triplets, while the left hand has
a descending scale of duplets against the triplets. In measure eighty-seven, the piano part makes the last free imitation of the tuba part. Here, the piano imitates the last three notes of the tuba melody in this variation. The interlude that follows is based on melodic fragments already used in the accompaniment of this variation. This interlude concludes this variation with the same type of projections and added notes as found in the variation itself.

The phrasing in variation \#2 is more regular than in the two preceding sections and divides the variation into four, five, four and six measure portions.

The harmonic basis for variation \#3 is somewhat more atonal than that in the rest of this sonata. This section is an arpeggiated variation of the theme for piano solo. These arpeggios were designed with the dissonant relationship of each successive note as the prime factor in their selection. The first portion, measures ninety-five to 104, is a continuous line of arpeggiated notes, with no two notes sounding together. The chief interval used in this portion is the second, major and minor, its inversion to sevenths and its expansion over several a octave span. Intervals of secondary importance are thirds and fourths and their inversions and expansions. In this variation, the use of the consonant intervals of thirds and fourths does not create any feeling of consonance because they are interspersed between the more dissonant intervals of the second and seventh.

The second portion of this variation used the combination of two notes sounding together. Here, as in the first portion, the linear consideration of dissonance is the determining factor in the choice the notes used. Also, the vertical sonorities of the notes that sound together are determined by their dissonant relationships to one another.

Measures 118 to 121 constitute an extension of the theme, in character. This extension serves to conclude this variation more completely, before the interlude begins. The interlude anticipates the accompaniment figure of the next variation.

The manner in which variation \#3 is set, not having the projection of fifths as its harmonic basis, does not stray from the intent of this sonata in style of harmonic content. This variation is included as a point of contrast to the other portions of this movement, first as a piano solo and second as an extension of the harmonic possibilities of variations on this theme. This contrast is made more complete by the harmonic digression towards a more atonal sound.

The accompaniment pattern for variation \#4, anticipated in measures 122 to 127 , marks the return to the projected firth harmonies.

The use of the projected fifths in this variation is more freely treated than in the first sections of this movement. In this variation, there is much more extensive use
of added tones to the basic projections. In measure 128, the basic projection for the first two beats is two two-note projections on $F$ and $A$. To this, the note $A$ flat is added. This particular chord yields two minor seconds in its basic projection. Then, this basic sonority is further enriched by the addition of neighboring tones to notes in the basic chord structure. These neighboring tones, $G$ and $B$, add two more minor seconds and two major seconds to the overall sonority of the first two beats of this measure.

The third beat in this measure is a bit simpler since it consists of only one five-note chord. This chord still maintains the dissonant sonority set up by the first chord. On this beat, there are two two-note projections, on E and A flat, plus an added note G, giving two minor seconds in this chord.

This is the type of projection and added tone chord structure used in this variation. Only once in this entire variation does a single projection of fifths occur. This happens in measure 140, where there is a projection of nine notes on the root $C$. This projection is not fully realized at first but is a composite of the notes from the first one and one-half beats. The last one and one-half beats are also built from this same projection.

All other projections used in this variation are more distorted by the consistent use of added tones at dissonant intervals. The chord spacing in this variation is more
restricted than in the theme section. These chords are not confined to the middle register of the piano, but move about freely, utilizing the upper register to good effect.

This variation used the same general phrasing as set forth in the theme section. However, in this variation, the notes are tongued rather than slurred together, the exceptions being the octave slurs in measures 131, 132, 137, 138, $145,146,147$ and 148. The entire variation is to be played by the muted tuba.

The three measure interlude at the close of this variation concludes this portion of the movement. It does not anticipate the fugue that follows. The harmonic basis of this interlude is a continuation of the same type of projection and added tones as used in the variation itself.

The fugue begins in measure 152 and is based on the first fourteen notes of the theme, rhythmically rearranged to fall into a $3 / 4$ time pattern. These notes are also confined to a one octave range thus creating an easily recognizable, five measure, fugue subject. The countersubject complements the subject with faster moving notes and syncopation.

Since the fugue subject is not tonally oriented, the successive entries of this subject will be referred to as being on a pitch level. The first entry is on pitch level $F$, in the soprano voice, the second entry is on level $C$, in
the tenor voice and the third entry is on level $G$, in the alto voice.

The second entry is varied at the beginning by changing the first two notes to eighth notes, in place of the original quarter notes.

The first three entries of the subject are consecutive with no episodic passages between them. There is a two measure episode at the close of the third statement built on the last four notes of the fugue subject. This motive from the subject is quite important in later development of this fugue and will be referred to as the "episode" motive.

