Some Aspects of Béla Bartók's Compositional Techniques

by

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In a conversation with Denijs Dille,[1] Bartók stressed that, although his research in harmony was conducted scientifically and rationally, intuition also played a significant role in his compositions and that all his music was composed with instinct and sensitivity; no one should ask him why he wrote something the way he wrote it, for he could not explain it — for such answers, one should turn to the music itself, it should be clear and strong enough to defend itself.

This statement is, of course, a gross exaggeration, although Bartók might have meant what he said quite sincerely. "Intuition" and "instinct" are loose terms and they should not be interpreted literally. After all, his compositional techniques discussed on the following pages cannot possibly be only the result of intuition, but much rather that of quite conscious, systematic and logical thinking. Perhaps this is exactly what he meant by "sensitivity".

At the end of his early period,[2] that is to say, at about the time he wrote his First String Quartet, Bartók had already worked out the essence of his style which, despite his never-ending interest in experimenting with new possibilities, remained unchanged until the very last works.

[1] In German. First published in French (*La Sirène*, Brussels, 1937). Vid. *Bartók Breviárium* (Bartók Anthology), collected by József Ujfalussy, edited by Vera Lampert. Zeneműkiadó, Budapest, 1974, pp. 478–9.

[2] Bartók's creative life is usually divided into four periods, the first lasting only six years between 1901–1907 (the early period), the second or middle period from 1908 to 1919, the third or "abstract" from 1919 to 1938 and the last or late period from 1939 to his death in 1945. According to Ujfalussy, however, Bartók himself considered the year 1926 much more decisive in the development of his style than the years 1919–1920. Vid. Bence Szabolcsi, "Das Leben Béla Bartóks", *Béla Bartók, Weg und Werk. Schriften und Briefe.* Herausgegeben von Bence Szabolcsi, Corvina Verlag, Budapest, 1957, p. 41 and József Ujfalussy, *Béla Bartók.* Translated from the Hungarian by Ruth Pataki. Corvina Press, Budapest, 1971, p. 166.

His development was consistent, so that clues to the newer works can always be found in the earlier ones. The unity of his style is comparable to that of Bach or Mozart and this is what most obviously distinguishes him from many of his contemporaries, above all from Stravinsky. His interest in tonal symmetry began around 1918 (Three Studies for Piano, Op. 18)[3] and was very intensive by the time of the Second Violin Sonata. It is generally known that this was when he was closest to Schoenberg's music and when Stravinsky's influence was the strongest, but it is less widely known that he knew only a few works of these composers.[4] He wrote in 1920[5] that an atonal system was still lacking and that there were not enough works written on which one could start building a new theory.[6] This means that he knew of the expressionistic movement and even took part in it with his abstract, expressionistic, "most difficult" pieces of the twenties,[7] in which the usual direct influence of folk music seems to be the least obvious.[8]

He asserted that, in order to create something new, one must go back to the old. This conclusion was the result of his experience with ancient Hungarian and other East-European folk music,[9] which helped emancipate him from the hegemony of the major-minor system by giving him the pentatonic and modal scales with which to generate new harmonies. This emancipation, then, led to the free disposition of all twelve tones of the octave.[10] But folk music gave him much more than this

[3] Vid. Colin Mason, "An Essay in Analysis: Tonality, Symmetry and Latent Serialism in Bartók's Fourth Quartet", *The Music Review*, vol. XVIII, no. 3 (August 1957), pp. 189–201.

[4] Vid. Serge Moreaux, *Béla Bartók, Leben–Werk–Stil*, Atlantis Verlag, Zürich/Freiburg, 1950, p. 74.

[5] "Das Problem der neuen Musik", *Melos*, vol. I, no. 5 (April 1920).

[6] Schoenberg was, of course, already working on his twelve-tone theory and, in fact, came out with it only three years later.

[7] Vid. Gerald Abraham, "The Bartók of the Quartets", *Music and Letters*, vol. XXVI, no. 4 (October 1945), p. 190. Vid. also William Austin, *Music in the 20th Century*, W. W. Norton, New York, 1966, p. 241.

[8] Vid. Colin Mason, "Bartók's Rhapsodies", *Music and Letters*, vol. XXX, no. 1 (January 1949), pp. 26–36. Vid. also Halsey Stevens, *The Life and Work of Béla Bartók*, Oxford University Press, New York, 1964, p. 208.

