AN EXPLORATION OF BARTÓK'S FUGAL STYLE

THESIS

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CHAPTER I

INTRODUCTION

Fugues have been written by many composers during the past four centuries. Because fugue has survived despite changes in musical styles and developments of new musical languages, a study of any composer's fugues sheds light on the nature of his musical language and shows to what degree he has preserved and departed from the traditions and practices of earlier times. The fugue of the common practice period, with its emphasis on the tonic-dominant relationship, seeks to illustrate the epitomy of the major-minor tonal system. Twentieth-century composers who use fugue modify it to suit the variety of formal structures and tonal (or other) idioms that they use.

This paper will discuss the fugues of Bartók's mature period, 1907-1937. His music has its roots in the classical major-minor tonal system, but the tonal language of his mature period represents an extension and a modification of it. For instance, he places more emphasis on the development of the material than on the simple statement or restatement of themes. He also manifests a fascination with palindromic form, a procedure hardly found in earlier classical models. Finally, whereas the fugues of the composers in the common practice period develop and transform ideas in an additive manner, Bartok's use varies between processes of integrated development and fragmentation. In his expositions, countersubjects are derived from subjects and with them form integral units. Later in the fugue, however, Bartók may fragment or truncate both subject and countersubject and use both as motives in development passages.

A composer's own insight into his compositional technique provides us with many valid guidelines for analysis. Bartók, however, rarely talked about his own music. Instead, his writings were generally concerned with folk music. John Vinton observes that Bartok's remarks on his own music "are basically the informal thinking of a composer rather than the systematic analysis of a scholar."[1] Aside from discussing melody and rhythm, Vinton's study presents Bartók's general conception of tonality, of polymodal chromaticism, and of harmonic practices such as the building of chords in fourths, the use of the tritone, and the minor seventh treated as a consonant interval. One of the most revealing statements that Bartók made concerning his music is this: "I never created new theories in advance; I hated such ideas."[2] To show the composer's treatment of fugue, however, not only his remarks, but theories of Bartók's harmony and form that have been developed by several authors, including Ernő Lendvai and János Kárpáti, prove useful.

The Hungarian scholar Ernő Lendvai is credited with making one of the most comprehensive analyses of Bartók's music. His book remains an important reference work for various aspects of Bartok's tonal and

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[1]John Vinton, "Bartók on His Own Music," Journal of the American Musicological Society, XIX/2 (1966), 232.

[2]Ibid.

formal organization.[3] Essential to Lendvai's concept of the composer's music is an understanding of the use of the Golden Section ratio to determine form, which will be explained in Chapter II. Lendvai also distinguishes between a diatonic and a chromatic system of tonal organization and finally relates the tonal and formal principles to each other.

Another Hungarian scholar, János Kárpáti, does not rely on Lendvai's interpretation to analyze Bartók's music. Kárpáti's work on Bartók's string quartets provides an in-depth analysis of the musical structure.[4] He incorporates some of Lendvai's ideas but uses them from a different viewpoint. For example, an important difference between Kárpáti and Lendvai is their explanation of key relationships. Lendvai's explanation of Bartók's tonality rests on the axis system. The axis system is based on a three-fold division of the circle of fifths into tonic, dominant, and subdominant axes. In this system, the two tones of the tritone are viewed as being closely related. Kárpáti, however, believes that the tritone is an example of "mistuning." According to his theory of mistuning, certain notes within a melodic pattern have been deliberately altered by Bartók to achieve the composer's intended effect, a distortion of the major-minor system framework. Lendvai stresses the importance of the tritone because it is an important interval in his axis system and considers it essential to Bartók's tonal

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[3] Ernő Lendvai, Béla Bartók: An Analysis of His Music (London: Kahn and Averill, 1971).

[4] János Kárpáti, Bartók's String Quartets, trans. Fred Macnicol (Budapest: Corvina Press, 1975).

idiom. Kárpáti also concedes this importance but prefers to explain the tritone as an altered perfect fourth or fifth and views it as a distortion of the tonal framework.

Other writings, in addition to those of Lendvai and Kárpáti and remarks made by Bartók himself, give fewer clues to Bartók's musical technique. Milton Babbitt explores the basic features of Bartók's string quartets, especially with regard to form.[5] Humphrey Searle devotes a chapter to Bartók but gives the erroneous impression that "a free use of chromaticism" is the best description of the composer's contrapuntal technique.[6] Robin Hawthorne gives a cursory analysis based on Bartók's fugal style as being in the "Beethoven tradition."[7] Because there is no one way of viewing Bartók's music, this paper will use a combination of approaches to explain the results Bartók achieves.

Works that do not deal exclusively with Bartók's music include the studies by Donald Chittum and William L. Graves, Jr.[8] Chittum's article contains a cellular analysis of Bartók's _Music for Strings, Percussion and Celesta_, while Graves' book shows the wide variety that exists in the treatment of twentieth-century fugue and quotes a few examples from

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[5]Milton Babbitt, "The String Quartets of Béla Bartók," _The Musical Quarterly_, XXXV (1949), 377-385.

[6]Humphrey Searle, _Twentieth Century Counterpoint_ (London: Williams and Norgate, 1954), pp. 44-54.

[7]Robin Hawthorne, "The Fugal Technique of Béla Bartók," _The Music Review_, X (November, 1949), 277-285.

[8]Donald Chittum, "The Synthesis of Materials and Devices in Non-serial Counterpoint," _The Music Review_, XXXI (1970), 130-135; William L. Graves, Jr., _Twentieth Century Fugue: A Handbook_ (Washington, D.C.: The Catholic University of America Press, 1962).

Bartók's music. Graves succeeds in showing that twentieth-century fugal style depends on the individuality of the composer who uses it.

Although there is no single approach to fugue that explains this idiom throughout music history, there does exist a generally acceptable approach to tonality. For this, Bruno Nettl's theory of tonal center is indispensable. He gives an ethnomusicological approach to identify tonal centers and to determine the hierarchical importance of tones in a piece.[9] Three primary criteria are frequency of appearance, duration, and initial or final position in the phrase. Four other criteria are listed. These criteria, when applied in combination, usually clarify the tonal center. Of course, in ambiguous cases, the ear must make the final decision.

Chapter II of this paper presents a closer study of the above sources, giving special attention to the writings of Lendvai, Kárpáti, and Bartók himself. There, the terminology related to the various theories is also defined. Other sources are cited to support or to refute particular aspects of the arguments of these authors.

Chapter III provides analyses of five selected fugues from the first, third, and fifth string quartets, the first-movement fugue of the Music for Strings, Percussion and Celesta, and the fugue in the first movement of the Sonata for Two Pianos and Percussion. Special attention is given to the tonal and formal organization of the musical material, and further clarification of terminology is given where appropriate. Analysis is confined to tonal and formal structure, in light of the theories and ideas presented in Chapter II.

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[9] Bruno Nettl, Theory and Method in Ethnomusicology (London: Collier-Macmillan, 1964), p. 147.

Rhythm is beyond the scope of this study, but some reference will be made to it when describing folk music influence and when its role is necessary to the explication of tonal organization; for example, agogic prominence plays a role in determining the tonal center of a phrase or musical passage.

The final chapter proposes to trace an evolution in Bartók's fugal style based on the seemingly increasing intricacy of the tonal organization from String Quartet I (1907) to the Sonata for Two Pianos and Percussion (1937). These five fugues were selected because they are all from Bartók's mature period; therefore, they provide an overall general picture of the development of Bartók's fugal style.

CHAPTER II

THE STRUCTURE OF BARTÓK'S MUSIC

Bartók's writings deal primarily with Eastern European folk music. Although he did not comment much about his own art music, an important source that reflects his thoughts is found in John Vinton's article "Bartók on His Own Music."[1] Based on material from the Béla Bartók archives in New York, some of the information it provides can help us in our study of the structure of Bartók's music.

Bartók claims never to have had a set of theoretical principles from which to compose his music. He stated the following in a lecture he prepared during 1942-1943:

> I never created new theories in advance; I hated such ideas. I had, of course, a very definite feeling about certain directions I wanted to take, but at the time of the work I did not care about what designations would apply to those directions, what sources they came from. This doesn't mean...composing without...plans and without sufficient control. The plans were concerned with the spirit of the new work and with technical problems--for instance, formal structure as required by the spirit of the work--all this more or less instinctively felt; but I was never concerned with general theories to be applied to the works I was going to write.[2]

Bartók also states that his music was influenced basically by two factors: "first, by a thorough knowledge of the devices of old and contemporary Western art music (for the technique of composition); and second by this newly discovered musical rural material of incomparable

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[1]John Vinton, "Bartók on His Own Music," Journal of the American Musicological Society, XIX/2 (1966), 232-243.

[2]Ibid.

beauty and perfection (this for the spirit of our works to be created)."[3] The influence of this "rural" material was tonal, melodic, rhythmic, and structural. These categories are similar to those that Vinton chooses for the organization of his article: melodic economy, melodic and rhythmic variability, tonality and modality, harmonic mannerisms, and the use of percussion instruments. Following is a brief summary of those aspects relevant to this thesis.

The melodic economy found in Bartók's music is due to his admiration of folk melody. Its simplicity and ability to express a musical thought in its most finished form impressed him because such melodies, he felt, had no nonessential elements. Vinton considered the Bagatelles (1908) for piano to contain examples of this terse melodic style.

Melodic variability in Bartók's compositional technique also stems from his study of folk music. The variation of pitch and rhythm found in both instrumental and vocal folk music gave way to his device of "extension in range" of a theme. The choice of any scale or mode applied to a theme can change its character a great deal--sometimes to such an extent that its final form is barely recognizable from the original. Unity and variety are preserved by the hidden relationship between the forms; Bartók considers this procedure to be no more "artificial" than diminution or augmentation. Even chromatic melodies can be "extended" into diatonic melodies.

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[3] Ibid., p. 233.

In his discussion of tonality and modality Bartók reveals that he always considered both folk music and his own music to be tonal. He rejected the terms atonality and polytonality. His explanation for this is based on the physical law of the overtone series.

> When we hear a single tone, we will interpret it subconsciously as a fundamental tone. When we hear a following different tone, we will--again subconsciously--project it on the first tone (felt as being the fundamental one) and interpret it according to its relation to the latter. In a so-called atonal work, one selects now this, now another tone as a fundamental one, and projects all other happenings of the piece onto these selected fundamentals. The same phenomenon appears when dealing with so-called polytonal music.[4]

Polymodality, however, is a term acceptable to Bartók, the simplest example being the "simultaneous use of major and minor third" of a diatonic scale. Bartók took this technique a step further to what he called "polymodal chromaticism." He describes this procedure as follows:

> As the result of superimposing a lydian and a phrygian pentachord with a common fundamental tone, we get a diatonic pentachord filled out with all the possible flattened and sharpened degrees...the flat and sharp tones are not altered degrees at all; they are diatonic ingredients of a diatonic modal scale.[5]

The same technique described above can be done with any two diatonic modes. Polymodal chromaticism is discussed more thoroughly later.

Vinton gives three harmonic mannerisms that characterize Bartók's music: the use of the minor seventh as a consonant interval, the building of chords in fourths, and the use of the tritone. The idea of the minor seventh used as a consonant interval comes from the structure of the pentatonic scale, which appears below.

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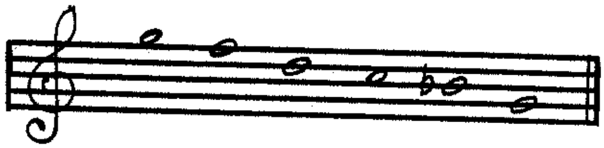
[4] Ibid., pp. 237-238.

[5] Ibid., p. 239.



Example 1. Pentatonic scale.

In folk melodies using this scale, "the third, fifth and seventh are of equal rank and importance."[6] The resolution of the seventh to the sixth cannot occur because the sixth is missing. The frequent skip of a fourth in these melodies led to the construction of the quartal chord, consisting of two or more perfect fourths. The use of the tritone stems from its presence in Roumanian and Slovakian folksong.[7] The combination of the tritone with the perfect fourth results in chords such as G - C# - F#.

The scarcity of information about Bartók's own views regarding his music leaves the opportunity for further analysis. We shall now focus on tonal and formal aspects. Ernő Lendvai, János Kárpáti, Bruno Nettl, and Milton Babbitt have contributed many insights into these areas, and it would be well to summarize them at this point.

Basic Tonal Principles

Lendvai's Axis System

Ernő Lendvai explains tonal principles through the axis system.[8] He claims that the axis system "grew out of functional music," and that

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[6] Ibid., p. 241. [7] Ibid., p. 242.

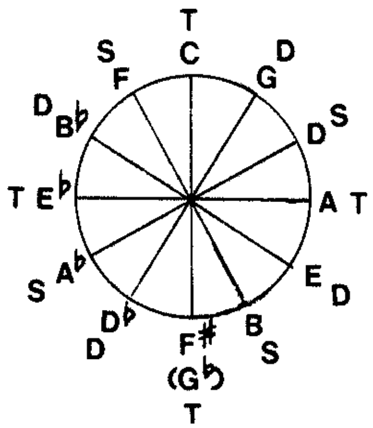
[8] Ernő Lendvai, Béla Bartók: An Analysis of His Music (London: Kahn and Averill, 1971), p. 1.

it comes down to us through "the harmonies of Viennese classicism and the tone world of romanticism."[9] Although Bartók did not admit specifically to following either this or any other theoretical system, Lendvai finds, nevertheless, that an axis principle seems to explain certain aspects of Bartók's music rather well.

Lendvai's axis system is based on six principles, which he outlines in his book:

a) the functional affinities of the fourth and fifth degrees
b) the relationship of relative major and minor keys
c) the overtone relations
d) the role of leading notes
e) the opposite tension of dominant and subdominant
f) the duality of tonal and distance principles.[10]

The circle of fifths plays an important role in the creation of the axis system. If any three adjacent consecutive pitches in the circle, such as F, C, and G, are respectively assigned the functions subdominant (S), tonic (T), and dominant (D), and if the S, T, and D functions are likewise assigned to successive adjacent pitches, the following circle of fifths results.[11]



Example 2. Circle of fifths.

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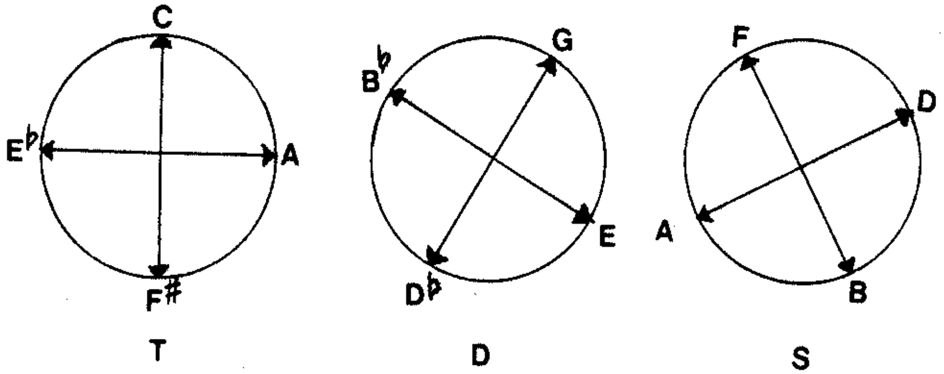
[9] Ibid., p. 1. [10] Ibid. [11] Ibid., p. 2.

The pattern S, T, D recurs four times. When all S's are connected, and likewise all T's and D's are connected, the entire circle of fifths is divided into tonic, dominant, or subdominant axes.[12]



Example 3. The tonic, dominant, and subdominant axes.