The fourth entry of the subject is for the tuba at level A.flat. The piano has two part counterpoint to this entry based on countersubject material. The final measure of the subject is extended in measures 169 through 172. This leads to an episode on countersubject material with references to the "episode" motive. This continues to measure 177 wilen the subject is heard at level B flat, in the tenor. This statement is treated in stretto at measure 179, at level $F$ sharp, in the alto voice.

At measure 186, a six measure episode begins, based on the "episode" motive. This motive is tossed back and forth between the voices in the piano part. It is extended and distorted to an arpeggiated figure in measure 184. In measure 187, this motive assumes a more recognizable shape and is treated in a three voice stretto.

The subject reappears in measure 189, at level D, in inversion, in the tuba part. This inversion begins both the second section of the fugue as well as the re-exposition of the subject. It next appears in measure 193, at level A, in the soprano voice. The tuba continues with the countersubject, slightly varied in measure 194 to include a dotted eighth and sixteenth note pattern.

The next entry of the inverted subject is in measure 198, in the tenor voice, at level E. This statement is extended in measure 202, leading to a fourteen measure episode.

This episode, based on a variation of the countersubject, contains four false entries of the fugue subject. Two inverted false entries occur in measures 204 and 205, at levels $C$ and $A$, in the alto and soprano voices, respectively. Two false entries of the original subject occur in measures 206 and 207, at levels E flat and B flat, both in the tuba.

From this point to measure 213, the countersubject variation of running sixteenth notes is continued. In measure 213, the "episode" motive enters using the rhythm pattern of the original countersubject. This builds in intensity until the subject re-enters in measure 219.

This entry, in its original form, is in the tuba part at level E flat. It is immediately treated in stretto, in measure 220, by the subject in its inverted form, in the
soprano, at level F. The accompanying counterpoint is based on the "episode" motive and the syncopation from the countersubject. These entries of the subject mark the beginning of the final section of the fogue.

The final entry of the subject is in the tuba part at measure 225, at level C. This statement is in the original form in double augmentation of note values. The accompanying counterpoint is based on the "episode" motive in dimunution.

At measure 229, the accompaniment is varied from sixteenth rest, three sixteenth notes to sixteenth rest, sixteenth note, triplet of sixteenth notes. This is further varied to a sextuplet of sixteenth notes in measure 231. The final entry of the subject is completed in measure 234. The accompanying figure continues to measure 235, when the motion of the sextuplet is slowed to a triplet of eighth notes. This slowing of the motion is continued in measure 236 where the pattern of triplet eighth notes is changed to straight eighth notes. This leads to the cadence measures beginning in measure 237. These measures are based on the "episode" motive in its original form. The movement concludes with the first three notes of the subject being sounded simultaneously.

Second Movement. The second movement is a throughcomposed movement that exploits the legato abilities of the tuba. This movement opens with a series of introductory
chords in the high and middle registers of the piano. These chords set up the kind of sound that will be the basis for this movement. The opening chord is a five-note projection on C with no added tones. This chord is the only chord in this movement utilizing a single projection without added tones. The other chords in this movement are built from two or more projections with added tones. The chord in measure two is two two-note projections on $F$ sharp and $A$, with an added tone, C. This is typical of the types of chords used in this movement.

There are two areas that are a contrast to this type of construction, measure twenty-three and measures thirty-two to thirty-four. In measure twenty-three, the three chords can be analyzed in a traditional tertian manner as, Ab\#\# ${ }^{\text {\# }}$, $b^{b_{M}} 9$, both in first inversion and $\mathrm{E}^{\mathrm{B} 7}$. These chords could be analyzed in the key of A flat major, however, they do not create the feeling of stable tonality because of the manner in which they are used relative to the melodic line of the tuba part.

In measures thirty-two to thirty-four, the main type of chord construction is one of tone clusters. These clusters are not "fist" chords but are chords constructed on major or minor seconds with either thirds or fourths. These chords were designed to create a mass of sound and rhythm that slides from the high register of the piano to the low register, without regard to their structure.

Other sections of the movement where the principle of projected fifths is not easily used are those where there are no chords present in structure or by implication. These sections are built of one line melodies. They are measure fifteen, sixteen and seventeen and the last six measures of the movement.

The phrasing in this movement is mainly in three measure segments. These phrases are sometimes divided between the tuba and the piano and are reliant on melodic lines, rather than on harmonic considerations, for their division.

Third Movement. The third movement is built on a twonote ostinato pattern of a rising minor second. This pattern and variations of it is found in all but four measures of this movement. It is strictly an accompaniment figure, but in section C, it does find its way into the melodic fibre of the tuba part.