[9] Vid. Agatha Fassett, *Béla Bartók's Last Years: The Naked Face of Genius*, Victor Gollancz Ltd., London, 1970, pp. 345–6. Vid. also János Kárpáti, "Béla Bartók and the East", *Studia Musicologica*, vol. VI (1964), pp. 179–94. Although his musical "mother tongue" originated in the authentic folk music of Hungary, he strongly believed that it is ultimately possible to locate the origin of the (folk) music of all peoples in a few ancient sources.

[10] Vid. his autobiographies dated 1918, 1921 and 1923, *Documenta Bartókiana*, edited by Denijs Dille, Akadémiai Kiadó, Budapest, 1965, vol. II, pp. 113, 117 and 122 resp. He was amazed to find this same pentatonic scale in Debussy's music and attributed its presence to East-European (Russian) influence, just as in Stravinsky's

It gave him more than just new possibilities for melodic, harmonic, tonal and rhythmic structure ; it gave him the principle of the golden section,[11] it made him think in dialectic terms and, consequently, it also made it possible for him to fuse Eastern and Western music into one, allembracing inimitable style.[12]

His tonal system grew out of the functional tonality of the past and is a logical continuation of the tonality of Liszt, Wagner and Richard Strauss. The greatest virtue of his system is that it applies the classical tonal relations to the whole twelve-tone chromatic scale.[13] This is, of course, not identical with the traditional chromatic scale, which consists of tempered approximations of an infinite series of fifths and relies on the fourth and fifth as referential structures to create functional tonality.[14] Bartók's chromatic scale differs from this in that, on the one hand, it is derived from the subdivision of the octave into twelve equal semitones but, on the other hand, the fourth (and the fifth), although their functional implications are different, still play an important role.

Like the Hungarian folk tunes, his music is primarily horizontally and not vertically conceived. His simultaneities are mostly "verticalized motifs" ; only at the local level are they often the results of contrapuntal convergence. The Golden Section System, the Axis System, the Alpha Formations and the Acoustic Scale are not separate entities but are organically interrelated to such a degree that it is often impossible to determine where one begins and the other ceases to function. The restrictions Bartók set for himself were not the results of mere speculation ;

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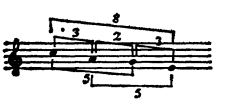
case. Vid. Agatha Fassett, op. cit., p. 167. Vid. also Endre Szervánszky, "Hogyan tanulmányozzuk Bartók műveit?" (How Should Bartók's Works Be Studied?), *Zenepedagógia*, vol. II, no. 2 (1948), p. 18.

[11] That the golden section is not an arbitrary concept but one of the most fundamental principles of music, is supported by the structure of the pentatonic scale which can be considered the simplest manifestation of the golden section :



The numbers refer to semitones, a practice taken from the twelve-tone theory. Vid. below, pp. 163–164.

[12] Vid. Bence Szabolcsi, op. cit., p. 37. His dialectic system makes it also possible to approach his music both from the viewpoint of tonality and from that of twelve-tone-ness.

[13] Vid. Ernő Lendvai, *Bartók költői világa* (Bartók's World of Poetry), Szépirodalmi Könyvkiadó, Budapest, 1971, p. 429.

[14] Vid. George Perle, "Symmetrical Formations in the String Quartets of Béla Bartók", *The Music Review*, vol. XVI (1955), p. 300.

his solutions are always aurally perceivable, musical solutions. His techniques are specific and idiosyncratic with apparently little possibility of continuation and future development.[15] There is no evidence of "protest" or "rebellion" in his music, comparable to that in the works of Schoenberg and late Beethoven[16] against the limitations of form and tonality, not even in his late works; without providing any suggestions for future possibilities, he seems to have solved the problems he had set for himself.[17] This seems to be especially true with regard to the violin sonatas which stand apart from the rest of his works partly as a result of the strange treatment of the two instruments: they are welded together but not intervowen: as a rule, they do not share the thematic material. Bartók never returned to this form and technique in his later works.[18]

It is interesting to note that the violin, the piano and the string quartet (or string orchestra) were adequate for expressing his ideas; his lack of interest in unusual instrumental combinations is striking. However, one must concede that he brought everything possible out of these instruments. And as he had a preference for certain instruments, he also had a strong preference for certain forms like the *sonata allegro*, the *rondo* and the *sonata-rondo* form, all very suited for his motivic technique. He never resorted, however, to the variation form, except in his Violin Concerto, for his most basic technique was variation itself.[19] Variation is closely related to improvisation, a very highly developed technique of Hungarian and Roumanian instrumental folk music.[20] But one should not be deceived by the seemingly quite free surface structure of the fantastic flute and violin improvisations of Hungarian and Roumanian peasants on the one hand and of the Second Violin