Each tone in a given axis may be considered to be a "fundamental" of a chord or the tonic of a key center. Lendvai cautions that:

> ...the particular axes should not be considered as chords of the diminished seventh, but as the functional relationships of four different tonalities, which may best be compared to the major-minor relations of classical music (e.g. C major and A minor, E^b major and C minor).[13]

Tones on opposite ends of each axis act as pole and counterpole with respect to each other (see example 3). If the tonic axis is based on C, the principal branch of the axis consists of C and F#, where C is the pole and F# the counterpole. Likewise, the secondary branch, or E^b and A, exhibits a similar pole-counterpole relationship. "A pole is always interchangeable with its counterpole without any change in its function."[14]

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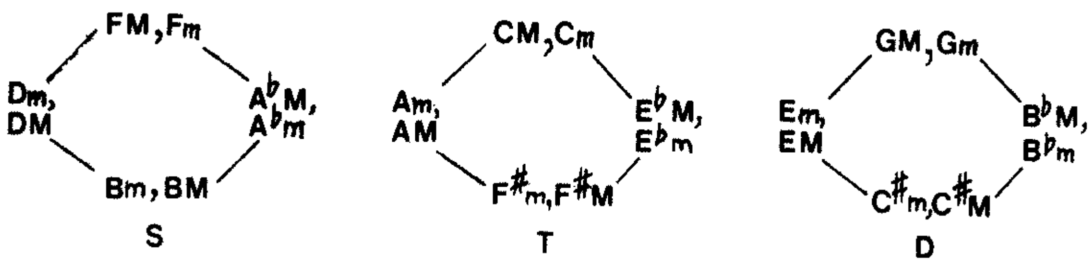
[12] Ibid., p. 3.

[13] Ibid.

[14] Ibid., p. 4.

As a result, keys that are a tritone away are considered to be closely related or equivalent, not distantly related as they had been in the music of the previous centuries.

"The birth of the axis system was a historical necessity, representing the logical continuation (and in a certain sense the completion) of European functional music."[15] The repetition of the tonic-dominant-subdominant function labeling around the entire circle of fifths is one way of arriving at the axis system. Each axis can also be formed independently. Lendvai illustrates this by means of related keys. For example, the following keys are related to each other in either the major or minor mode.



Example 4. Related keys arranged in the axis system (M = major mode, m = minor mode).

Those keys connected by a line have the same key signature or the enharmonically equivalent key signature. This "logical continuation" can be thought of as beginning with the major key and its relative minor (C major and A minor) in the early common practice period, with the addition

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[15] Ibid., p. 8.

of the upper third (E^b major, arrived at by changing the mode of C to minor in this case) in the Romantic period, and finally continuing the process to complete each circle. Disregarding the change of mode yields the three axes. Frequently, in Bartók's music, the mode may be mixed as in the major-minor chord below.[16]

Example 5. C major-minor chord.

Next, Lendvai draws upon the overtone series to further justify his axis system: "...all cadential relations rest on the principle of interconnection between roots and their overtones."[17] This method of determining functional affinity between tones yields E and B^b as well as G as the dominants of C, simply because they are the nearest overtones. These overtones also form part of the dominant axis, but C# is on this axis also and cannot be so easily explained by using the overtone series. Furthermore, in the traditional sense, few would agree with the interpretation of B^b as a dominant of C.

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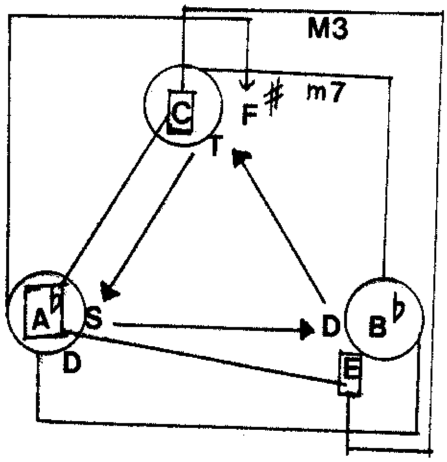
[16] Ibid., p. 9.

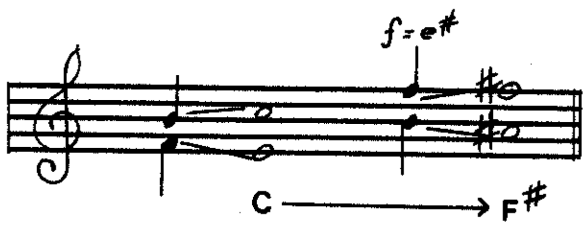
[17] Ibid., p. 10.



Example 6. The major third and minor seventh as dominants.

Adding the nearest overtone again produces the axis system.[18]

The role of leading notes in the diatonic scale can illuminate the meaning of the pole-counterpole relationship. For example, the two leading notes that provide the pull in a V^7 - I cadence in the key of C are B and F. If the tritone relationship between these tones is inverted, the pull will be to F#, thus exemplifying some relationship between C and F#. To clarify this, the following illustrates that the tritone in a diatonic scale can pull to either direction.[19]



Example 7. Resolution of the tritone in opposite directions.

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[18] Ibid., p. 11.

[19] Ibid., p. 12.

The first tritone resolves to the pole C; the second resolves to its counterpole, F#. According to Lendvai, the pole and its counterpole are interchangeable. To show that the function of F# is still that of tonic, he presents the following arguments.

Considering C as the tonic, an upward perfect fifth movement from it produces G, the dominant. A downward perfect fifth movement from C produces F, the subdominant. In Lendvai's view, the G and the F represent two different functions. But if the movement from the tonic C in either direction is that of a tritone instead of a perfect fifth, the tone F# is produced in both cases. Lendvai contends that there is no difference in function this time because the movement in either direction produces the same tone and therefore the same function. He implies that such movement is static, whether the tones C and F# are considered to be key centers or fundamentals of a chord. The tritone bisects the octave. The tritone distance between C and F# is further bisected into minor thirds by E^b in an upward direction from the tonic C and by A in a downward direction from the tonic C. All those tones lying at these points of bisection are interpreted by Lendvai as tonics that make up the tonic axis. No further bisection into equal-interval distances less than tritones or minor thirds can be made; there can be no more than four tonics on the tonic axis. "The pole-counterpole relationship is born" from the first bisection (C - F#), and a second pole-counterpole relationship is derived (A - E^b) from the second bisection.[20]

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[20] _Ibid_., p. 13.

With the twelve-note system found in the circle of fifths and the three functions of tonic, dominant, and subdominant, the axis system "is the only system that can be realised by means of distance division."[21] Lendvai believes that the axis system defines the meaning of the twelve tones differently from Schöenberg's use of twelve-tone idioms. "Schöenberg annihilates and dissolves tonality whereas Bartók incorporates the principles of harmonic thinking in a perfect synthesis."[22] Although few would agree with Lendvai's characterization of Schöenberg's techniques, his thinking is in line with Bartók's insistence that his music is grounded in tonality even though the twelve tones of the tempered scale may be treated somewhat differently in much of his music.

Kárpáti and the 'Phenomenon of Mistuning'

János Kárpáti's remarks concerning tonal principles in Bartók's music are centered around polytonality and his own theory, which he refers to as the "phenomenon of mistuning," both of which are related.[23] Before probing into this relationship, some general observations connected with Kárpáti's theory should be made.

Kárpáti points out that Bartók never hesitated to use the atonal way of expression if it served his purpose. Kárpáti uses the term "atonal way of expression" to refer to "all expressive means which were based on equal use of the twelve chromatic degrees."[24] He calls Bartók's

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[21] *Ibid.*, p. 16.

[22] *Ibid.*

[23] János Kárpáti, *Bartók's String Quartets*, trans. Fred Macnicol (Budapest: Corvina Press, 1975), p. 136.

[24] *Ibid.*, p. 137.

chromatic system "free atonality" and further states:

> "...once he was able to make free use of the twelve-degree system, Bartók strove to establish the role of tonality, but the tonality which he brought about is essentially different from functional tonality in the old sense."[25]

These observations seem to agree with Lendvai's ideas of the treatment of the twelve chromatic tones within a tonal system, but Kárpáti believes that no one single compositional technique (such as the application of Lendvai's axis sytem) fits Bartók's music. For this reason, he can be said to disagree with the axis system theory because it is too limited and does not create an authentic picture of Bartók's tonal principles.[26] According to Kárpáti, the "phenomenon of mistuning" is what gives Bartók's music polytonal implications. When considering Kárpáti's view, one must remember that Bartók himself disavowed the use of polytonality.

The phenomenon of mistuning takes place when the tonal framework of a melody is relaxed by varying pitches, rhythms, or intervals in the melody.[27] Frequently, the source material for mistuning may be a folk melody. One example given by Kárpáti is from the last movement of the first string quartet.

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[25] Ibid.

[26] Ibid.

[27] Ibid., p. 139.

Example 8. Béla Bartók, Opus 7, Introduzione to the 3rd movement, measures 7-8 and 14-15 of the violoncello part.

The second half of the melody has been stretched from an octave framework into an augmented octave framework as shown in the first line of the example. The next time the melody appears (second line in the example), further alteration includes changing the first interval from a perfect fourth to an augmented fourth.[28] (The melody has also been transposed up a fifth as well as altered.) A more common method of mistuning, which distorts the fifth-octave framework, is found in the principal theme in the first movement of the fifth string quartet. Shown below are the hypothetical fifth/octave framework,[29] followed by the compressed form actually used in the score, namely an augmented fourth/major seventh framework.

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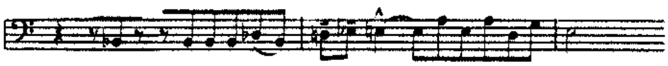
[28] Ibid.

[29] Ibid., p. 143.



Example 9. Béla Bartók, Opus 102, 1st movement, measures 4-6 of the violoncello part (Kárpáti's hypothetical form followed by Bartók's "mistuned" form).

The second half of the melody has been transposed down a semitone to achieve the chosen theme. Kárpáti quotes other examples to support his theory and concludes: "...it can be said that in Bartók's compositional technique there is a definite tendency towards the mistuning of perfect octave and fifth intervals, frameworks, structures--either by contraction or expansion."[30] The application of mistuning, especially in cases where whole portions of melodic lines have been transposed helps to support the concept of polytonality. But if we wish to respect Bartók's view, that the ear will still evaluate a single common tonal center, then it is more accurate to describe the result of mistuning as polymodality. In short, polytonality implies more than one tonal center; polymodality implies a use of more than one modal inflection but with one tonal center. The questions of the meaning of polymodality is, of course, more involved and will be further discussed where the concept of "polymodal chromaticism" is explicated.

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[30]Ibid., pp. 147-148.

The Ethnomusicological Approach to Tonal Center

The ethnomusicological approach to tonal center is explicitly stated by Bruno Nettl in Theory and Method in Ethnomusicology.[31] Nettl explains this approach as follows:

> If we are to talk about tonality at all, in ethnomusicological description, then we should use tonality as a concept directly descriptive of the music. And while counting the frequency of the tones in a song, and calculating the interrelationships of of tones in terms of their positions in the song, may produce results which violate the acoustical criteria of tonality, the information thus gained does tell something concrete about the song itself.[32]

Nettl then proceeds to give seven criteria for the identification of tonal centers and for the formation of tonal hierarchies that may exist in musical material.

He cites frequency of appearance of a tone as the most widely used criterion. The more a tone is heard, the more the ear perceives it as stable and uses it as a reference point, giving it obvious importance. The length of duration of a tone is often associated with frequency of occurrence. To satisfy this criterion, a tone must have agogic prominence in comparison to those surrounding it. The initial and/or final position of a tone in the phrase is believed to give some tonic weight to it. Related to this is the appearance of a tone at the lowest end of the scale or in the center of the scale. If the tone is frequently used and if it appears in more than one octave transposition, or if it occurs a fifth below another frequently used tone, then it also may

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[31]Bruno Nettl, Theory and Method in Ethnomusicology (London: Collier-Macmillan, 1964), p. 147.

[32]Ibid.

indicate the tonal center. Finally, rhythmic stress, established either by accents or by either regular or irregular patterns of placement in meter, may aid in establishing a tonal center.

In determining a tonal center, not all criteria may be satisfied simultaneously. The above guidelines are only that--guidelines. They can assist in working with many types of music. But Nettl warns that "We must never neglect the possibility that a musical style will contain a system of tonality which can only be identified by means other than those already known and used." This last criterion should not be overlooked.[33]

The views of Bartók, Lendvai, Kárpáti, and Nettl have been presented to give a general picture of an approach to tonal principles in Bartok's music. Bartók's views must be considered in areas where they can be applied; unfortunately, he never fully explained his compositional technique. Lendvai's axis system best applies to the selection of tonal centers, as will be shown in the later analysis. Kárpáti's view is more speculative in nature. One cannot be certain that Bartók first conceived a melody and then mistuned it. Bartók could easily have written such "mistuned" melodies directly. The ear cannot be expected to hear the final melodic product as mistuned in relation to an unheard preconceived one. In other words, the ear does not know that when it hears a tritone it is really a mistuned fourth or fifth. Nettl's approach to tonal center, however, can be applied without conflicting with the viewpoints held by the other three and can sometimes be used as a check on them.

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[33] Ibid.

A discussion of formal principles in Bartók's music follows. The three Hungarian viewpoints are again contrasted. Milton Babbitt has some material that supports them in part.

Formal Principles

Formal structure in Bartók's music is often traditional, including classical forms from the common practice period. At other times, however, his forms are innovative. He wrote little about formal structure in his own music.

A general overview of Bartók's formal approach can be found in The New Grove's Dictionary of Music and Musicians.

> After the condensed and continuous ABa'b' form of the Third Quartet, mentioned above, Bartók sought a more spectacular structure that would display its organization more clearly. This he found in the palindrome, which defines the classical symmetry of the Fourth and Fifth Quartets....[34]

The sectional structure of palindromic form is ABCB'A', where "the fourth and fifth sections are not just variations on the second and first but are recast to produce something aesthetically conclusive."[35] Such a structure is not utilized by Bartók in an exact sense, but in a creative sense where irregularity in the form itself will provide contrast. Milton Babbitt refers to palindrome form as "arch-form" and attempts to classify it as one of two basic formal techniques in Bartók's music.

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[34] László Somfai, "Béla Bartók," The New Grove's Dictionary of Music and Musicians, ed. Stanley Sadie, Vol. II (London, 1980), pp. 213-214.

[35] Ibid., p. 214.

In Babbitt's view, "The evolution of the theme in Bartók is not confined to the region of a single movement. In all of Bartók's quartets, thematic relationships among movements occur."[36] The formal structure that stems from such thematic relationships is based on either monothematicism or symmetry. Monothematic technique "has as its goal the creation of a type of structural climax by the gradual emergence of the theme through various stages of increasing importance from movement to movement."[37] The gradual emergence of the theme is accomplished through expansion or contraction of its length or harmonically through increasingly complex contrapuntal structure. Kárpáti dwells at length on the monothematic technique.

Monothematicism, according to Kárpáti, is a technique present in "virtually every one of Bartók's composite musical constructions."[38] Kárpáti's opinion on this matter is directly supported by Bartók whom he quotes:

> You have probably noticed that I lay great emphasis on the work of technical development, that I do not like to repeat a musical thought identically, and that I never bring back a single detail exactly as it was the first time. This treatment stems from my inclination towards variation and transformation of themes.[39]

This statement by Bartók gives the essence of his compositional technique. Unity and contrast are created simultaneously by the treatment of a theme in this way. Bartók's monothematic technique is not

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[36]Milton Babbitt, "The String Quartets of Béla Bartók," _The Musical Quarterly_, XXXV (1949), 384.