The opening melodic line is a wide leaping line making use of the ponderous and heavy capabilities of the tuba. The first portion of the melody is repeated three times, each in different rhythmic patterns. In measure eight, a lighter more lyric line is introduced. This line continues for three more measures when the more widely leaping line is again presented. There is a change back to the more lyric melody in measure eighteen. In measure nineteen, the use of the diminuendo and crescendo in reverse order
from the expected nuance, gives a striking effect. This section closes with the widely spaced melodic line in measure twenty-six.

The simple accompaniment for this opening section consists of parallel octaves on the ostinato pattern. The only exceptions to this occur in measure seven, where the piano part imitates the tuba melody from the measure before, in diminution, in measure nine, where the right hand of the piano part again imitates the tuba melody from the preceding measure and in measures eleven through fourteen, where the accompaniment wanders up and down before coming to rest on the ostinato pattern in measure fifteen.

In measure eighteen, the pattern is altered to a rising minor second followed by a falling minor second. This new pattern is continued with little variation until measure twenty-two, where the interval of a minor ninth is introduced. This new interval is used extensively in section B.

The ostinato pattern is used to create tension in two ways. First, the incessant repetition of this pattern builds tension. Second, this pattern is periodically raised in pitch level. The pattern begins on $G$ sharp-A in measure one. It is changed to $A-B$ flat in measure eight, then to $B-C$ in measure fifteen. In measure twenty, it rises to C-D flat and finally comes to rest on E-F in measure twentythree. In the next three measures, the pattern is freely moved about until it settles on B-C in measure twenty-seven.

Section B, beginning in measure twenty-seven, is characterized by a jerky rhythmic motive in the tuba part. This motive is built on the Lombard rhythm of a sixteenth note followed by a dotted eighth note, the sixteenth note being on the beat. This jerky motive is repeated in measure twenty-nine with some note changes. In measure thirtyone, the rhythm of this motive is altered to triplets and in measure thirty-four, only and representation of the melodic motive can be found. This final variation of this motive is three rising quarter notes at wide interval spacing.

The accompaniment for this section is based solely on the B-C pattern, with inversions and expansions to the intervals of the seventh and ninth. In measure thirty-one, the piano rhythm is altered to coincide with the triplets of the tuba part. The triplet idea is then alternated with the original eighth note pattern up to measure thirty-six. In this measure, the motion of the pattern races foreward in a dynamic climax of sixteenth notes ànd a sextuplet of sixteenth notes. This climax concludes this section.

Section $A^{\prime}$ is marked by the tuba taking the ostinato pattern, at the C-D flat level, in measure thirty-seven. In the next measure, the right hand of the piano takes the opening melody. Tris is answered in canon at the octave two beats later, by the left hand. The canon continues through measure forty-one. A new canon, on the second part of the
opening theme, begins in measure forty-three. This canon is at the octave also, but it is at one beat delay. In measure forty-four, the delay is lessened to one-half beat.

The accompaniment in the tuba is handled very similarly to that of the piano in section $A$ and $B$. In this section, it begins on C-D flat level, then it is raised to C sharp-D, then to $D-E$ flat, then $D$ sharp-E, E-F, F sharp-G, and G-A flat. These changes occur in rapid succession, with only two beats devoted to some of these pitch levels.

By the time the G-A flat level is reached, in measure forty-six, the dynamic level is pianissimo. In measure forty-seven, $G$ sharp-A is played and the piano very discretely enters two octaves higher. In measure forty-eight, A-B flat is reached, the dynamic level is increased and the piano is only one octave higher than the tuba. The A sharp-B level is heard in measure forty-nine and the dynamics are increasing. Finally, the B-C level is reached in measure fifty. The piano is playing one octave higher than the tuba in the right hand and in unison with the tuba in the left hand. The piano takes sole possession of the ostinato pattern in measure fifty-one. The dynamics are swiftly reduced and section $A^{\prime \prime}$ begins.

Section $A^{\prime \prime}$ is very similar to section $A$ in all respects except length. This section is fifteen measures shorter than section $A$, the last fifteen measures of section A having been omitted.

A device similar to that used at the close of section $B$ appears in measure fifty-nine. Here, the accelleration is more rapid and the climax is achieved with a full tremolo before section $C$ begins.

The accompaniment in section $A^{\prime \prime}$ wanders more than in section A. In measure fifty-six, it does stabilize on the E-F level before returning once again to the B-C level for the climactic measures.

Section $C$ is quite short and may easily be included with section A". It has been separated from section A" because of the descending melodic line in the tuba part. This descending line is also found in the accompaniment in measures sixty-one through sixty-three.