[15] Vid. Milton Babbitt, "The String Quartets of Béla Bartók", *The Musical Quarterly*, vol. XXXV (1949), p. 385. It is no accident that there is no "Bartók-school" outside of Hungary and that there, too, composers seem only to imitate Bartók's music without trying to use it as a starting point for developing a new style.

[16] Vid. Jacques de Menasce, "The Classicism of Béla Bartók", *Modern Music* (1946), p. 88.

[17] But unlike Schoenberg or Beethoven, he discovered "new" forms and "new" interpretations of tonality in the "exotic" folk music of Eastern Europe, unknown at that time to the western world, and in adopting these in his own music, he was able to free himself from the limitations of western traditions, without having to work out a completely new "system".

[18] Vid. Halsey Stevens, op. cit., p. 211.

[19] Vid. Robert Smith, "Béla Bartók's Music for Strings, Percussion and Celesta", *The Music Review*, vol. XX (1959), p. 276.

[20] Vid. Hugo Leichtentritt, "On the Art of Béla Bartók", *Modern Music*, vol. VI, no. 3 (March-April 1929).

Sonata on the other: both are based on systematic relations that extend to the smallest details.[21]

While he lived, Bartók withstood storms of abuse and misunderstanding for his incessant search for the new — and now, thirty-three years after his death, he is considered a traditionalist.[22] The "radicals" like to reproach him for two things. One is his alleged lack of the rigorous consistency of Schoenberg and his school and the other is his refusal to give up tonality.[23] The first charge is an unfounded delusion, originating perhaps from the fact that Bartók did not publicize his compositional techniques as some of his contemporaries did.[24] To the second charge, Bence Szabolcsi says that by not giving up tonality, Bartók was consistent with his Credo, and that to have turned to twelve-tone atonality would have meant a complete turnabout, the abandoning of his most basic principles.[25] Bartók himself took the position that since the foundation of his music is folk music and since no atonal folk music exists, it follows that his music is also tonal. True, at one time he came near a kind of twelve-tone music, but even the pieces of that time are without doubt built on tonal foundations.[26] One critic heard infantilism in Bartók's music and thought that its construction, not to speak of its spirit, was primitive. He went even further than that, delving into the field of anthropology by declaring that this could be attributed to the fact that Hungarians are really Mongolians, thus partly yellow (!).[27] At another time, he "forgave" Bartók for this infantilism and barbarism in view of the beauty of the second movement of the Second Violin

[21] Vid. Allen Forte, "Bartók's 'Serial' Composition", *The Musical Quarterly*, vol. XLVI, no. 2 (April 1960), pp. 233—4.

[22] Vid. Robert Sabin, "Revolution and Tradition in the Music of Béla Bartók", *Musical America*, February 1949, p. 7.

[23] Vid. Ernő Lendvai, *Bartók dramaturgiája — színpadi művek és a Cantata profana* (Bartók's Dramaturgy — the Works for the Stage and the Cantata Profana), Zeneműkiadó, Budapest, 1964, p. 11.

[24] This charge is, by the way, flatly contradicted by another critic who charged in turn that in the middle quartets, Bartók was almost wholly preoccupied with technique at the expense of expression. Vid. N. G. Long, "The Quartets of Béla Bartók", *The Listener*, March 1946, p. 381.

[25] Bence Szabolcsi, op. cit., p. 39.

[26] Béla Bartók, "The Folksongs of Hungary", a lecture given in the *Pro Musica Society* in 1928. Its Hungarian translation (by Bence Szabolcsi) first appeared under the title "Magyar népzene és új magyar zene" (Hungarian Folk Music and New Hungarian Music) in *Zenei Szemle*, 1928. Also in *Bartók válogatott írásai* (Bartók's Selected Writings), edited by András Szőllősy, Művelt Nép, Budapest, 1956, pp. 203—14. In German, *Béla Bartók — Weg und Werk. Schriften und Briefe*, pp. 158—63.

[27] Lazare Saminsky, "Béla Bartók and the Graphic Current in Music", *The Musical Quarterly*, vol. X (1924), pp. 401—2.