[37]_Ibid._

[38]Kárpáti, _Bartók's String Quartets_, p. 97.

[39]_Ibid._

simply variation; often, it is thematic transformation carried to such an extreme that the resulting form of the theme may be almost unrecognizable from the original. Monothematic or symmetrical techniques can be found at work from the motive to the overall formal structure of an entire piece. Lendvai's approach to formal principles is more specific than either Kárpáti's or Babbitt's and may appear highly contrasting to the monothematic/symmetrical approach; yet, Lendvai's approach is based on organic growth of the musical material and can encompass monothematicism while creating a specific type of symmetry.

The Principles of Golden Section

Lendvai uses the principle of Golden Section (GS) to explain Bartók's formal principles.

> Bartok's method, in his construction of form and harmony, is closely connected with the law of the GS. This is a formal element which is at least as significant in Bartok's music as the 2 + 2, 4 + 4, 8 + 8 bar periods or the overtone harmonisation in Viennese classical style.[40]

The GS is defined as follows by Lendvai:

> Golden Section...means the division of a distance in such a way that the proportion of the whole length to the larger part corresponds geometrically to the proportion of the larger to the smaller part, i.e. the larger part is the geometric mean of the whole length and the smaller part.[41]

The following diagram will serve to clarify his above definition.[42]

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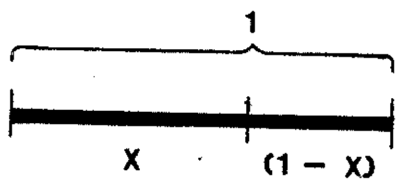
[40] Lendvai, Béla Bartók: An Analysis of His Music, p. 18.

[41] Ibid., p. 17.

[42] Ibid.



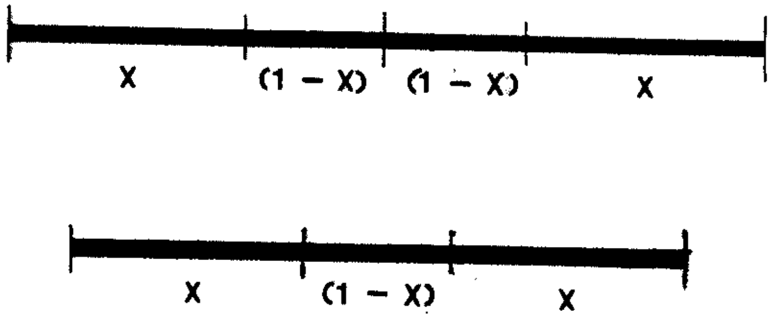
Example 10. Linear representation of the GS proportion.

The proportion is expressed here algebraically as $\frac{1}{x} = \frac{x}{1-x}$. Solving for x, we obtain the value $\frac{\sqrt{5}-1}{2}$, or approximately 0.618. The proportion of the smaller section to the larger is therefore approximately 0.382 to 0.618, which itself is the value 0.618. Lendvai further assigns to the larger section the designation positive and to the smaller, negative. He concludes "that the positive section is accompanied by intensification, dynamic rise or concentration of the material, while the negative section by a falling and subsiding."[43]

To determine where the GS point is, the total number of measures, if equal in length, is multiplied by 0.618. If the meter varies, the total number of beats or durational units is used instead of the number of measures. Something significant, such as the climax, may occur at that point. If not, then two deductions can be made: either the manifestation of GS proportion is approximate or the theme or section measured has a symmetrical structure. (An exception is the first movement fugue of the *Music for Strings, Percussion, and Celesta* where the meter varies, but the number of measures is used in calculating the GS,

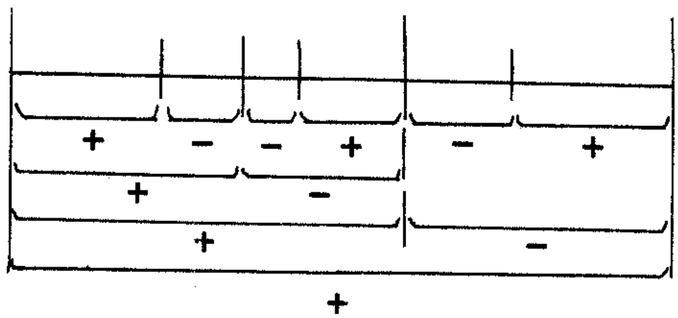
[43]*Ibid.*, p. 22.

which coincides with the climax.) GS proportions can be used in a symmetrical way as well. Bartók was fond of reversing the order of the GS sections. When the GS sections are reversed, the following combinations are seen, one where the negative sections are joined (union) and one where the negative sections are superposed (intersection).



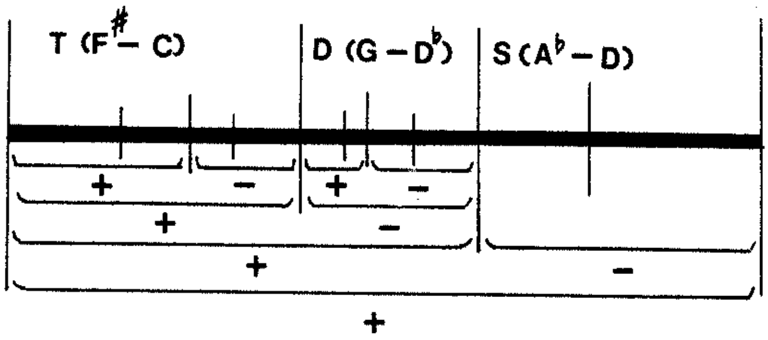
Example 11. GS proportions used symmetrically by a) union, and b) intersection.

Even superposition of the GS proportion upon itself can create a possible form as in the diagram below.



Example 12. Example of GS proportions superposed.

At every point of GS division, something of tonal significance such as a change of tonal center could possibly occur. According to Lendvai, this is precisely what happens in the introductory bars 2-17 of Bartók's Sonata for Two Pianos and Percussion in the first movement. The following diagram shows Lendvai's arrangement of positive and negative sections accompanied by the tonal axes used in each major section. The subdominant axis is associated here with inversion of the theme.[44]



Example 13. Lendvai's formal analysis of the Sonata for Two Pianos and Percussion, measures 2-17, with tonal axes.

Monothematicism, symmetry, and GS proportions all play an important part in understanding formal principles in Bartók's music. While Bartók may never have directly referred to his use of Golden Section proportions, Lendvai's theory contributes much to understanding other aspects of Bartók's music besides form, especially the aspect of harmony.

Harmony

A survey of the structure of Bartók's music in tonal and formal theories would not be complete without a discussion of harmony. The subject of harmony will be divided into chromatic harmony and diatonic harmony. The first issue, then, is to clarify the meaning of chromatic

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[44]Ibid., p. 20.

and diatonic. The New Grove's Dictionary of Music and Musicians gives concise definitions of these terms.

Chromatic refers to that based on an octave species of twelve semitones, as opposed to a seven-note diatonic scale. "A chromatic scale consists of an ascending or descending line that advances by semitones."[45] Diatonic refers to that based on an octave species consisting of five whole tones and two semitones, in which the two semitones are "maximally separated." The major and minor scales and the church modes are diatonic.[46] If these preceding scales are given as examples, then half steps that are maximally separated means separated by the distance of a tritone. Another interpretation of maximally separated can be seen when the diatonic scale is shown as an incomplete circle of fifths: F-C-G-D-A-E-B, where the distance from F to B is the maximally separated tritone. The article in Grove's Dictionary assumes that diatonic scales or modes are restricted to the major and minor scales and the church modes. That dictionary's definition of diatonic and chromatic does not fit Bartók's use of the two types of harmony.

Lendvai uses the axis system to derive both chromatic and diatonic types of harmony as they are used in Bartók's music. From the tonal axes, he derives intervals, but for his explanation of Bartók's chromatic harmony, he selects only intervals that can be explained by the Fibonacci series. For his explanation of the diatonic harmony, he bases the intervals on the overtone series.

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[45] "Chromatic," The New Grove's Dictionary of Music and Musicians, ed. Stanley Sadie, Vol. IV (London, 1980), p. 377.

[46] "Diatonic," The New Grove's Dictionary of Music and Musicians, ed. Stanley Sadie, Vol. V (London, 1980), p. 423.

The Fibonacci Series and Chromatic Harmony

The Fibonacci series is closely related to the principle of GS. The Fibonacci series is a sequence of numbers where "every member is equal to the sum of the two preceding members: 0, 1, 1 , 2, 3, 5, 8, 13, 21, 34, 55, 89...."[47] This series exists in nature. The spiral arrangement of sunflower seeds and of fir cones, the growth patterns of the leaves on numerous plants--all reflect the pattern of numbers in the Fibonacci series. "For example, the sunflower has 34 petals and its spirals have the values of 21, 34, 55, 89, 144."[48]

The Fibonacci series also "approximates more and more to the irrational key-number $\frac{\sqrt{5}-1}{2}$ of the GS (the GS of 55 is 34, and that of 89 is 55)."[49]

Lendvai gives the following table of numbers and their interval equivalents.[50] Each number of the Fibonacci series represents the number of semitones constituting an interval. Subdivisions of intervals or the formation of chords can only be done according to existing Fibonacci numbers. For example, 5 can only be divided into 3 and 2, never 4 and 1. Intervallically, a perfect fourth can be divided into a major second and a minor third. From this simple relationship between intervals and Fibonacci numbers, Lendvai proceeds to list several features that can be drawn from this system.

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[47] Lendvai, *Béla Bartók: An Analysis of His Music*, p. 27.

[48] *Ibid.*, p. 34.

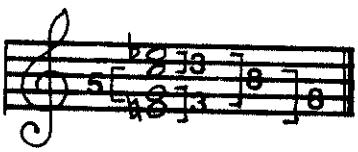
[49] *Ibid.*, p. 27.

[50] *Ibid.*, p. 35.

Fibonacci number (number of semitones)	Interval
1	minor second
2	major second
3	minor third
5	perfect fourth
8	minor sixth
13	augmented octave

Example 14. The Fibonacci intervals.

One chord that Bartók used when writing in what Lendvai considers a chromatic style is the major-minor chord.[51] The intervals are shown in terms of Fibonacci numbers.

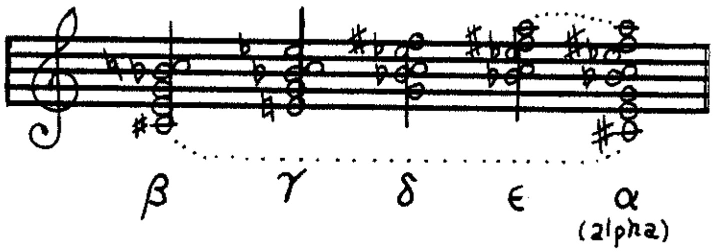


Example 15. Fibonacci intervals in the major-minor chord.

The major-minor chord led to the formation of the alpha chord and its forms. These chord forms "do not contain the characteristic intervals

[51] Ibid., p. 40.

of the overtone system--fifth, major third and the minor seventh."[52] The following figure shows an alpha chord and its forms.[53]



Example 16. The alpha chords with C as tonic.

The fusion of all the types designated by the Greek letters beta (β), gamma (γ), delta (δ), and epsilon (ϵ) results in the complete alpha (α) chord, which is made up of two diminished seventh chords. These diminished chords, in turn, represent a combination of the tonic and dominant axes, in this case, the C tonic axis and the G dominant axis. The complete C alpha chord consists of these two axes together. Some examples from Bartók's music appear below. A chord based on GS intervals is typical of what Lendvai calls Bartók's chromatic style.

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[52] Ibid., p. 42.

[53] Ibid.

Example 17. Alpha chord forms in Bartók's music.

Scales can also be based on GS intervals. One of these is the pentatonic scale, which Bartók frequently identified with old Hungarian folk music.[54]

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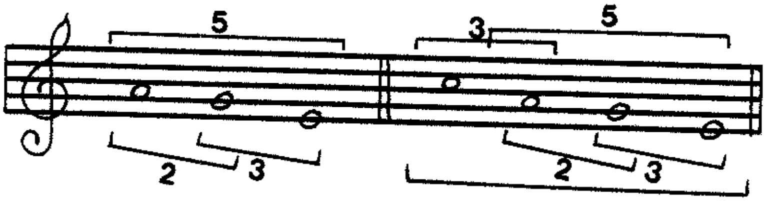
[54]Béla Bartók, Hungarian Folk Music, trans. M. D. Calvocoressi (London: Oxford University Press, 1931), p. 17.



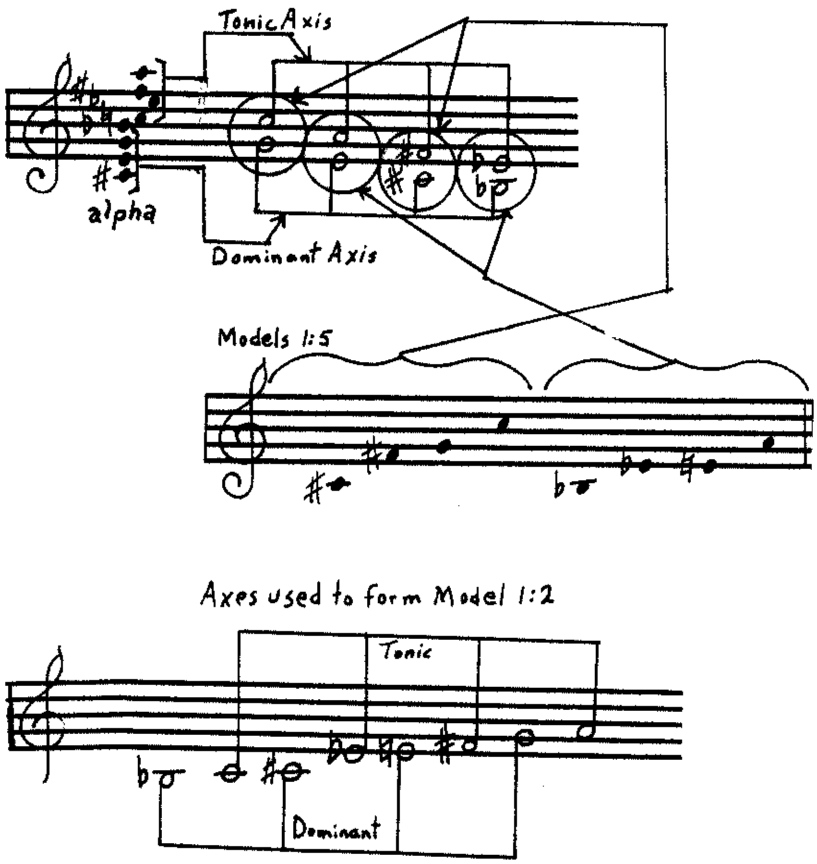
Example 18. Pentatonic scale structures showing GS intervals.

Because the pentatonic scale structure, like all structures consisting of GS intervals, is not derived from the overtone series, it is placed within Lendvai's interpretation of Bartók's chromatic style. The significance of this will be seen where Lendvai's analysis of the composer's diatonic style is presented.

There are other structures, which Lendvai labels as "models" that are also placed into this chromatic system. He cites three models whose respective proportions are 1:5, 1:3, and 1:2. More specifically, model 1:5 is created by the alternation of minor seconds and perfect fourths such as C - C# - F# - G - C.... Model 1:3 is made by alternating minor seconds and minor thirds and model 1:2 by alternating minor and major seconds. Lendvai attributes the most importance to model 1:2, calling it the basic scale of Bartók's chromatic system. He draws a relationship among three aspects of his chromatic system.