With the exceptions in measures sixty-one through sixty-three, the accompaniment is confined to the B-C pattern. This pattern does not alter its rhythm from the steady eighth notes of the original.

The Coda section begins in measure seventy-one and is a cadenza for tuba alone. The melodic line of this cadenza has many minor seconds in it. The piano makes only two interjections into this cadenza, in measure seventy-four and in measure seventy-six. These interjections are a rising major seventh, $C$ to $B$, in the low register on the piano. The movement ends with the tuba sustaining the pitch b with a large crescendo. The piano interjection in this measure serves to signal the release of this note.

## CHAPTER IV

## SONATA \#2: GENERAL CONSIDERATIONS <br> AND FORMAL ANALYSIS

Sonata \#2 is composed on the tone row: A, C, B, F, E, E flat, A flat, G flat, G, D flat, D, B flat. This row is used in all transpositions, inversions and retrogressions. The main feature of this row is the five minor seconds in it. This may be considered six minor seconds if the interval between the last note and the first note is taken as an interval of this row. This interval of the minor second is the predominant interval in the harmonic and melodic substance of this sonata.

The construction of this row was a process of linear association of the tones with special attention paid to the avoidance of triadic sounds between adjacent notes. This eliminated tertian sounds from the strict use of the row. However, through careful selection of the notes from several rows, a G sharp minor triad is created in the first movement, measure thirty-eight. This triad was selected for its special effect in this movement.

In this sonata, continuity of the flow of rows within each movement is achieved by the technique of overlapping one or two notes of successive rows. This technique may be seen in the first measure of the first movement; the last note of the original row number one is overlapped with the first note of original row number seven.

This sonata is in four movements: (1) Pompous--in the style of Hindemith, (2) Rubato--in the style of Stravinsky, (3) Andante--in the style of Ravel, (4) Allegro-Waltzw-in the styles of Bartok and J. Strauss.

In these movements, the styles of the various composers should be used as a guide to the approach to each of these movements. The first movement "in the style of Hindemith" should be interpreted as a dry, almost mechanical approach. The second movement "in the style of Stravinsky" describes the changing time signatures and the static quality of the repeated notes. "In the style of Ravel" is intended to create an impressionistic feeling about this movement. The fourth movement "in the styles of Bartok and J. Strauss" describes the compositional technique of Bartok and the performance practice of the music of J. Strauss. The technique of crossed hands and repeated clusters of notes in the piano part are indicative of Bartok while the method of performing a Strauss waltz is to be used in the Waltz of this sonata.

## Formal Analysis

The form of most of these movements is basically the same: A B A. (See Appendix C.) The form of the first movement is A B C A. The A section runs from the opening measure to measure fourteen. This section is characterized by the strong half note motto in the tuba and the light broken chord accompaniment. The B section, measure fifteen to measure twenty-six, is lighter and more legato in the tuba part. Section C, measure twenty-seven to measure forty-six, is marked by a change in time signature from $6 / 4$ to $2 / 2$. There are two opposing forces in this section, the smoothly moving part and the dotted eighth and sixteenth note rhythmic part. The return to section $A$ is a direct transposition of the opening section up a minor third. The section is also shortened by the omission of three measures, four, five and six. The last two measures, fifty-seven and fifty-eight, are added to complete the cadence and the movement.

The second movement is in A B Al form. The A section is marked Moderato--Rubato and runs from the opening measure to measure nineteen. At this point, the tempo is changed to Allegro--Rubato and section $B$ begins. The only significant change between these two sections is the tempo change. Section $B$ is quite long and ends in measure sixty-six. During this measure, a rest with fermata, the mute is inserted into the tuba and section $A^{\prime}$ is played, muted. This section is shortened from the original section by the omission of five
measures. The last four measures of this movement constitute an extension of ideas from the preceding four measures and round out the cadence for the movement.

Movement three is also in A B A' form. The balance of these sections is more symmetrical than in movement two. The number of measures in each section is fourteen, eleven, thirteen. The fourteen measure $A$ section and the thirteen measure $A^{\prime}$ section are identical since there are two $2 / 4$ measures in section $A$ and one $4 / 4$ measure in section $A$ :.

The B section is characterized by a faster moving melodic line than either of the A sections. This section is divisible into two equal halves in measure twenty, on beat two. These two halves are perfectly symmetrical. There are four $3 / 4$ measures and one $2 / 4$ measure before and after the mid-measure, measure twenty. This middle measure also contains the high point for the solo tuba, the $\mathrm{d}^{\prime}$ on beat two.