Sonata.[28] Another critic, in reviewing a joint concert given in London by Ernst von Dohnányi and Bartók in which the Second Sonata was also performed by Miss Jelly D'Arányi and Bartók himself, was so emotional in his dislike of Bartók's music and playing that he stopped just short of calling him names.[29] After his death, of course, more and more people recognized Bartók's greatness; but reading through the vast literature, one must see, unfortunately, that even today, very few people understand the essence of his art.

The literature dealing with Bartók's life, music and scientific work falls into three main categories. The first and largest is a general and broad description of his work as a composer and scientist. The numerous publications of his correspondences, writings and other personal documents, although they are not, strictly speaking, literature, also belong to this category.[30] The bulk of this literature, quite naturally and understandably, originates in Hungary[31] where most of the sources are to be found[32] and where the so-called "Bartók research" is practically a government undertaking. I must say, unfortunately, that much of this literature — and this applies above all to the non-Hungarian literature — is limited to repetitions of generalities, is often loaded with bombastic emotional statements and is frequently even unscholarly, containing gross misconceptions of Bartók's techniques arising from a lack of detailed and thorough analyses. The most comprehensive and best book in this category, in English, is still the one by Halsey Stevens.[33]

[28] Lazare Saminsky, "Schönberg and Bartók, Pathbreakers", *Modern Music*, 1924, pp. 27–8.

[29] Richard Capell, "Mr. Bartók's Bombardment", *The Daily Mail*, London, December 3, 1923. Also in *Documenta Bartókiana*, vol. II, pp. 137–8.

[30] Most of these are in Hungarian; only the last years have seen some translations come out, mostly by or in co-operation with the Corvina Press in Budapest. A recent publication of a collection of Bartók's letters in English, *Béla Bartók Letters*, collected, selected, edited and annotated by János Demény, Corvina Press, Budapest, 1971, is unfortunately, not available commercially outside of the socialist countries. In German, *Béla Bartók Briefe* I–II, edited by János Demény, Corvina Press, Budapest, 1973.

[31] E. g., from Bence Szabolcsi, János Kárpáti, János Demény, Dénes Bartha, Ernő Lendvai, József Ujfalussy et al.

[32] In the Bartók Archive in Budapest, under the auspices of the Musicological Institute of the Hungarian Academy of Sciences, in the care of László Somfai, director of the archive. Aside from a substantial number of Bartók's manuscripts, letters and other documents, the archive houses also his library and furniture etc. which are permanently and publicly displayed. The archive also publishes, from time to time, new materials in its periodical *Documenta Bartókiana* (in German), edited by Denijs Dille. The bulk of Bartók's music manuscripts are, however, located in the Bartók Archive in Lynbrook, New York (Estate of Béla Bartók, P. O. Box 717, Lynbrook, New York 11563. Dr. Benjamin Suchoff, Trustee). A complete catalog is available: vid. *Bartók Archive*, edited by Victor Bator, New York, 1963.

[33] Halsey Stevens, op. cit.

The second category consists of articles of detailed and scholarly analyses of certain, more or less isolated aspects of Bartók's compositional techniques. These articles were written almost exclusively by American and British scholars[34] and have one thing in common, namely, that they are addressed to specialists in music theory, to scholars who are well versed in the techniques of Stravinsky and of the composers of the twelve-tone school. Many of these articles stress those procedures of Bartók's technique which are similar to those employed by serial composers, and these are in turn looked at in the light of twelve-tone theory. Some of Bartók's tonal concepts are also recognized but no comprehensive formulation, theory or "system" of Bartók's tonality has yet emerged.

The third category is the exact opposite of the second, namely, that consisting of Ernő Lendvai's writings.[35] He has discovered Bartók's "system"; but in trying to prove his point, he has taken isolated examples from many different compositions and has failed to show how this system actually works. His theses are little, if at all, known outside of Hungary, because of a lack of translations of his books.[36]

In this limited space, I will not be able to show all aspects of Bartók's techniques but will have to limit myself to those which I think are the most fundamental. The first of these is the golden section which is a geometrical principle of dividing a distance into two unequal sections in such a way that the larger section is in the same proportion to the whole as the smaller section is to the larger section. Its formula is: $a : b = b : (a + b)$. If the whole distance is taken as 1, than the two sections have the approximate proportion of 0.618 : 0.382. The Fibonacci

[34] E.g., by Milton Babbitt, Allen Forte, George Perle, Colin Mason et al.