> There exists an organic correlation between the axis system, the alpha chords and model 1:5. If we detach the upper C - A - F# - E^{b} and the lower G - E - C# - B^{b} layers

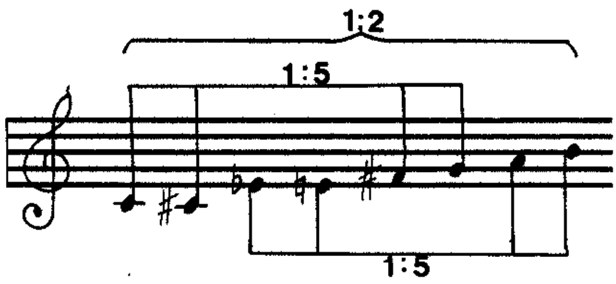
of the axis...and pile up one on the other, we obtain the alpha chord.... If we separate the pole-counterpole relations (C - F# and A - E^{b}, respectively) of the axis, we have Model 1:5....If we combine the notes of the axis we get a Model 1:2....[55]



Example 19. The correlation between the axis system, the alpha chords, and models 1:2 and 1:5.

[55] Lendvai, Béla Bartók: An Analysis of His Music, pp. 55-56.

Model 1:2 can also be formed from two transpositions of model 1:5.



Example 20. Two transpositions of model 1:5 used to form model 1:2.

Finally, the last type of structure that Lendvai places in his chromatic system are the "chords of equal intervals." At least as they are presented by Lendvai, they are also made up of GS intervals.[56]

Type of Structure	Intervallic Arrangement (in semitones)
Whole-tone chords	2 + 2 + 2 + 2 + 2 + 2
Diminished sevenths	3 + 3 + 3 + 3
Chords in fourths	5 + 5 + 5 + 5....
Augmented triad	8 + 8

Example 21. Chords of equal intervals.

The augmented triad must be shown as two consecutive minor sixths (consisting of 8 semitones each) in order to qualify as a GS intervallic structure, since major thirds (consisting of 4 semitones) are outside

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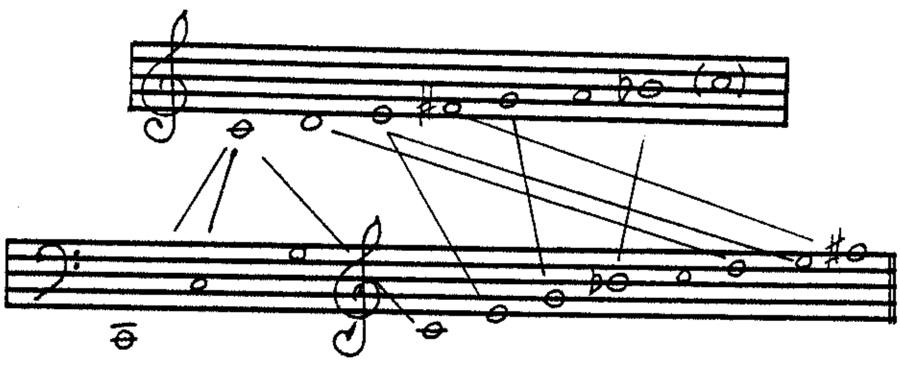
[56] *Ibid.*, p. 62.

the Fibonacci number series. After discussing the characteristics of Bartók's chromatic technique, Lendvai provides another structure, the overtone series, to explain Bartók's diatonic technique.

The Overtone Series and Diatonic Harmony

Lendvai uses the overtone series to explain Bartók's diatonic harmony. The overtone or acoustic scale is the basic or "most characteristic" scale of Bartók's diatonic system. According to Lendvai, the overtone scale is derived from the overtone series.[57] Discounting the pitch classes that recur, the first eleven partials in the overtone series contain seven unique pitch classes. The overtone scale consists of these seven pitch classes, written in the range of one octave. Example 22 shows the overtone series on C and indicates the correspondence between the degrees of this scale and their position in the series.



Example 22. The C overtone scale and the overtone series on C.

[57] *Ibid.*, p. 67.

Note that Lendvai gives a new dimension to the word "diatonic." The overtone scale does not quality as a major or minor scale or as one of the church modes. The Hungarian theorist Lajos Bárdos has coined the term <u>heptatonia secunda</u> meaning "second diatony" to describe the overtone scale and its forms. The various transpositions and derivations of the scale, which are grouped by Bárdos under this term, "are related to certain features of Romanian and Arab folk music."[58] Kárpáti also has adopted this term. Even <u>Grove's Dictionary</u> uses the term in its article on Bartók. If the definition of "diatonic" that is presented in <u>Grove's Dictionary</u> is referred to as "first diatony," then the forms of the overtone scale can be referred to as "second diatony."

Bartók also has a practice of combining tetrachords that are taken from different modes into new scales or melodic patterns. Sometimes, these constructions do not fit into first or second diatony. Instead, they are part of the basis of polymodal chromaticism which is described in the next section.

An interesting comparison can be made between the division of the ordinary chromatic scale into a GS scale based on Fibonacci numbers and an overtone scale.

Example 23. The division of the chromatic scale into a GS scale and an overtone scale.

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[58]Somfai, "Béla Bartók," pp. 211-212.

The Fibonacci sequence of numbers designates intervals associated with chromatic harmony. When these intervals are removed from the ordinary chromatic scale, the pitches of the entire overtone scale remain. Note that Lendvai does not include C# in his GS scale, even though 1 is a Fibonacci number. He also does not explain the B . This tone may be considered a leading tone. Lendvai states that both C# and B "require a chromatic interpretation," but he does not explain further.[59]

Lendvai claims that the diatonic and chromatic systems "reflect each other in an inverse relationship."[60] One such relationship between the two systems is manifest in intervals. The Fibonacci intervals associated with chromatic harmony (given in Example 14) invert to produce "diatonic" intervals, including the major third, perfect fifth, and minor seventh.[61] These "diatonic" intervals are, in fact, characteristic of the lower part of the overtone series. However, the inversions of the other Fibonacci intervals (minor third and minor second) yield the major sixth and the major seventh, which do not occur in the overtone series until the thirteenth and fifteenth partials, respectively. Lendvai does not classify the tritone as either chromatic or diatonic.

Lendvai tries to demonstrate how scales may act as inversions of one another. If the intervals of the overtone scale are reflected around the starting pitch, a new scale is derived that Lendvai refers to as a GS scale.[62] However, GS or Fibonacci intervals explain neither the

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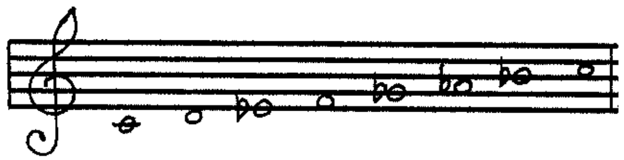
[59] Lendvai, _Béla Bartók: An Analysis of His Music_, p. 70.

[60] _Ibid._, p. 72.

[61] _Ibid._, p. 73. [62] _Ibid._, p. 72.

tritone nor the minor seventh. This scale is more commonly referred to as a diminished scale because of its characteristic diminished fifth.



Example 24. The diminished scale.

Lendvai does not mention this scale when discussing the chromatic system. Because it is derived from a diatonic scale (the inversion of the overtone scale) and because it contains chromatic (Fibonacci) intervals, it is an example of how the chromatic and diatonic systems overlap.

Because Lendvai's definitions of the diatonic and chromatic systems are based on the intervals these systems contain, triads and their inversions are classified in a way that is unexpected and that departs from Rameau's treatment. For example, Lendvai claims that the triad in root position is diatonic because it contains the major third and the perfect fifth in relation to the root. The triad in first inversion, however, is chromatic because it contains Fibonacci intervals (the minor third, perfect fourth, and minor sixth).[63] Of course, the root position triad also contains a minor third, but not in relation to the root.

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[63] Ibid.

Unlike Rameau, Lendvai appears to classify chords by their lowest tones rather than by their roots. A similar mixture of Fibonacci and "diatonic" intervals occurs when the seventh chord C - E - G - B^b is placed in first inversion, E - G - B^b - C.[64]

Lendvai makes several more analogies to compare his chromatic and diatonic systems. He considers diatonic harmony consonant and chromatic harmony dissonant. The twelve chromatic tones arranged in the overtone series are naturally infinite and represent an open diatonic system. The diatonic system has a fundamental note, the chromatic system a central note. Diatonic harmonies are static while chromatic harmonies are dynamic. The closed chromatic system is like a circle; the open diatonic system is like a straight line. These and other analogies provide at best a somewhat incomplete explanation of the differences between the chromatic and diatonic systems.[65]

Polymodal Chromaticism

Modality is not restricted to the use of the church modes, because intervals can be arranged within the octave in many different ways. Bartók uses this broader concept of modality to expand and to develop the resources of major-minor tonality.[66] Going beyond simple diatonic modes, the composer sought combinations of intervals that form special scales, many of which contain augmented seconds, diminished fifths, and

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[64] Ibid., p. 73.

[65] Ibid., pp. 72-89.

[66] Kárpáti, Bartok's String Quartets, p. 126.

augmented fifths. The overtone scale is one of these special scales. According to Kárpáti, the overtone scale appears as a combination of the lower tetrachord of the Lydian mode and the upper tetrachord of the Mixolydian mode. He also calls this scale "the scale of Máramaros Rumanian folk music," and agrees with Bárdos who refers to it as one of the modes of heptatonia secunda. To stretch tonal frameworks further, Bartók creates heptatonic scales by altering tones so that the perfect fifth and sometimes the octave are avoided. Such scales, with their additional leading tones, tend toward twelve-tone chromaticism.[67]

On the other hand, polymodal chromaticism expands diatonic resources by providing more than one spelling for certain scale degrees. This mixing of modal color does not always result from the addition of leading tones. Polymodality, simply defined, means "simultaneity of various modes."[68] As stated earlier, Bartók defines polymodal chromaticism as the superimposition of modes on each other so that tones generated by one mode may fall between tones generated by another mode. However, the use of two spellings for a single scale degree expands the diatonic resources rather than implying total chromaticism. The flattened and sharpened degrees are not altered degrees but diatonic ingredients of separate diatonic modal scales. The following examples should help to clarify the difference between polymodal chromaticism and chromaticism by alteration.

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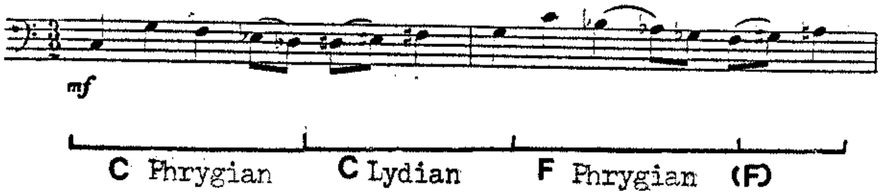
[67]Ibid., p. 127.

[68]Ibid., p. 129.

Polymodal chromaticism:



Chromaticism by alteration:

Example 25. Béla Bartók, Cantata profana, 2nd movement, measures 103-104 of the baritone solo part, and 1st movement, measures 5-9 of the 1st flute part.

Some good examples of the use of the twelve tones to produce chromaticism have been discussed through Lendvai's chromatic system, especially the models sometimes present in melodic patterns. To the extent that the expansion of diatonic resources tends towards chromaticism, the tenchique of polymodal chromaticism as used by Bartók represents a possible fusion of diatonic and chromatic thinking.

The diatonic interpretation of polymodality is justified by Bartók's actual use of cells from different modes. In these cells rarely will two spellings of the same scale degree be found together. Instead, alternative spellings of these scale degrees usually occur in an adjacent cell. As Kárpáti states: "The phenomenon of polymodality is justified only when connected melodies or at least melodic cells or closed structures separately represent the individual modes."[69]

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[69] Ibid., p. 131.

Kárpáti discusses two other aspects of polymodal chromaticism--the superimposition of major and minor modes, and bimodality arising from mirror symmetry. Kárpáti bases his explanation of major-minor bimodality on Lendvai's model 1:3.[70] Model 1:3 can be obtained by borrowing different tones from the major and minor scales. The following illustration of model 1:3 clarifies this.

Example 26. Model 1:3 on C illustrating major-minor modal mixture.

Tones common to both major and minor scales are shown as whole notes. Those borrowed from the major mode have upward stems; those borrowed from the minor mode have downward stems. Kárpáti feels that model 1:3 "may be the most complete combination of the major and minor modes."[71] Another type of bimodality has its origin in mirror symmetry, which is produced when the scale is inverted and the symmetrical scale retains a common center note.

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[70] Ibid., p. 132.

[71] Ibid., p. 132.

> Indeed, musicality based on mirror inversions and centre notes in one sense stands opposed to the tonal conception, since the functional content of a given interval movement depends on whether it is directed upwards or downwards. Bartok's music, therefore, reflects a modal attitude in this respect as well.
> This kind of thinking based on the symmetry principle, however, already includes polymodality concealed within it, too, for the exact mirror inversion of any melody produces in the majority of cases a change of mode as well.[72]

The overtone scale and its inversion are common examples of mirror symmetry. The inversion produces a descending diminished scale with a common key center. Forms of mirror symmetry also exist in other types of polymodal combinations.

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[72] Ibid., pp. 132-133.

CHAPTER III

ANALYSIS OF THE FUGUES

This chapter, which will present analyses of several of Bartók's fugues, is organized into sections that discuss the major components of the fugal exposition: the subject, the answer, and the countersubject. In addition, the final section is concerned with the internal organization of each fugue, with emphasis on exposition, episode, stretto, and coda. The chapter discusses five fugues: the fugue in the third movement of *String Quartet I*, the fugue in the *Seconda parte* of the *String Quartet III*, the fugue in the fifth movement of *String Quartet V*, the first movement fugue of the *Music for Strings, Percussion and Celesta*, and the fugue that constitutes the coda of the first movement of the *Sonata for Two Pianos and Percussion*. Actually, fugato is the correct designation for four of these five fugal selections. They are fugal passages within a larger form. In the fugatos selected from the first, third, and fifth string quartets, the subject is announced in the midst of accompanying material, such as ostinato figures or chords. On the other hand, the fugue subject in the codal fugato of the *Sonata for Two Pianos and Percussion* is presented with a solo percussion accompaniment. For convenience in describing these four selections, all fugal passages will be referred to as fugues. However, the first movement in the *Music for Strings, Percussion and Celesta* is a complete fugue in itself.

The Subject

Bartok's fugue subjects capture the important aspects of his fugues in miniature. A thorough understanding of each subject makes it easier to comprehend better the larger formal units such as exposition, stretto, and episode. The tonal organizations of these subjects become progressively more elaborate from String Quartet I (1907) to the Sonata for Two Pianos and Percussion (1937).

String Quartet I (1907)

The fugue in String Quartet I commences approximately one-third of the way into the third movement. It functions as the major component of the development section. The fugue subject is illustrated in Example 27.

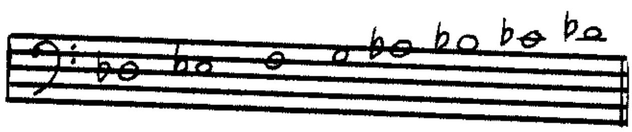
Example 27. Béla Bartók, Opus 7, 3rd movement, measures 158-165 of the cello part.

As shown, it can be divided into three contrasting sections, each having a different melodic character.

The first section (Section 1) has D^b as its tonal center. This is reinforced by A^b, forming a tonic-dominant relationship. The middle section (Section 2) is modulatory in character and leads to the final section (Section 3), which has A^b as its tonal center. The choice of D^b as tonal center in the first section is supported by its agogic prominence, its appearance at the end of the phrase, the downward fifth movement to it from A^b, and its rhythmically stressed position. All of these criteria are consistent with Nettl's ethnomusicological approach to the identification of tonal center, cited earlier in Chapter II.