The fourth movement is similar in formal structure to the first movement, with the addition of a short coda: A B C A' Coda. The coda is based on elements of section $B$ and, at the cadence, the rhythm of section $A$.

The first A section is characterized by an ostinato pattern in the piano part, supporting a rhythmic melodic line in the tuba part. This rhythm is maintained until section $B$ begins in measure thirty. The characteristic of section $B$ is the sixteenth note tremolo-like pattern in both hands of the piano part. Over this, the tuba has a
legato, slower moving melodic passage. The B section is easily divided into three subsections. The first division is in measure forty-eight and the second in measure sixtysix. Subsection $b$, beginning in measure forty-eight, is marked by a change in voicing from subsection a. Here the piano right hand takes the melodic line and the tuba an accompanying rhythmic pulse. Subsection $c$, measure sixtysix, is a cadenza for tuba alone.

Section C is a Waltz and begins in measure seventyseven. The Waltz is subdivided into three sections at measures ninety-three and 102, with a long solo for piano at measure 110. In this Waltz, the performance technique is to be taken from that of a Strauss Waltz. This is, the chords on beat two of each measure are to be played slightly ahead of the beat. Subsection a is characterized by the piano playing only on beats two and three, while the tuba has the melody. In subsection $b$, the melodic line is given to the right hand of the piano, while the left hand continues with the beats two and three accompaniment. Subsection c is similar to subsection a in melodic voicing, but with no actual melodic connection. The cadence measures are taken from the style of subsection $b$.

Section A' begins in measure 116. It is similar to section A in rhythmic drive and melodic implication only. There is a subsection beginning in measure 133 where the piano takes the rhythmic motive of the tuba part.

The coda begins in measures 143 and 144. This indecision is the outcome of an elision of ideas in these two measures. The final phrase of section $A$ ' continues into measure 144 while the beginning of coda material is found in measure 143.

The coda is built on ideas from the accompaniment of section $B$ and the melodic ideas from the cadenza section at the close of section $B$. The rhythmic motive of sections $A$ and $A$ ' are returned in the last four measures.

## CHAPTER V

## SONATA \#2: HARMONIC ANALYSIS

The harmonic basis for Sonata \#2 is the tone row as shown in Chapter IV. This row is used in all transpositions, all inversions and all retrogressions. In the discussion of this row and its uses, this shorthand will be used to describe which version of the row is being discussed.

O--Original Row<br>I--Inverted Row<br>R--Retrograded Row<br>RI--Retrograde Inverted Row

The numbers that will follow these letters refer to the number of the transposition in question. (See Appendix D.) One other set of letters and numbers will be used; 1P. This indicates what will be called, for purposes of this discussion only, a First Class Permutation. This permutation is the selection of notes from the row in this order: 1, 3, 5, 7, 9; 11, 2, 4, 6, 8, 10, 12. This is the only permutation design used in this sonata. Other variations in the use of the row are random omissions of notes, repetitions of notes and free mixing of notes. The passages where this occurs will be cited as they happen.

First Movement. The first movement begins with a strict statement of 01 , divided between the tuba and piano. Note 10 is omitted, since it is heard as the second note of the next row used, 07. Then 012 is used and RI9. This completes measures one through four. In measure five, in the piano part, RI7 is used in a first class permutation with free mixing and deletion of notes. This was necessitated by the B-D-F chord that would have arisen from a strict use of the row. This chord was not wanted here so the notes were altered to B-C-A flat. The A flat is the last note of this row and the first note of the next row used, I5. From here up to measure thirty-seven the rows are used in strict technique.

In measure thirty-eight there begins a technique of selecting certain notes from the rows and sustaining them as pedal points until these notes form a minor triad, $G$ sharp-B-D sharp. This triad is formed with the ninth note of I3 and notes 1 and 4 from R7. In this mixture, the overlap of the two rows allows note 2 of $R 7$ to equal note 9 of 13 . This triad is then used as a pedal point unto itself. In measure forty it is transposed up one half step to an $A$ minor triad and in measure forty-two up to a $B$ flat minor triad. In measure forty-three it is returned to the $G$ sharp minor triad. In measure forty-four it is finally dissolved and a new row takes over, row 08.

The row selection from here to the end of this movement is a transposition up a minor third of the rows used in the opening section. The harmonic support and melodic line are the same as found in section $A$ with the omission of measures five, six and seven.

Second Movement. The technique used in the second movement is basically the same as that used in the first movement. The rows are used in strict unaltered form. The biggest difference is the use of unaccompanied tuba. Using the tuba alone necessitated the establishment of an harmonic implication through the use of repeated notes from the row, interpolated between successive notes of the row.