[35] "Bevezetés a Bartók-művek elemzésébe" (Introduction to the Analysis of Bartók's Works), *Zenetudományi Tanulmányok* (Studies in Musicology), vol. III, Liszt Ferenc és Bartók Béla emlékére (In Memoriam Franz Liszt and Béla Bartók), edited by Bence Szabolcsi and Dénes Bartha, Akadémiai Kiadó, Budapest. 1955, pp. 461—503; *Bartók költői világa* (Bartók's World of Poetry); *Bartók dramaturgiája — színpadi művek és a Cantata profana* (Bartók's Dramaturgy — the Works for the Stage and the Cantata Profana); "Bartók und die Zahl" (an analysis of the Sonata for Two Pianos and Percussion), *Melos*, vol. XXVII (1960), pp. 327—31. O. Nordwall has also recognized the importance of Lendvai's theses. Vid. his article, "Béla Bartók and Modern Music", *Studia Musicologica*, vol. IX (1967), pp. 278—9. Vid. also Jürgen Uhde, *Béla Bartók* (series "Köpfe des XX. Jahrhunderts", vol. 11), Colloquium Verlag, Berlin, 1959.

[36] A summary of his views in German can be found in: "Einführung in die Formen- und Harmonienwelt Bartóks", *Béla Bartók — Weg und Werk. Schriften und Briefe.* This book, however, is not in circulation outside of the socialist countries. To my knowledge, the only book on the subject in English is his *Béla Bartók — An Analysis of His Music*, with an Introduction by Alan Bush, Kahn and Averill, London, 1971, also a relatively short summary of his writings.

series expresses this ratio with simple whole numbers: 2 : 3 : 5 : 8 : : 13 : 21 : 34 : 55 : 89 etc.

The axis system is based on the circle of fifths:

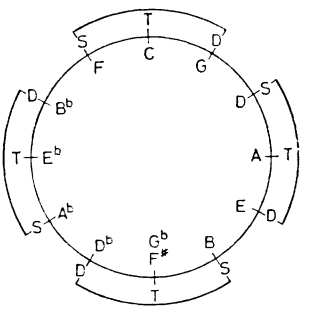


Fig. 1

If, in the circle of fifths, C is considered the tonic, than F will be the subdominant, G the dominant. D is the relative of F (S function), A the relative of C (T function) and E the relative of G (D function). This can be applied to the whole circle of fifths, in which case the three principal functions are periodically repeated. Figure 2 shows the separation of the three principal functions and the resulting three axes:

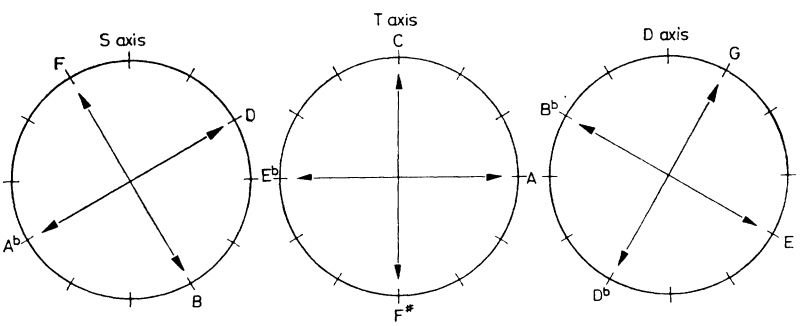


Fig. 2

Each axis has a principal and a secondary branch and each of these has its pole and counterpole:

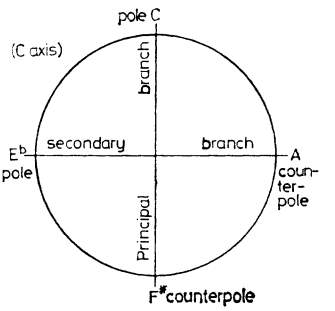


Fig. 3

Any pitch is interchangeable by any of the other three members of the same axis, especially by its counterpole, without affecting its function.