The A^b tonal center in the third section is generally supported by the same criteria, except there is no fifth relationship present within the section, and A^b does not occur at the end of the phrase. It is, however, the lowest note in the section, another criterion that is found in Nettl's approach. One must usually rely on a combination of several features when deducing a tonal center. The modulatory character of the second section is easily heard, as it gives no feeling of repose and leads directly into the third section.

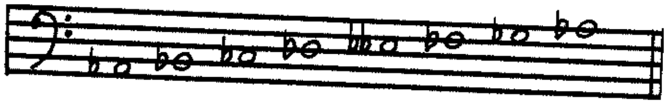
The overtone scale on D^b provides a partial framework for the tones in the first section of the subject.



Example 28. D^b overtone scale.

This scale does not explain G^b or C; however, the B present may be thought of as C^b, which is in the scale. The scale does demonstrate the importance of scale degrees 1, 4, and 5, exhibited in the subject's first section.

In a similar fashion, the diminished scale on A^b explains the tones of the third section. (All enharmonic equivalents of notes are represented only by one spelling.)

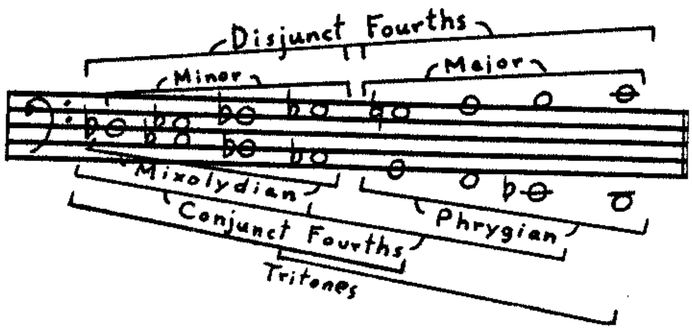


Example 29. A^b diminished scale.

This scale is the retrograde of the inversion of the overtone scale on A^b. The G^b not accounted for in the first section by the D^b overtone scale is present in the A^b diminished scale. The C, however, is still not accounted for.

The C occurs in measure 5 of the subject and is agogically prominent at the end of the second section. This agogic emphasis on C is an example of Lendvai's GS division of the form. The length of the subject's duration in this case is 49 eighth-notes; 49 X 0.618 = 30.3, which coincides with the thirty-first eighth-note value where the tone C is located.

Using the above scales to explain the tonal structure of this subject has obvious deficiencies. A still more concise way of organizing the tonal material is to build a scale of disjunct tetrachords.

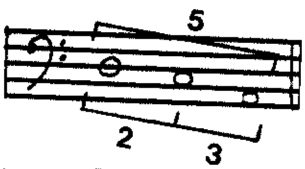


Example 30. Tonal organization of String Quartet I subject shown as a tetrachord structure.

The results of this procedure appear to produce a form of polymodality arising from mirror symmetry. The tetrachords used come from four different modes. Bartók may have simply combined different tetrachords to expand his tonal resources, or he may have "mistuned" the outer major and Phrygian tetrachords to produce scales with a major seventh range.

The tonal center of the tetrachord structure is D^b. The Mixolydian tetrachord has particular significance because its tones are common to both the D^b overtone and the A^b diminished scales, shown earlier. This mirror scale accounts for every note in the subject, giving the C, which had not been explained satisfactorily, by the above scales, a prominent position at the end of the major tetrachord.

Folk music influence is exemplified in the first and third sections of the fugue subject. The melodic pattern in the first section contains two instances of the seven-note rhythmic pattern (). According to Kárpáti, the line type of seven syllables is frequent in the folk music of Western European countries, "...but in all probability it was from the freshly discovered Hungarian folksong that Bartók took his inspiration."[1] In the third section, the three-note melodic nucleus of pentatony appears.



Example 31. Three-note nucleus of the pentatonic scale.

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[1] János Kárpáti, Bartók's String Quartets, trans. Fred Macnicol (Budapest: Corvina Press, 1975), p. 67.

The presence of this underlying structure in the third section also shows the influence of folk music.

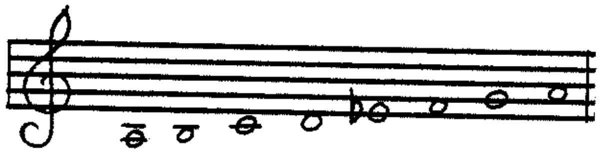
Particular emphasis has been placed on the preceding fugue subject to show examples of the formal principle of GS and the manner in which tetrachords may be combined to produce a tonal organization applicable to it. The above scale, composed of four tetrachords, explains the tonal structure of the subject completely because it accounts for all the subject's tones. Notes in the subject itself may have more than one spelling for the same note, suggesting that the spelling of the note is not critical. Nevertheless, the tetrachord structure is superior to the overtone and diminished scales in modeling this subject's tonal structure.

String Quartet III (1927)

Located two-thirds of the way into the Seconda parte of String Quartet III, the subject of this fugue is decidedly straightforward in character and needs little explication.

Example 32. Béla Bartók, Opus 85, Seconda parte, measures 242-245 of the second violin part.

It consists of one complete period with four regular sixteenth-note groups. Here the form is symmetrical and repetition of notes is a prominent feature. The pitches outline the A diminished scale.



Example 33. The diminished scale on A.

This subject is actually a transformed and simplified version of the main theme in the Seconda parte.

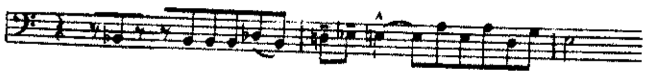
Example 34. Béla Bartók, Opus 85, Seconda parte, measures 30-32 of the first violin part: main theme.

The diminished fifth is avoided in the main theme but is prominent in the subject and becomes an integral part of the contrapuntal structure of the fugue.

The choice of A as a tonal center can be supported by Nettl's approach to tonal center. The A exhibits frequency of appearance, is present at the beginning and end of the subject, and is rhythmically stressed. The E^b is another prominent pitch and its relationship to the key center of A is that of a tritone. One could describe this as a pole-counterpole relationship within the melody, thus using the tonic axis on A to explain the tonal organization of the subject.

<u>String</u> <u>Quartet</u> <u>V</u> (1934)

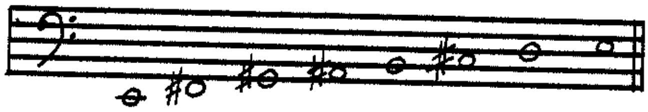
In <u>String</u> <u>Quartet</u> <u>V</u>, thematic transformation is evident between the main theme of the first movement and the fugue subject in the fifth movement.



Example 35. Béla Bartók, Opus 102, 1st movement, measures 4-6 of the violoncello part: main theme.

Example 36. Béla Bartók, Opus 102, 5th movement, measures 370-382 of the viola part: fugue subject.

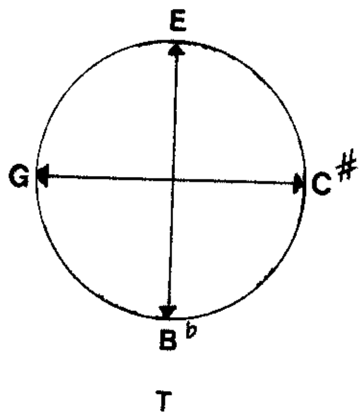
Though the pitches of the subject outline an E overtone scale, the interval of the perfect fifth is not prominent melodically. The tone B is always rhythmically unstressed. Therefore, the use of this scale does not necessarily imply a hierarchy of tones based on a fifth relationship analogous to conventional dominant-tonic relationships. The scale is shown below.



Example 37. E overtone scale.

Instead of a fifth relationship, the melodic framework changes tonal centers from E to A# and back to E. The A in measure 5 of the subject functions as a leading tone to pull the melody into the tonal area of A#. The D (last beat of measure 9 in the subject) leads the melody downward into the E tonal area again with F serving as another chromatic leading tone.

The tonal center movement can be explained by Lendvai's theory of tonal axis. If E is considered to be the tonic note, the following tonic axis results.



Example 38. The tonic axis with E as tonal center.

This entire fugue is constructed around the tonic axis. If it contained more than one fugal exposition, Bartók might base his construction upon one of the other axes, as indeed he does in other pieces.

Kárpáti, however, does not entirely agree with Lendvai's axis theory. He would apply what he calls the "phenomenon of mistuning" to such a subject. If the subject is rewritten using a simple melodic minor scale on E, the implications of mistuning can be seen immediately.

Example 39. Fugue subject from String Quartet V transformed to E minor.

If one accepts the above example as the "original" melody and compares it to the actual subject, the B has been changed to A#, distorting the perfect fifth/octave framework. Kárpáti maintains that the regular tonic-dominant structure "...would obviously have been flat and uninteresting for Bartók and so he transformed the melody so that the upper layer slides down a semitone," and the tritone/major seventh structure becomes the framework of the melody.[2] However, the transposition is not exact, and the tritone in the final product is what the listener

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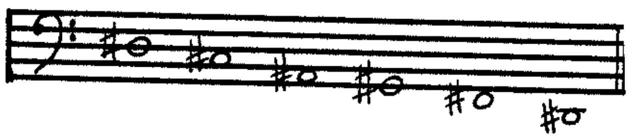
[2]Ibid., p. 144.

actually hears. This makes it difficult to assume that the listener will interpret the tritone framework as a mistuned perfect fifth framework.

The nucleus of the pentatonic scale is manifested in this subject as well. The notes D#, G#, C#, and A# are emphasized. With F#, a full pentatonic scale exists within the subject, even though F# is not emphasized.



Example 40. D# pentatonic scale.

Calculating the GS division yields the eighth rest at the beginning of the eighth measure of the subject. This helps to establish the overall architecture of the subject.

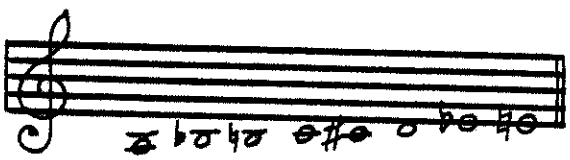
This fugue subject has many facets. Within it can be found the overtone scale, and an underlying pentatonic scale, arranged into a GS proportion of the form. It is unusual, though true to Bartók's ingenuity, to find so much diversity within a single line and still find a strong unity holding the melody together.

Music for Strings, Percussion and Celesta (1936)

The most chromatic subject of the five appears to be that of the *Music for Strings, Percussion and Celesta.*

Example 41. Béla Bartók, *Music for Strings, Percussion and Celesta*, 1st movement, measures 1-4 of the viola part.

Obviously, the first question to be answered concerns the choice of tonal center. It becomes apparent that Nettl's ideas must be examined more closely in this case. This subject contains all the chromatic steps between A and E. The following example shows the tones of the subject arranged in chromatic order.



CRITERION								
Frequency of appearance	2	4	4	5	5	3	3	1
Agogic duration (♪)	2	5	5	7	6	4	3	1
Initial point in cells	2			1	1			
Final point in cells		2	2					
Prominent notes in scale				X	X			

Example 42. Nettl's criteria applied to the chromatic tones of the fugue subject in *Music for Strings, Percussion and Celesta*.

To determine the tonal center of the subject, five of Nettl's criteria are applied: frequency of appearance, agogic prominence, the prominence of the initial note in the phrase, the prominence of the final note in a phrase, and the importance of notes occurring in the center of the scale. When frequency of appearance is considered, C and C# show equal importance. When agogic prominence is also considered, the C is the more important of these two tones. Because the subject can be divided into four cells (or phrases) the tones that begin and end each cell achieve certain prominence. The tone A begins two of the cells, with C and C# leading the other two. However, B^b and B occur at the end of cells, and B^b ends the subject. C and C# again represent prominent notes at the middle of the scale. Based on this approach, one might conclude that the subject's tonal center is ambiguous, a contest between C and C#.

Of course, Nettl's criteria may not be applicable to this subject because of its chromatic nature. The character of the subject appears similar to melodies found in Arab folk music. Kárpáti refers to this influence by saying:

> The minor third model...is likewise really a typical and unmistakable stylization of the various oriental scale types.... In this case it is principally Arab folk music that has to be taken into consideration, where a scale consisting of alternating minor thirds and semitones is to be found in a natural form, too, and without any stylization whatsoever.... If the stylization were to be continued, the major second model could be produced from the contraction of the minor third model.[3]

The minor third model that Kárpáti describes is Lendvai's model 1:3.

The subject consists entirely of minor seconds, minor thirds, and major seconds. (All intervals, incidentally, are Fibonacci intervals.)

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[3] Ibid., p. 90.

However, the interval of a major second does not appear within any cell of the subject until just after the point of its GS division, where the stylization described by Kárpáti does indeed continue and the major second model is produced from contracting the minor third model.

Chittum and Vauclain use two entirely different approaches in analyzing this subject. Chittum's approach focuses on the intervallic nature of the cells. The four cells show intervallic expansion and contraction. The first cell has the range of a major third, the second cell, the expanded range of a tritone, and the third and fourth cells contract their ranges to perfect fourths. In the extensive cellular analysis provided by Chittum, the first and second cells are labeled "A" and "B" respectively with the last two labeled "C."[4] Common to all four cells are the intervals of the minor second, which gives much of the chromatic flavor to the subject. One minor third occurs in cell A and in each of the two C cells; cell B contains two minor thirds. Though the major second first occurs within the first C cell and appears to be a characteristic of the C cells, major seconds occur across the eighth rests between each of the four cells. From this scrutiny of the intervals and the similarities of their occurrence among cells, it is clear that "Bartok creates thematic unity, not through the relation of surface contours but through the relations of various cells to each other." Furthermore, in the whole fugue, "almost all of the cells are either A, B, or C

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[4]Donald Chittum, "The Synthesis of Materials and Devices in Non-serial Counterpoint," The Music Review, XXXI (1970), 130.

cells, and the entire organization is clearly projected by a delineating kind of phrasing which, in the absence of this structural logic, would otherwise seem incomprehensible."[5] Chittum gives no indication that this subject could contain diatonic implications and his chromatically-oriented analysis gives no hint of possible tonal centers.

Constant Vauclain makes a case for polymodal chromaticism. In his analysis of the tonal structure of the subject, he distributes pitches of the subject into two melodic lines.

Example 43. Division of the fugue subject of _Music for Strings, Percussion and Celesta_ into two melodic lines.

Pitches in the upper line belong to a pentachord that rises from A to E. Pitches in the lower line belong to a tetrachord that falls from E^b to B^b. Note that the tonal centers of the pentachord and tetrachord are a tritone apart, that is, they are on the same tonal axis.

The following approach is an adaptation of Vauclain's ideas and is an attempt to trace the evolution of the subject's tonal organization. (Please refer to example 44 for the discussion which follows.)

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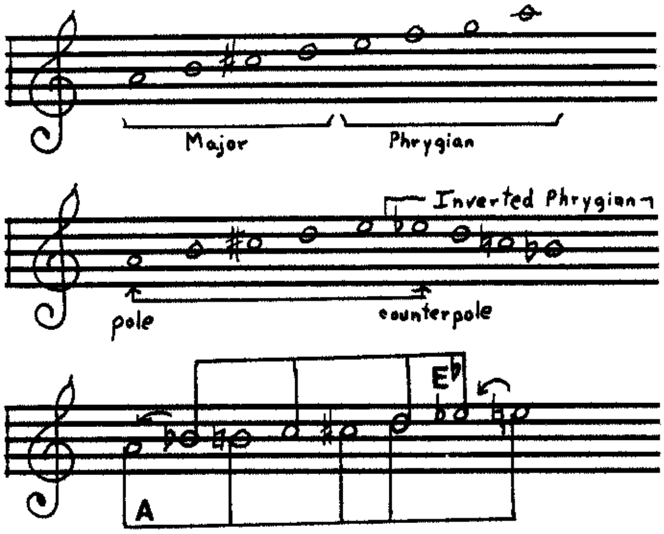
[5] _Ibid._, p. 131.