The opening measures set up the variation of time signatures and repeated note patterns typical of this movement. The first five measures are built on the repetition of notes 1, 2 and 3 from 07. The next three measures are built on notes 4, 5, 6 and 7. From here to the end of the Moderato section, 07 is used in strict sequence, with RI12 in measures fourteen to nineteen.

Measure twenty begins with a repeated note pattern that sets up the harmonic implication mentioned above. In this measure, notes 7 and 8 of RI12 are played followed by note 9. In measure twenty-one, notes 7 and 8 are played followed by note 9 and notes 7 and 8 are played followed by note 10. In measure twenty-two, notes 7 and 8 are followed
by note 12. Note 11 is omitted from this statement of the row. Notes 7 and 8 are heard last in measure twenty-three.

In measure twenty-four, 01 is introduced, the first three notes of which are omitted to allow notes 4 and 5 to be used in the same manner as notes 7 and 8 of RI12. These notes are one half step lower and set up a short sequence pattern.

This sequence of the two note pattern is used throughout this section. In measure twenty-six, notes 10 and 11 of 01 are used in this pattern. In measure twentyeight, notes 10 and 11 are maintained while RI6 is used as the melody notes. In measure thirty-two, notes 2 and 3 of I8 are used as the repeated note motive. These notes are one half step higher than notes 10 and 11 and serve to build tension. This same pattern is followed throughout this section. In measure thirty-seven, notes 2 and 3 of I4 are used; in measure forty-two notes 8 and 9 are used. These two notes are from 09 and are reversed. In measure forty-six, notes 2 and 3 of 08 are used; in measure forty-nine, notes 7 and 8 of 08 are used with the last three notes of 09. This change from 08 to 09 is for melodic purposes only. In measure fifty-six, notes 4 and 5 of R9 are used; in measure fifty-eight notes 2 and 3 of 01 are used and finally in measure sixty-two, notes 10 and 11 of 01 are used as the last two note pattern in this section.

The return to the Moderato section is a transposition of the opening section up one half step. The row used here is 09. The movement is concluded with the first seven notes of 12 .

Third Movement. Movement three makes use of another type of ostinato technique. This involves the repetition of a two measure arrangement of the first nine notes of a given row. The first pattern used 01 and is repeated four times. Over this repetition, the melodic line is created from the last three notes of 01 and all of 08 .

In measure nine, the ostinato pattern is taken from 05. The melodic line is formed from the last three notes of 05 and all of 010.

The B section makes use of the same notes from the given rows but in a chordal style for the accompaniment. The row used first is 03 , and uses the first nine notes of this row for the accompaniment. The more agitated melody is from the last three notes of 03 and all of 07 . Note 5 is omitted from 07 to avoid a chromatic half step passage in the melody line.

At measure twenty-two, the tuba and piano combine on the accompaniment pattern while the left hand of the piano part has the melody. This melody is similar in style and character to the melody from the tuba part of the previous five measures. This melody is from row 08.

The A' section, beginning in measure twenty-six, makes use of the opening ostinato pattern with the addition of note 10. The row first used in this section is 07. The melody is made from the last three notes of 07 and all of 04.

The ostinato row is changed in measure thirty-one to 05 and note 11 is added to the pattern. The melodic line begins with the last three notes of 05 and 010 in its entirety.

The last five measures show a gradual disintegration of the ostinato pattern in preparation for the end of the movement. This disintegration is by way of stretching and distorting the rhythm of the ostinato through the use of added rests in the pattern.

Fourth Movement. In the fourth and final movement still another type of ostinato is used. This involves the repetition of a minor second at various pitch levels, depending on the row from which the notes are taken.

The movement opens with a Largo measure built on the first five notes of 012. The Allegro follows immediately and is built on R3. Notes 2 and 3 are used as the ostinato interval. The melody is made up of remaining notes of this row. In measure six, 07 is used. Notes 2 and 3 are the ostinato interval and the remaining notes are the melody.

This same technique is followed for the rest of this section. The main consideration in the selection of ensuing rows is that the ostinato be at a higher pitch level than
the preceding one. The level of intensity is increased intentionally by this progressively higher pitch level.

The highest pitch level reached in this section occurs in measure thirty where notes 2 and 3 of 01 are used. Here the ostinato pattern is changed to a tremolo-like figure on the intervals of a major seventh or a minor ninth, in both hands of the piano part. The notes for this new pattern are taken from notes 2 and 3 , and 4 and 5 of the rows used. Since all rows have minor seconds between notes 2 and 3 , and 4 and 5, these intervals of this new pattern will always be the desired intervals, sevenths or ninths. The melody in this section is created from the remaining notes of the rows used.