In order to have a tonal feeling, it is necessary to support the tonic with its dominant, that is, the octave must be asymmetrically divided. The alpha formation, the foundation of Bartók's chromaticism, is nothing but the application of this principle with the aid of the axis system, namely, the substitution of the tonic and the dominant by the other three members of their axes:

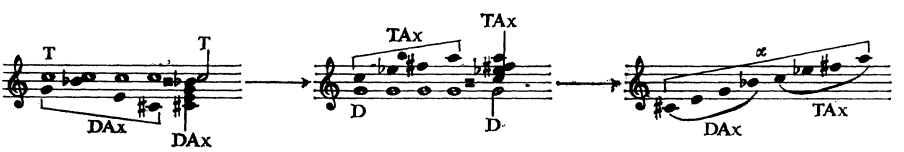


Fig. 4

In other words, the alpha formation is the combination of at least two of the three axes. The diatonic formations, on the other hand, are based on the so-called acoustic scale which is derived from the natural overtone series, containing one flat and one sharp:

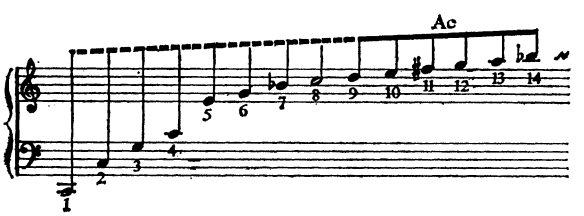


Fig. 5

The seven modes of this scale are shown below:

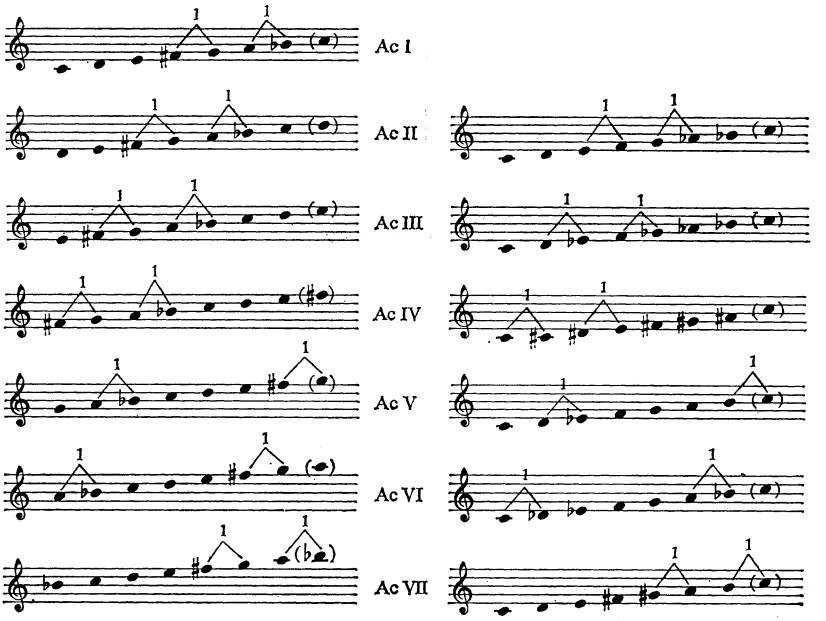


Fig. 6

One last word about Bartók's principle of duality, of opposites that complement one another. These opposites are omnipresent and inseparable. Let it suffice to name just a few of them: alpha formations or pentatonic scale versus acoustic scale, symmetry versus asymmetry, positive (larger segment) versus negative (smaller segment), even metrics versus uneven metrics, tonal center versus root, dissonance versus consonance, dynamic versus static etc.

The foregoing was necessary to be able to look at the first twenty measures of the Second Sonata for Violin and Piano, dated 1922, to see how these principles actually work. Let us begin with the formal structure of these measures.

The whole formal structure of the Sonata will unfold from the microstructure of the violin part of the introductory three and a half measures. (As the piano has but a single note for these bars, it plays no role aside from beginning the piece and thus giving a meaning for the violin's initial rests.) Up to but not including the *fermata* that separates the be-

ginning measures from the main theme, this section consists of 21 ![37] units of eight notes. The quarter and eighth rest (3 ! units) are followed by a dotted quarter note tied to another quarter note (3 ! + 2 ! = 5 ! units) and by an eighth note tied to a quarter (1 + 2 ! = 3 ! units). Thus far, then, this section consists exclusively of golden section proportions and yet, aside from the asymmetrical division of 5, it is quite symmetrical in its structure :[38]

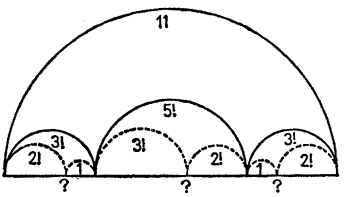


Fig. 7

There is a further division at the point where the first E is attacked, namely, a division into the segment of the initial rests and that of two E's :

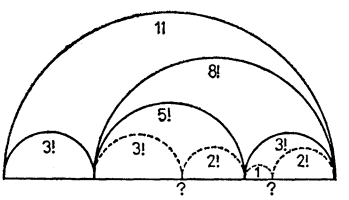


Fig. 8

This segment is the first half of 21 units, separated from the second half by the first change in dynamics (*dim. calando*) and by the tie that connects the remaining notes.