[6] Constant Vauclain, "Bartók: Beyond Bi-modality," _The Music Review_, XLII/3-4 (August-November, 1981), 243-251.



Example 44. Evolution the fugue subject's tonal organization.

Assume as a point of departure, that the subject is built on a scale that contains the characteristic intervals of the overtone series: the major third, the perfect fifth, and the minor seventh. One such scale is A B C# D E F G A. Note that this scale consists of a major tetrachord followed by a Phrygian tetrachord and is characterized by a symmetrical interval structure. Its pattern of half steps and whole steps is 2 2 1 2 1 2 2. Assume also that an E^b has to be added to the scale in order to include the tritone (or counterpole of the tonic) and that the E will be retained. If the Phrygian tetrachord is built downward from the added E^b, the resultant tetrachord folds over on the A-E pentachord and generates the chromatic tones that fill out the pentachord. The end result of interweaving the A major pentachord (A B C# D E) with the descending E^b tetrachord (E^b D C B^b) is polymodal chromaticism. The pentatonic scale nucleus is also present in two directions (B^b C E^b and E^b C# B^b). Both the two modes and the pentatonic arrangement fold back on themselves in a circular fashion. Not only does this circular "motion" or folding back show itself in these scalar constructions, but it is exemplified in the actual melody of the subject as well.

Sonata for Two Pianos and Percussion (1937)

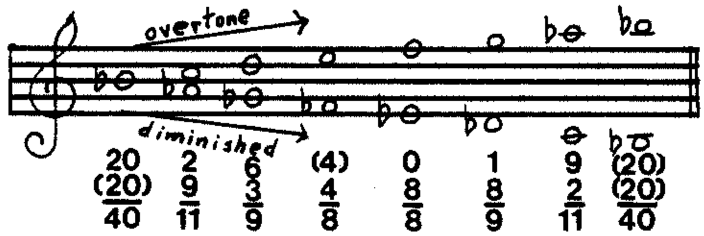
A most extraordinary development of pitch cells and rhythmic motives is found in the fugue subject that commences the coda in the first movement of the Sonata for Two Pianos and Percussion.

Example 45. Béla Bartók, Opus 110, 1st movement, measures 332-334 of the second piano part.

The fugue subject discussed in String Quartet I has a tonal organization similar to this subject--both are built from symmetrical mirror scales. However, adjacent melodic intervals of the former do not have the significance of those in the latter; adjacent intervals here are based on the Fibonacci series. The two instances where the intervals are downward major thirds (4 semitones) imitate what Lendvai calls the Bartók signature.[7] The signature is made up of a broken major-major seventh chord Moreover, in the subject under discussion, the signature's end coincides with the point of GS division.

[7]Ernő Lendvai, Béla Bartók: An Analysis of His Music (London: Kahn and Averill, 1971), pp. 83-84.

The following symmetrical wedge formation (or mirror scale), mentioned previously, contains every note of the subject.



Example 46. Tonal organization of the fugue subject in the <u>Sonata for Two Pianos and Percussion</u> shown as a symmetrical mirror scale.

The tonal center of the subject, B^b, is deduced from the application of Nettl's approach. Frequency of appearance, agogic prominence, appearance at the center of the scale, and rhythmic stress are criteria that are all satisfied here. An overtone scale and its mirror inversion, a descending diminished scale, make up the structure of this wedge.

Symmetrical patterns based on rhythmic duration can also be found in this subject. Using the basic unit of an eighth note (♪ = 1), the pitch B^b is given a value of 20 because its total duration throughout the subject consists of the equivalent of 20 eighth-note values. The numbers given below the wedge show that when the total durations of the pitches that mirror each other are added, a symmetrical pattern of durations is produced. A repeated pitch in the scale is considered only once when durational associations are made. Note that there are no F pitch classes present in this subject, but F is the tonal center in the next statement of the subject.

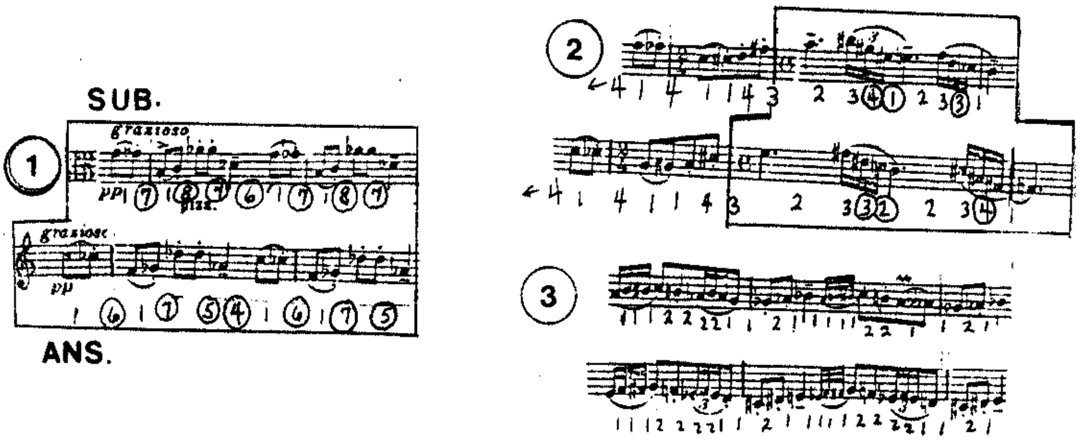
The Answer

Three types of answers exist in Bartók's fugues, depending not only on their melodic material, but also on the way that they contribute to determining the structure of each exposition. So that the terminology used here will be clear, the answer will be considered to take one of three forms: a nonliteral answer, a literal answer, and a restatement of the subject.

"Nonliteral answer" is a term given to those answers that mimic the subject in melodic contour, length, and perhaps key center. However, these answers do not necessarily qualify as tonal answers, a label used specifically in relation to fugues of the common practice period, where certain intervallic changes are made in the answer to keep it within the same tonality as the subject. The term "literal answer" is equivalent to "real answer," but the latter term will not be used because of its common practice period connotations. Finally, there are some cases where it is best to describe the appearance of an answer as a restatement of the subject at a different key level, simply because a restatement of the subject at the original key level never occurs.

Given the above information, only the subject in String Quartet I has a nonliteral answer, with the interval of imitation a perfect fourth above the subject. The subjects in the third and fifth string quartets have literal answers in a consistent subject-answer-subject-answer format, the interval of imitation being the perfect fifth in the former and the diminished fifth in the latter. On the other hand, the subjects in the Music for Strings, Percussion and Celesta and the Sonata for Two Pianos and Percussion simply have restatements of the subject at different key levels each time, in a subject-subject-subject-subject format and at a consistent interval of imitation--the perfect fifth. The nonliteral answer of the String Quartet I subject will be closely examined because its intervallic content differs from that of its subject. Because the answers in the other four fugues are not transformed in this way, they will not be discussed here.

The following example directly compares the String Quartet I subject with its nonliteral answer.



Example 47. Béla Bartók, Opus 7, 3rd movement, measures 158-165 of the violoncello part and measures 165-172 of the second violin part: String Quartet I subject and answer.

All intervals have been marked in semitones. Circled intervals represent deviation from exact transposition. Surprisingly few differences exist between the subject and the answer, which occurs a perfect fourth above it. Two areas deserve special mention. In section 1, the perfect fifth at the end of the subject's first two phrases is answered by a perfect fourth, creating a "tonal" answer effect. In section 2, the boxed motives, though still in imitation at the fourth, have exchanged melodic motives. The dotted quarters here correspond at the intervals of a fourth, a tritone, and a fourth, respectively, between subject and answer. There is enough similarity here between the subject and its nonliteral answer to conclude that the answer is subordinate to its subject, and has as its object the preservation of the original tonal center. Further justification for such a conclusion stems from a regular format of the exposition (subject-answer-subject-answer) in the fugue--subject and answer are repeated in the other two voices exactly as they appeared the first time.

The Countersubject

Bartók places less importance on the countersubject in his fugues than one would expect to find in the fugues, for example, of J. S. Bach.

> Bach attached some importance to a regular counter-subject and achieved great richness of effect by combining the counter-subject in double counterpoint with the subject at varying relative pitches.... In the stretto fugues Bach necessarily lays less emphasis upon the counter-subject. Bartók's fugues, being mostly stretto fugues, show little concern with the subtle variations of harmonic flavor implicit in double counterpoint and regular counter-subjects.[8]

There are no countersubjects present in the fugue of the first string quartet or in the fugue movement of the Music for Strings, Percussion and Celesta. Countersubjects are present in the third and fifth string quartet fugues and in the Sonata for Two Pianos and Percussion fugue.

The countersubject in the third string quartet fugue appears in the exposition and is developed through the episode that follows, but it disappears when the stretto section begins. It has some independence of

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[8]Robin Hawthorne, "The Fugal Technique of Béla Bartók," The Music Review, X (November 5, 1949), 280-281.

melodic character but clings closely to the subject and is derived from it. The first appearance of this countersubject occurs with all four statements of the subject in the exposition.

Example 48. Béla Bartók, Opus 85, Seconda parte, measures 242-245 of the second violin part and measures 246-249 of the violoncello part: String Quartet III subject and countersubject.

The fifth string quartet fugue contains another countersubject that closely follows the general direction of its subject rather than being truly contrapuntal in its motion. The relationship between answer and countersubject is that of a tritone (B^b - E). The countersubject occurs with the two remaining statements of subject and answer, preserving the tritone relationship. In addition to this, a constant ostinato figure is employed that changes very little throughout the exposition. Again, the countersubject disappears when the stretto section is reached.

Example 49. Béla Bartók, Opus 102, 5th movement, measures 370-382 of the viola part and measures 383-391 of the viola part: String Quartet V subject and countersubject.

The countersubject in the Sonata for Two Pianos and Percussion fugue is regular in the exposition but does not reappear elsewhere. The countersubject mimics the subject with a rhythmic motive (♪♩) common to both subject and countersubject.

Example 50. Béla Bartók, Opus 110, 1st movement, measures 332-339 of the second piano part and measures 339-346 of the second piano part: Sonata for Two Pianos and Percussion subject and countersubject.

(The subject shown above is the first statement; the countersubject plays against the second statement of the subject.) The common rhythmic motive may alternate between subject and countersubject or occur in unision. However, the character of the countersubject is so much like that of the subject that it loses its independence from a contrapuntal standpoint.

The countersubject appears to be tonally ambiguous. The C# is a prominent pitch because it is both the initial and final note. The pitch E is prominent agogically (a value of ten eighth notes in the passage), and it occurs in close proximity to both the initial and final C#. Other pitches that occur with values equal to or more than a dotted quarter note in duration are agogically prominent. In addition to D and C#, these include E^b, F, D, and B. While creation of a scale for the countersubject accomplishes little, five of the above prominent pitches can be arranged as B C# D E F, with a 2 1 2 1 semitone pattern. This is Lendvai's model 1:2.

The subject above the first countersubject statement has F as its tonal center. If the tonal center of the countersubject is accepted as C#, then there is a major third relationship between the tonal centers. The major third, when inverted to a minor sixth--the most prominent interval in the subject, may help to explain the mimicry taking place when the ear hears the lines in counterpoint.

Bartók's countersubjects do not have a decidedly rhythmic character of their own, and their melodic movement often coincides with that of their subjects. A countersubject is not found after the exposition in any of the fugues examined. "The need for conciseness of thought and brevity of utterance which is imposed upon the composer at such a point is perhaps the reason for the concentration of subject and counter-subject into a single statement of double-fugal nature."[9]

Overall Organizations of the Fugues

The Exposition

None of the fugues examined in this study has more than one exposition. The structure of each exposition is determined by the nature of the answer employed within it. In the case of literal or nonliteral answers (considered actually to be answers), the format is subject-answer-subject-answer; this organization occurs regularly in the quartet fugues. The subject-answer relationship in the first string

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[9] Ibid., p. 283.

quartet fugue has already been examined--a nonliteral answer sounding a perfect fourth above the subject. In the third quartet fugue, the answer is literal and the interval of imitation is the perfect fifth. In the fifth quartet fugue, the answer is literal, but the interval of imitation is the diminished fifth. Kárpáti discusses this novel interval of imitation by saying:

> Bartók, however, not only preserved the tradition [of Bach]: he transformed it. This sort of effort becomes manifest in his introducing the technique of mistuning into counterpoint as well, when he replaces the perfect fifth answer in many of his fugally structured works by a mistuned fifth answer.[10]

If the axis system is used as a model instead, the subject and answer act as pole and counterpole on the tonic axis. If indeed the pole can be interchanged with its counterpole as Lendvai states, then Bartók is changing only the pitch level of the subject material but not its functional level, and the subject-answer format in tonal terms is tonic-tonic-tonic-tonic. Of course, since the listener expects a tonic-dominant-tonic-dominant pattern, the ear may hear the answer as mistuned. This may be one case where Kárpáti's mistuning principle holds its own. Kárpáti also states that this kind of mistuning "solves the problem of uneven (fifth-fourth) division of the octave by means of the distance principles, the diminished fifth-augmented fourth way of halving the octave, and although it is built on the twelve-note chromatic system--it removes the danger of toppling tonality over."[11] At any rate, the tritone is already prominent in those subjects that have tonal organizations that fall into a diminished (or overtone) scale pattern.

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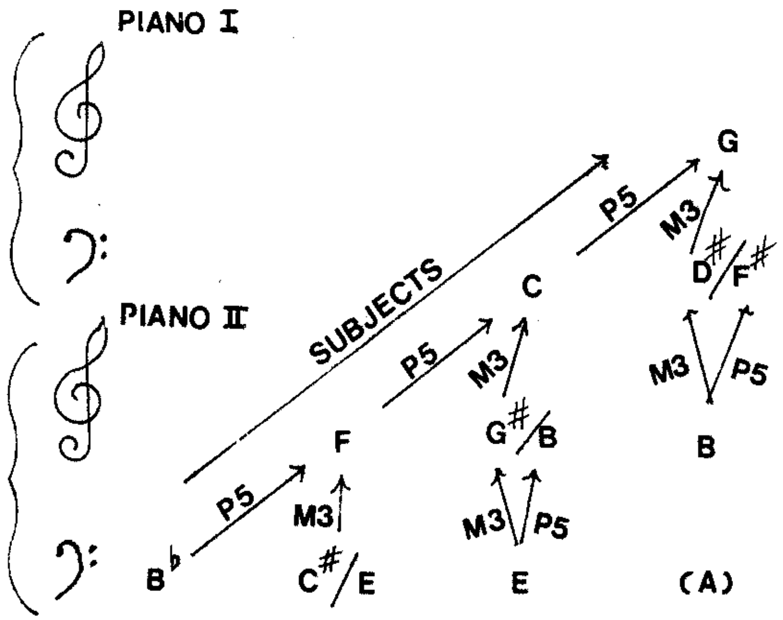
[10]Kárpáti, Bartók's String Quartets, p. 147.

[11]Ibid.