Here, as in the first section, the consideration made in the selection of rows is that the ostinato pattern be at a higher pitch level. This pattern reaches its highest level in measure fifty-three, using notes 2 and 3 of R9. At this point only the left hand of the piano part has the tremolo pattern. The tuba has a representation of this pattern and the right hand of the piano part has the melodic line. As before, the melodic line is taken from the remaining notes of the row used here.

In measure fifty-nine the pattern is changed to lesson the tension. Here, the ostinato notes are taken from notes 11 and 12 from 03. This interval, now a minor sixth, lessens the tension by implying a tertian sound. The
tension is then increased again in measures sixty-one to sixty-three by the utilization of intervals of a minor seventh and a major seventh.

Then, a section for solo tuba follows with interjections from the piano, reminiscent of the ostinato.

In the Waltz that follows, permutations of the row are used for the melody line and mixed permutations for the accompaniment. The type of permutation used is the First Class Permutation described above. The first row used in this manner is 08, hereafter designated 1 PO8.

The melodic line through this section consists of notes 1, 3, 5, 7, 9 and 11, only. The accompaniment uses notes $2,4,6,8,10$ and 12 , only.

In the construction of this row, no thought was given to the use of permutations as a factor determining the order of notes. Thereby, one important consequence presented itself. This is; notes 8,10 and 12 and notes 1,3 and 5 of original rows and retrograded rows, respectively, form major triads and notes 1, 3, and 5 of inverted retrograded rows and notes 8,10 and 12 of inverted rows form minor triads. The chords formed with these notes were not the type of chords wanted in this passage. A method was then devised of altering the sounding chord to coincide with the typical sounds of this sonata. To do this, the notes for the accompaniment, $2,4,6,8,10$ and 12 , were freely mixed
so that the desired dissonance was achieved. This free mixing is different each time to avoid monotony.

It is not felt that this technique is a complete disregard of the twelve-tone technique but a justifiable manipulation of the twelve tones in such a way as to make reasonable sense and create a pleasing musical effect.

The tuba takes the melody in measure seventy-seven accompanied by the piano on a pattern of chords on beats two and three. In measure ninety-three, the right hand of the piano part takes the melody while the left hand continues with the accompaniment. The procedures for melodic construction followed here are the same as those followed for the tuba. The tuba reenters in measure 102, following these same procedures.

In measure 116, the style of section A returns to the tuba part. The piano part does not enter with the ostinato pattern until measure one-hundred and twenty. As before, the ostinato interval is taken from the second and third notes of the row used; here row $R 4$ is used. The same type of increase in tension is used here as was described in section $A$.

In measure 143, the tremolo-like pattern is used again, in support of melodic elements from the cadenza at the close of section $B$. The notes in the tremolo pattern are taken from notes 2 and 3, and 4 and 5 of row 08.

The last four measures use the notes from the first three measures of the movement, in retrograde and with the rhythm of section $A$. These notes are the notes 7, 8, and 9 from 03 and notes $8,9,10,11$ and 12 of row R12. The movement ends on the note on which it began, an A flat.

## APPENDIX A

SONATA \#1: FORMAL SCHEME

First Movement--Moderato--Theme, Variations and Fugue


Second Movement--Lento--Legato
Through-composed

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| :---: | :---: | :---: | :---: |
| 1 | 24 | 30 | 42 |

Third Movement--Andante con Moto--Ostinato


## APPENDIX B

Sonata \#1: Harmonic Projections
First Movement:
Theme


ए: Chord Structure
d : Melodic Notes
$\bigcup:$ Melodic section without chordal accompaniment.

49



Variation \#1: Chord structure essentially the same
as in the Theme Section.
Variation \#2



Variation \#3. The basic structure of this variation is other than that of projected fifths. This structure did not lend itself to the present harmonic display and description.
Variation \#4.



The remainder of this movement is a fugue. This
fugue is fully described in the text beginning on page twenty-one.

## Second Movement




The third movement is described in the text, beginning on page twenty-six.