In the fugues of the Music for Strings, Percussion and Celesta and the Sonata for Two Pianos and Percussion, the expositions consist of five and four successive entries of the full subject, respectively. The interval of imitation in both cases is the perfect fifth. However, the entrances in the former fan out from the first entrance on A. The second subject appears on E, a fifth above A, and the third subject appears on D, a fifth below A. The exposition in the latter fugue has its fifths arranged in one direction, with the tonal centers as follows: B^b F C G. Because the construction of the fugue in the Music for Strings, Percussion and Celesta is innovative, fuller treatment will not be given to it until episode and stretto are discussed later. The relationships that occur among subject, answer, and countersubject in the fugal exposition of the Sonata for Two Pianos and Percussion, however, needs special attention. Recalling the earlier discussion of the tonal centers in this fugue, the subject's tonal center is B^b in the first statement. Then the second subject statement occurs with F as the tonal center in counterpoint to a countersubject where the tonal focus is unclear--either C# or E.

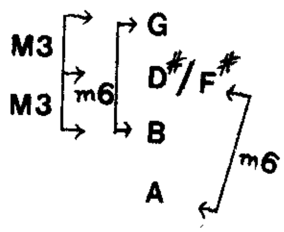


Example 51. Illustration of the relationships between tonal focuses in the exposition of the Sonata for Two Pianos and Percussion fugue.

The strict canonic treatment of the exposition gives rise to a second countersubject presented only twice and only in the second piano part.

Example 52. The second countersubject.

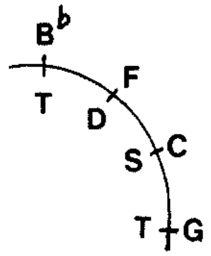
This second countersubject has not been mentioned before, so that its role in the total exposition could be more fully explained. While the third entrance of the subject is governed by C as a tonal center, the first countersubject appears to be centered around G# and B and the second countersubject appears to be centered around E. In the same way, the countersubjects set against the subject in G center around D#, F#, and B. The tonal focus of the lowest voice under the fourth subject appears indefinite, but suggests A at the end of the exposition. The interval between the tonal center of the third subject in the uppermost voice and the second countersubject in the lowest voice is that of a minor sixth (E up to C). The minor sixth occurs again a fifth higher under the fourth subject (B up to G). Furthermore, under the fourth subject, if A is accepted as the tonal focus of the lowest voice, the tonal ambiguity of the first countersubject above it (D#/F#) indicates that it may resolve in the direction of F# because the vertical arrangement of the four voices' tonal focuses shows two interlocking minor sixths. The tonal focuses in the three upper voices related to each other by major thirds (B, D#, and G). The vertical arrangement of the tonal centers under the fourth subject is repeated below, indicating the intervallic relationships.



Example 53. Vertical arrangement of the tonal focuses by the end of the exposition.

By now, it is clear that the most important interval in this exposition is the minor sixth (or major third). (The minor sixth is represented in the Fibonacci series by 8.)

A further relationship can be postulated to prove the importance of the major third/minor sixth interval. When a subject ends in this exposition, and the voice that carried this subject carries the countersubject, the tonal focus moves up an augmented second (B^b to $C^{\#}$) because the new subject enters the perfect fifth above the first subject. The interval that results when comparing the tonal center of the new subject and the tonal focus of the countersubject is a major third (or minor sixth. The same procedure occurs two additional times until the subject arrives at the G tonal center. If a circle of fifths is shown with B^b as the starting point, the movement of tonal centers of the four subjects from B^b to F to C to G is clearly seen. The movement is related in this exposition to the major third/minor sixth relationship.



Example 54. Tonal centers of the exposition located on the circle of fifths.

The Episode

Bartók shows considerable freedom in the use of material in his fugal episodes. He uses episodes to whittle away at the previous material, until he has reached that which forms the essence of the subject, or else he chooses and develops a motive that represents only that essence. Rather than building up, he builds down, but there is still much variety to be found.

The episodes introduce contrast to the other essential parts of a fugue. The first episode usually comes after the exposition. For Bartók, however, the episode can take on a life of its own, giving freshness to the somewhat redundant exposition.

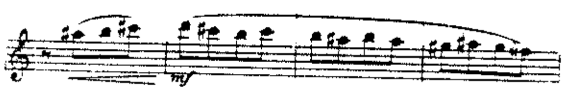
In the case of the first quartet fugue, the single episode comes immediately after the exposition and precedes the stretto section. Its construction is based on the motivic material from the final section of the subject. This motive is repeated to form an ostinato pattern in the bass thus elongating the last statement of the subject. During this last statement of the subject in the bass, free material resembling the main theme of the first movement of the quartet begins to appear above it. This free material becomes more rigid (with the rhythmic motive ♩. ♪) and by the end of this last subject statement, this material continues over the ostinato for four measures when the stretto section is reached. The episode therefore begins within and blends with the exposition.

The first episode in the third quartet fugue occurs again immediately after the exposition and before the stretto section. It represents essentially a development of the straightforward subject and countersubject created by rearranging the four-note motives of the subject into different orders with more intervallic variation and in combination with an eighth-note motive resembling the countersubject.

Example 55. Béla Bartók, Opus 85, Seconda parte, measures 255-257 of the score: beginning of the episode.

A second episode occurs after the stretto section beginning in a canonic fashion one-half beat apart. The lower three voices employ much parallel scalar motion while the violin uses repeated notes. This episode is also built from subject motives.

The fifth quartet fugue has no episodes. However, the transition back to the main body of the movement is a transformation of the last part of the subject.



Example 56. Béla Bartók, Opus 102, 5th movement, measures 430-433 of the second violin part.

The entire transition extends the above idea in a chromatic scalar fashion until it causes the fugue gradually to blend back into the movement. The ostinato figure, which characterizes the entire fugal passage throughout the exposition and the stretto section finally ceases as the chromatic transition gains momentum in more voices. This ostinato figure is shown below.

Example 57. Béla Bartók, Opus 102, 5th movement, measures 370-371 of the violoncello part: ostinato figure found throughout the fifth quartet fugue.

The nature of the entire fugue after its exposition in the Sonata for Two Pianos and Percussion is episodic, but the interval of the minor sixth, so prominent in the subject, is an integral part of it. The rhythm is predominantly made up of eighth note-quarter-note motives (♪♩). One example of how this rhythmic motive and the minor sixth is integrated into this episode is given below.

Example 58. Béla Bartók, Opus 110, 1st movement, measures 384-385 of the second piano part: minor sixth ostinato.

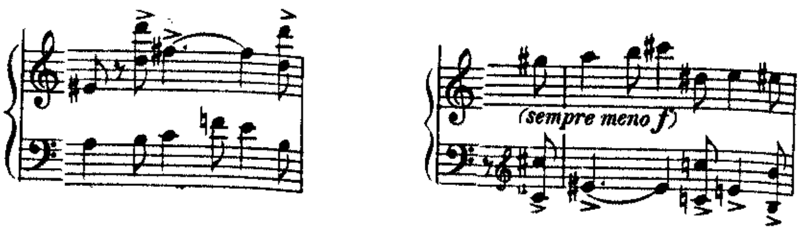
The figure is used as an ostinato throughout much of the episode becoming later contracted into chords employing the same rhythmic motive.

The lengthy episode of the *Sonata for Two Pianos and Percussion* fugue can roughly be divided into six phases. These phases cannot be equivalent to sections, for the counterpoint is continuous and unyielding for the most part. Each phase contains certain motives often exchanged between the piano parts. The predominant rhythmic motive (♪♩) pervades the entire episode.

The first phase concerns itself with intervallic expansion and contraction. In this phase, a melodic line such as the following is presented.

Example 59. Béla Bartók, Opus 110, 1st movement, measures 360-361 in the upper voice of the first piano part.

Two other significant events occur in the beginning and middle of this phase.



Example 60. Béla Bartók, Opus 110, 1st movement, measure 360 of the second piano part and measure 364 of the first piano part.

The second phase continues the intervallic treatment in the direction of contraction to the point of chromatic scalar motion. Its beginning shows more preoccupation with the minor sixth set in counterpoint against itself.

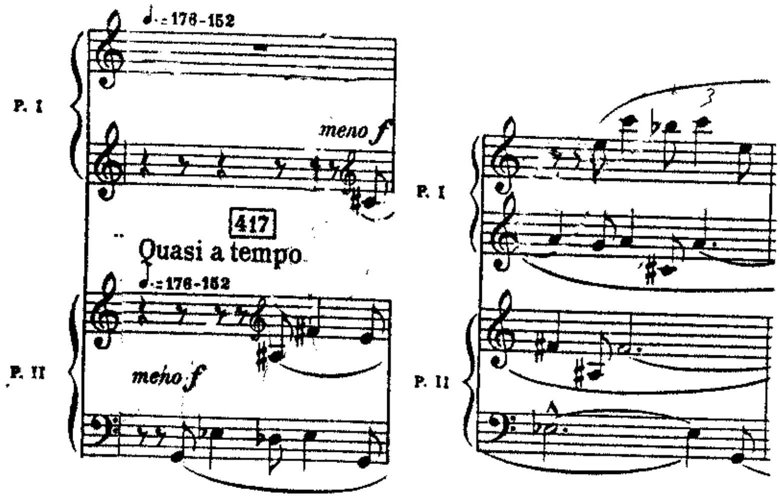
Example 61. Béla Bartók, Opus 110, 1st movement, measures 368-369 of the first piano part.

The third phase is also concerned with minor sixths but they gradually develop into the ostinato pattern (shown earlier), and the pattern accelerates. Different variations on the chromatic pattern below appear every two measures or so and then every half measure on top of the ostinato. The result is a building up of intensity as the climax is approached.

Example 62. Béla Bartók, Opus 110, 1st movement, measure 386 of the second piano part.

The GS division of the fugue is marked by a four-measure drum roll occurring just before the fourth phase. In phase four, the ostinato pattern changes to doubled parallel sixths, the melodic pattern over it becoming more scalar and less chromatic, finally forming downward parallel thirds. The dynamic level is fortissimo at this point, and four simple measures of ascending minor sixths (A# - F#), in a suddenly thin texture (after the approximate division of the episode itself), lead into a fifth phase that employs some aspects of stretto.

Only the beginning of the fifth phase can actually be described as hinting at stretto.



Example 63. Béla Bartók, Opus 110, 1st movement, measures 417-418 of the score.

The voices begin overlapping each other by imitation at the minor third three (eight-note) beats apart. The constant use of the minor sixth continues on in another ostinato pattern while a distinctive motive is created above it.

Example 64. Béla Bartók, Opus 110, 1st movement, measures 424-426 of the score.

The sixth phase is announced by the irregular rhythmic contraction of the following motive:

Example 65. Original rhythmic motive and its irregular contraction in the sixth phase.

The contracted rhythmic motive is set in counterpoint against itself for the remainder of the fugue, except where the full alpha chord on G appears.

Example 66. Béla Bartók, Opus 110, 1st movement, measure 436 of the two-piano score: alpha chord on G.

The base line in the tympani after this chord alternates C and F# for six measures indicating the C tonic axis with C - F#) and ends with G - C at the cadence.

Stretto

Stretto is a characteristic shared by all of the string quartet fugues. The <u>Sonata for Two Pianos and Percussion</u> fugue does not contain stretto in the strict sense; the entrances of the minor sixth motive so important in the subject's beginning occur at times in rapid succession, but no other part of the subject repeats itself. Stretto occurs in various places in the <u>Music for Strings, Percussion and Celesta</u> fugue with the subject in fragmented form in the episodes and sometimes in complete form in a few areas. This latter fugue is examined in further detail later.

This section discusses the interval of imitation, the distance between entries of the subject (or subject fragments), and the character of the subject that allows itself to be set against itself in stretto. Inversion of the subject is noted when it occurs. A comparison of the intervals of imitation and the distance between entries in the stretto sections of the quartet fugues follows.

The stretto in the first string quartet fugue properly begins with the appearance of the motive from the third section of the subject, which has been used as the ostinato of the four-measure episode before it. The motive is played against itself a tritone apart.

Example 67. Béla Bartók, Opus 7, 3rd movement, measures 192-197 of the score: beginning of stretto section.

Then the motive from the first section of the subject is used to form the remainder of this backward stretto (shown above). The notes used to initiate each motive collectively form a G major pentachord; the order of entrance is A C D G C^b(=B). One could say that this stretto, because of the emphasis given the notes which begin each subject motive, exhibits an overall G tonality. The subject and its nonliteral answer are presented with a tonal center of D^b. (See example 30 and 47) The emphasis in that example was on the Mixolydian tetrachord in the lower part of the wedge structure. The emphasis in the stretto here is on the G major tetrachord.

The stretto section of the third quartet fugue has its interval of imitation a quarter note apart at the major sixth in the lower three voices. The voices enter respectively on D, B, and G#. The stretto section continues immediately with inverted subjects in three voices sounding again a quarter note apart and descending from the first violin through the viola to the cello. The interval of imitation here is again a major sixth, with entries on G, B^b, and C#. The initial tones of all the subjects in this stretto fill all the chromatic steps from G to D. If the stretto's tonal organization is based on G, its relationship to the A tonal center of the fugue is that of dominant. The G occurs on the E dominant axis. The subject statements may be elongated or truncated at either end.

The stretto section in the fifth quartet fugue begins before the last complete statement of the subject has run its course in the exposition. The first stretto subject occurs on C, which is imitated six beats later on A, and then two beats later on F#, creating imitation at the major sixth as in the previously discussed stretto section. The last subject, on E, is inverted and occurs eight beats later. This inverted statement is the last statement of the subject, and it breaks the pattern of imitation at the major sixth. The other three pitches, F#, A, and C, belong to the F# subdominant axis in relation to E. The number of repeated notes of the beginning of a subject in stretto varies.

The Final Statement of the Subject

The tradition of stating the subject a final time somewhere near the end of a fugue has its roots in the common practice period. It is like the end punctuation of a sentence. Also, a short coda may or may not be present after the final statement.

The *Sonata for Two Pianos and Percussion* fugue has neither a final statement nor a true coda. Once its episode has begun, the remainder of the fugue continually develops the minor sixth and abandons the material in the rest of the subject.

The final statement of the *Music for Strings, Percussion and Celesta* fugue is a double statement, one voice presenting the subject and the other presenting the subject in inverted form at the same time. The celesta accompaniment of these statements thickens the texture After the complete final statements, the celesta stops and a coda concludes the fugue with fragmentary statements of the subject.

The above fugues are special cases. The three quartet fugues follow a more traditional pattern. The final statement of the first quartet fugue (shown below) is an altered statement of the subject beginning in A and then progressively changing tonal centers.

Example 68. Béla Bartók, Opus 7, 3rd movement, measures 203-210 of the second violin part.

The extension of the first motive is taken up by other voices and leads back into the main body of the movement.

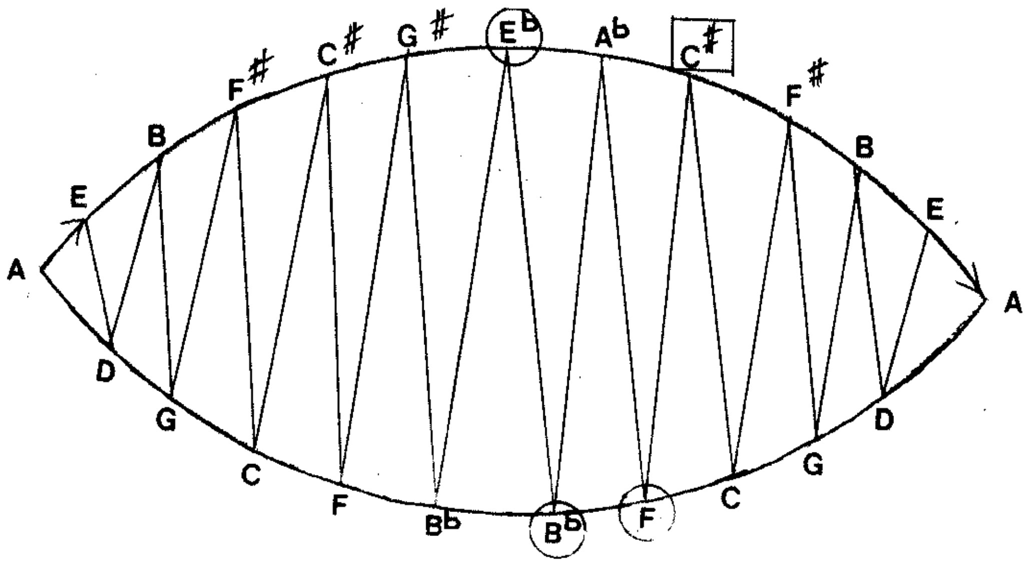
The final subject statement of the third quartet fugue is fragmentary with extension of the repeated note. The tonal center appears to be B, a subdominant axis relationship to the original tonal center of A. Three fragments of this final statement appear below.

Example 69. Béla Bartók, Opus 85, Seconda parte, measures 285-288 of the second violin part and measures 290-291 of the first violin part.

The final statement of the fifth quartet fugue, as mentioned before in the discussion of stretto breaks the major sixth imitation and occurs in inversion. This inverted subject is considered the final statement because it returns to the original tonal center of the fugue (E). The fact that this entrance breaks the interval of imitation established in the stretto occurring at this point aids in establishing this statement as a concluding entry.

The Music for Strings, Percussion and Celesta

The first-movement fugue of the Music for Strings for Strings, Percussion, and Celesta is a good example of how completely Bartók integrates tonal organization and form. His tonal organization here traces the circle of fifths beginning at A and returning to A. The following diagram shows the various entries of the subject.



Example 70. Diagram showing the tonal organization of the fugue subject entries in the Music for Strings, Percussion and Celesta.

The ascending fifth in the tonal organization is traditional and is expected. In the *Sonata for Two Pianos and Percussion* fugue, the use of rising fifths in the exposition was also discussed. The fugue under discussion, however, employs both the rising fifth and the falling fifth. A possible precedent for the use of the falling fifth is found to a degree in folk song.

> The most ancient pentatonic type of Hungarian folksongs, which displays close relationship with the folksongs of other Asian peoples, has an individual verse structure in which the material of the first two melodic lines is repeated a fifth lower. This fifth layering is naturally not a characteristic which is exclusively found in the folk music of these particular people; obviously, it appears in the music of other peoples as well--as a result of the acoustic phenomenon of fifth relationship. In Bartók's melodic writing and also in his structuring of form it is possible to observe this peculiar fifth layering of folksong structures.[12]

In example 70, the circled pitch classes E^b, B^b and F occur in the climax section of the fugue and are not entries of the subject in any form. They are used to hammer out a syncopated rhythmic motive () that is peculiar at the climax. However, the fact that this rhythmic motive is transposed up the circle of fifths and continues the key scheme of the movement is significant. Even more significant is that an A^b entrance, carrying subject material, appears between the B^b and F entrances of the rhythmic motive during this climax; the subject material is in inverted form for the first time.

There is no C# entry of any kind. A is reached again when the subject is presented in a final statement in which a transformed version

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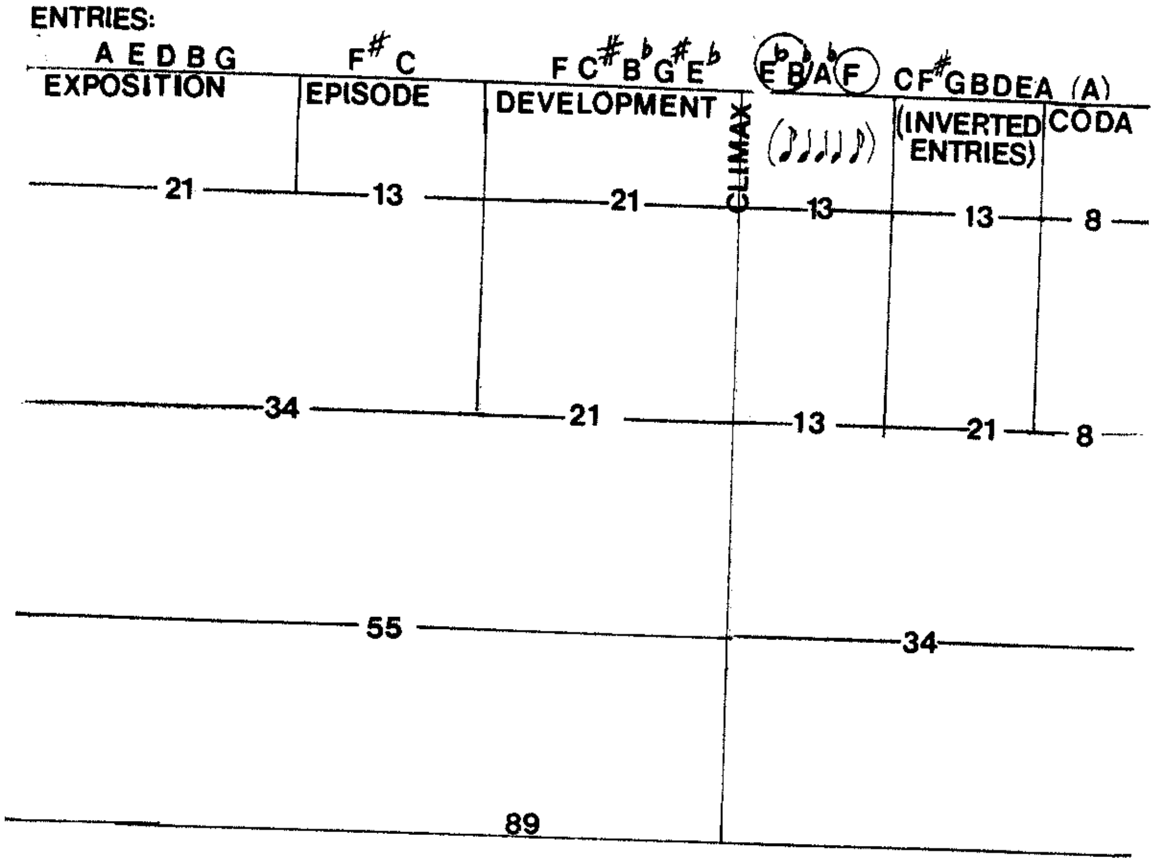
[12]Kárpáti, *Bartók's String Quartets*, p. 147.

of the subject and of its inversion occur simultaneously and three octaves apart. The last statements are not exact repetitions of the subject. Except for the exposition, the subject, in fact, is never presented in exactly the original form again; its form may be fragmented or the cells may be rearranged and distorted through thematic (or cellular) transformation accomplished most often by intervallic expansion and contraction. However, there will usually be enough of the subject's melodic or rhythmic character present to identify it unmistakably.

The following diagram, which describes the fugue's formal construction, divides the various subject entries into sections. The circled pitches again represent the motives used at the climax.



Example 71. Formal construction of the fugue in Music for Strings, Percussion and Celesta.

The entire form falls into approximate GS proportions. Although this movement uses a number of meters, unlike other such works, the GS divisions are not based on the total number of beats, as would be expected. Instead, the Fibonacci numbers in example 71 indicate the number of measures in each section. Actually, the fugue contains a total of 88 measures, but in order to complete the divisions using only Fibonacci numbers, one measure of silence should be added to the coda. This total of 89 measures, in turn, divides into smaller and smaller sections. The divisions are logical because each section develops a different aspect of the chromatic material. In those sections containing subject entrances, the subject is treated each time in a different way, often producing stretto. The sections blend into each other in a complex contrapuntal fashion that produces an almost continuous moving mass of sound. The sound mass also has definite and consistent dynamic direction, the fugue beginning at pianissimo, building up to <u>fortississimo</u> at the climax and diminishing gradually from there to a <u>pianississimo</u> at the end.

Five full entries of the subject on A, E, D, B, and G constitute the exposition. The G entry concludes on G in the bass, as if bringing the exposition to a cadence at measure 21. The free counterpoint occurring in the other voices around each subject statement is built on continuous transformation of the subject's cells. This free counterpoint continues after measure 21 to form a thirteen-measure episode.

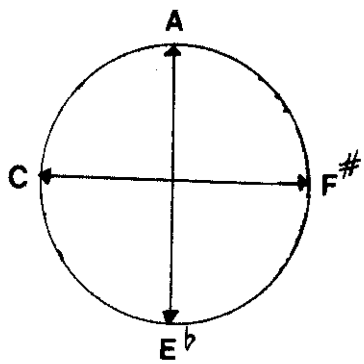
During the episode, the first five measures continue the free material, but the next five present two full entries of the subject (on F# and C) with each entry doubled in stretto. During the stretto, two voices in between the two subject entrances continue uninterrupted with episodic material. A three-measure continuation of the free material forms a transition to the development section, which begins at measure 35.

The development section is 21 measures long, divided into four units consisting of respectively three, eight, five, and five measures. A stretto of overlapping subject fragments constitutes the first three measures; the subject fragments enter on F#, C#, and B^b. Two subject entries, each doubled, with cells expanding intervallically, occur in stretto over a seven-measure span, staggered four measures apart. The first doubled entry is on B^b, and the second, on A^b, but the direction of the latter entry is inverted, not necessarily preserving the full character of the subject. A third doubled entry on E^b presents a subject fragment. Another episodic section five measures long continues intervallic expansion of the cells, with the perfect fourth as a prominent interval. The climax of the development is reached in the next five-measure section, at measure 52, where a stark open-fifth sound (D - A) suspends the motion momentarily. The tympani sounds and the chromatic lines arrive on E^b at the fortississimo dynamic level, hammering out the syncopated rhythmic motive (♪♩♩♪) described earlier in this section.

The remainder of the subject entries on G, B, D, and E are transformed fragments until the double final statement on A, which are full statements. The G, B, D, E, and final A entries consist of 13 measures. All remaining subject fragments in the remaining measures, which begin on A, overlap each other in stretto. Note that these last fragments in stretto make up the seven-measure coda, but to fill out the eight measures expected in a Fibonacci structure, one measure of silence must be imagined at the end of the movement. The final fragments are in unison, but one is inverted. Illustrated here, it calls attention once again to a symmetrical pattern, which is able to give a definite cadence to support the tonic note.

Example 72. Béla Bartók, Music for Strings, Percussion and Celesta, 1st movement, measures 86-88 of the score: final cadence.

The tonal organization of this fugue also exhibits the axis system. The climax at measure 56 on E^b represents arrival at the counterpole of the tonal center of A. The sixth and seventh subject entrances in the episode, on F# and C, represent the other pole-counterpole relationship on the tonic axis.



Example 73. The tonic axis on A.

The same "progression" occurs when going from E^b back to A with the subject in inverted form. The only break in the pattern of the circle of fifths is the omission of the C# entry in the key scheme. Because three of the key areas at the climax do not contain subject material, and because one of the C# entries is missing, the total number of statements of the subject material is 21.

CHAPTER IV

CONCLUSION

Tonal organization in Bartók's music departs from that of the common practice period as a result of the composer's innovative use of both new scales formed by tetrachord combinations and also old scales such as the pentatonic scale from folk sources. His tonal language becomes more elaborate as a result of the mixing of modes. The mixing of the major and minor modes is a simple result of this process; symmetrical mirror scales represent a more advanced process. The technique of polymodal chromaticism produces yet more complex arrangements of pitch organization, even approaching total chromaticism.

The theoretical principles contributed by Lendvai, Kárpáti, and Nettl provide some guidelines for analysis of Bartók's music. Where tonal principles are concerned, Lendvai's axis system is a flexible one and can be used to explain some of the relationships such as change of tonal center between tonal areas within a melody or within an entire section or movement. The Fibonacci series can be used to explain some of Bartók's scales as well as some of his harmonic devices and formal proportions. Kárpáti's mistuning theory is perhaps more useful when applied to the tracing of themes to folk music sources, but nevertheless it shows how the subject of the fifth quartet fugue may have been originally conceptualized and then transformed by the composer. The ethnomusicological approach to discovering tonal centers has been quite helpful in all the analyses except that of the fugue in the Music for Strings, Percussion and Celesta because the latter is so chromatic.

Formal organization according to Lendvai's GS divisions can be applied with some success in almost every fugue, especially in regard to its subject. The Fibonacci number series, a phenomenon related to GS division, shows clearly the sections of the fugue in the Music for Strings, Percussion and Celesta. Monothematicism, at least in the third and fifth quartet fugues, explains how the subject is derived from the main theme or a previous theme found in the quartet itself. Monothematicism, however, is more applicable to the explication of the formal structure in the overall plan of a piece between movements and large sections.

The string quartet fugue subjects show some similarity in pitch organization. The most common model among the scalar structures associated with these fugue subjects is the use of the overtone scale, (which contains the pattern of semitones arranged in a 2 2 2 1 2 1 2 sequence), and its inverted form, (where the sequence is reversed). These scales present themselves in three of the fugue subjects, located in String Quartet I, the Music for Strings, Percussion and Celesta, and the Sonata for Two Pianos and Percussion.

Another prevalent technique used to generate tonal idioms is tetrachord combination. The wedge structure formed from the pitches of the String Quartet I subject can be broken down into four tetrachords:

minor, major, Mixolydian, and Phrygian. The diminished scale of the String Quartet III subject is made up of two tetrachords: minor (A B C D) and Lydian (E^b F G A). The String Quartet V fugue subject, generally based on the E overtone scale, likewise contains two tetrachords: Lydian (E F# G# A#) and minor (B C# D E). Even the symmetrical organization of pitches in the fugue subject of the Sonata for Two Pianos and Percussion can be broken into two minor and two Lydian tetrachords. As a result of these tetrachordal combinations, various new scales are formed. Whether their origin is attributed to folk music, to the overtone series, or to mistuning of another heptatonic scale, these scales all contain tetrachords.

Even though tetrachord combinations can explain the tonal material in all the fugue subjects considered to some degree, polymodal chromaticism is the best model for the pitch organization in the fugue subjects located in String Quartet I, the Music for Strings, Percussion and Celesta, and the Sonata for Two Pianos and Percussion. In String Quartet I, the polymodality is created by the presence of tetrachords from four modes; their actual usage results in a chromatic subject. The Music for Strings, Percussion and Celesta fugue is unique in that the combination of an A major pentachord interwoven with an E^b descending tetrachord results in a structure that folds back on itself. Bimodality arising from mirror symmetry, between an overtone scale and its inversion, occurs in the fugue subject of the Sonata for Two Pianos and Percussion. Mirror symmetry is another model found in both this latter fugue subject and in the String Quartet I fugue subject, even though the fugues were written 30 years apart.

Finally, an interval that is both characteristic of Bartók's style and used by him in a novel way in all five fugue subjects is the tritone. Lendvai's axis system, which explicates the pole-counterpole relationship, shows how the tritone affects the structure of his works as well as their surface features. The tritone to Bartók seems to be what the major or minor third was to the common practice period. He exploits its characteristic sound in such a way that it becomes an integral part of his tonal language.

This thesis has attempted to show the variety and the evolution of the tonal organizations present in Bartók's fugues. However, the fugues do not show a consistent pattern of development of tonal complexity based on chronology. Instead, the focus has been centered on how the above models--tetrachord combination, overtone scale patterns, polymodal chromaticism, symmetrical mirror scales, and the use of the tritone as a prominent interval--are manifest throughout the fugues. All the models discussed are, to varying degrees, valid descriptions of Bartók's style in the fugues and reflect the breadth of his stylistic resources in all his works.

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