## APPENDIX C

SONATA \#2: FORMAL SCHEME

First Movement--Pompous--in the style of Hindemith


Second Movement--Rubato--in the style of Stravinsky


Third Movement--Andante--in the style of Ravel


Fourth Movement--Allegro--in the styles of Bartok and J. Strauss


| Section A: | Coda |  |
| :--- | :--- | :--- | :--- |
| 143 | $-\sqrt{144}$ | 161 |

## APPENDIX D

$\begin{array}{llllllllllll}1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12\end{array}$

1. $\begin{array}{lllllllllllll}\mathrm{A} & \mathrm{C} & \mathrm{B} & \mathrm{F} & \mathrm{E} & \mathrm{Eb} & \mathrm{Ab} & \mathrm{Gb} & \mathrm{G} & \mathrm{Db} & \mathrm{D} & \mathrm{Bb} & 12\end{array}$
2. $\mathrm{F} \# \mathrm{~A} \quad \mathrm{Ab} \quad \mathrm{D} \quad \mathrm{Db} \quad \mathrm{C} \quad \mathrm{F} \quad \mathrm{Eb} \quad \mathrm{E} \quad \mathrm{Bb} \quad \mathrm{B} \quad \mathrm{G} 11$
3. $\mathrm{G} \quad \mathrm{Bb} \quad \mathrm{A} \quad \mathrm{Eb} \quad \mathrm{D} \quad \mathrm{Db} \quad \mathrm{Gb} \quad \mathrm{E} \quad \mathrm{F} \quad \mathrm{B} \quad \mathrm{C} \quad \mathrm{Ab} 10$

4. $\begin{array}{lllllllllllll}\mathrm{D} & \mathrm{F} & \mathrm{E} & \mathrm{Bb} & \mathrm{A} & \mathrm{Ab} & \mathrm{Db} & \mathrm{B} & \mathrm{C} & \mathrm{Gb} & \mathrm{G} & \mathrm{Eb} & 8\end{array}$
5. $\begin{array}{lllllllllllll}\mathrm{Eb} & \mathrm{Gb} & \mathrm{F} & \mathrm{B} & \mathrm{Bb} & \mathrm{A} & \mathrm{D} & \mathrm{C} & \mathrm{Db} & \mathrm{G} & \mathrm{Ab} & \mathrm{E} & 7\end{array}$
6. $\mathrm{Bb} \quad \mathrm{Db} \quad \mathrm{C} \quad \mathrm{F} \# \mathrm{~F} \quad \mathrm{E} \quad \mathrm{A} \quad \mathrm{G} \quad \mathrm{Ab} \quad \mathrm{D}$ Eb $\mathrm{B} \quad 6$
7. $\begin{array}{lllllllllllll}\mathrm{C} & \mathrm{Eb} & \mathrm{D} & \mathrm{Ab} & \mathrm{G} & \mathrm{Gb} & \mathrm{B} & \mathrm{A} & \mathrm{Bb} & \mathrm{E} & \mathrm{F} & \mathrm{Db} & 5\end{array}$
8. $\mathrm{B} \quad \mathrm{D} \quad \mathrm{Db} \quad \mathrm{G} \quad \mathrm{F} \# \mathrm{~F} \quad \mathrm{Bb} \quad \mathrm{Ab} \quad \mathrm{A} \quad \mathrm{Eb} \quad \mathrm{E} \quad \mathrm{C} \quad 4$
9. $\begin{array}{llllllllllllll}\mathrm{F} & \mathrm{Ab} & \mathrm{G} & \mathrm{Db} & \mathrm{C} & \mathrm{B} & \mathrm{E} & \mathrm{D} & \mathrm{Eb} & \mathrm{A} & \mathrm{Bb} & \mathrm{Gb} & 3\end{array}$
10. E G F\# C $\quad \mathrm{B} \quad \mathrm{Bb} \quad \mathrm{Eb} \quad \mathrm{Db} \quad \mathrm{D} \quad \mathrm{Ab} \quad \mathrm{A} \quad \mathrm{F} \quad 2$
11. $\mathrm{G} \# \mathrm{~B} \quad \mathrm{Bb} \quad \mathrm{E} \quad \mathrm{Eb} \quad \mathrm{D} \quad \mathrm{G} \quad \mathrm{F} \quad \mathrm{F} \# \mathrm{C} \quad \mathrm{Db} \quad \mathrm{A} \quad 1$
$\begin{array}{llllllllllll}12 & 11 & 10 & 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1\end{array}$
Original rows are read from left to right.
Inverted rows are read from top to bottom.
Retrograde rows are read from right to left.
Retrograde Inversions are read from bottom to top.
Numbering of the notes of each row corresponds to the numbers at the edge of the square, read in the same direction as the row in question is read.


A DISSERTATION
SUBMITTED TO The GRaduate Faculty


THE UNIVERSITY OF OKLAHOMA GRADUATE COLLEGE

TWO SONATAS FOR SOLO TUBA AND PIANO VOLUME II

A DISSERTATION SUBMITTED TO THE GRADUATE FACULTY


So nata \#1




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Andante $d=50$


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## $90$







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