In the second half, the first two units (divided into 1+1 only because they are carried over the bar line) are separated from the following 2 ! + 3 ! = 5 ! units by the *tenuto* mark and by the change of strings ; the *pp* separates the last three units (quarter note plus eighth rest).

[37] Exclamation marks after numbers call the attention to the fact that the figure is part of either the Fibonacci series or a golden section proportion.

[38] Question marks are placed under those segments where the division is not unequivocally the result of notation only. Vid. below, p. 169.

It is significant that the *pp* is placed not under the last eighth of the third measure but under the quarter of the fourth.[39] The result is again a more or less symmetrical structure:

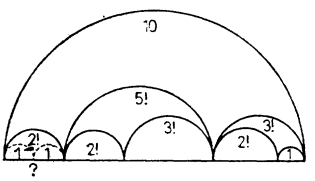


Fig. 9

The change from the E string to the D string and the *tenuto* marking, however, separate the first two units from the rest, so that the ten units are divided into 2 + 8:

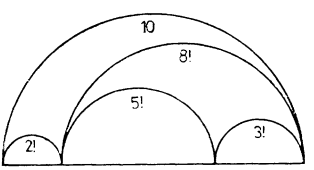


Fig. 10

By putting the two halves together, the following structure results:

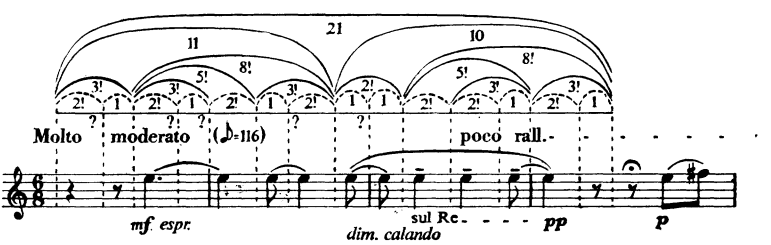


Fig. 11

It is clear from the above not only that the higher the number of segments demarcated at one point, the more important structural role that point plays, but also that the different segments represent different structural layers and often simultaneously even more than one; e.g., the first segment of three rests in figure 11 is not only part of the 3 : 8 ratio but also identical with the second segment of three units.

[39] The exact location of this *pp* has been checked in the autograph manuscript.

It is sometimes difficult to determine which segment belongs to which layer, for the foreground level may be impossible to identify exactly. The two three-unit segments in question may illustrate the problem. The first one consists of a quarter and an eighth rest, the second one of a dotted quarter note. (Note that the two segments may be considered identical, for in 6/8, while dotted quarter notes are commonly used in traditional notation, dotted quarter rests are not: these are always notated with a quarter and an eighth rest.) It is not clear whether they represent the foreground (i.e., the smallest) level or can be broken down into 2 + 1 (quarter rest plus eighth rest and notehead plus dot) or whether such divisions of rests and durations of single notes are the result of notation only or are structurally significant, i.e., aurally meaningful.

This is then the microstructure from which the whole Sonata is projected. If we now change the units of eighth notes to those of measures, we can follow the macrostructure of the first theme. First a one-and-a-half-measure phrase is heard, followed by another two-and-a-half-measure one. The break between the two marks the golden section of the four measures. At (1) begins the next four-measure phrase, divided into 2+2 measures. This is again followed by two measures. These six measures are then divided into 4 + 2 (golden section). This section overlaps with the following one in the violin: the D—E of measure 14 and the subsequent four measures constitute a single phrase. However, this is overshadowed at (2) by the sudden shift in the piano register, preceded by a rest and accompanied by a change of dynamics (*p*—*mf*) in both instruments. These mark the beginning of the last six measures of this section; these are further divided into (1 + 3) + 2-measure segments:

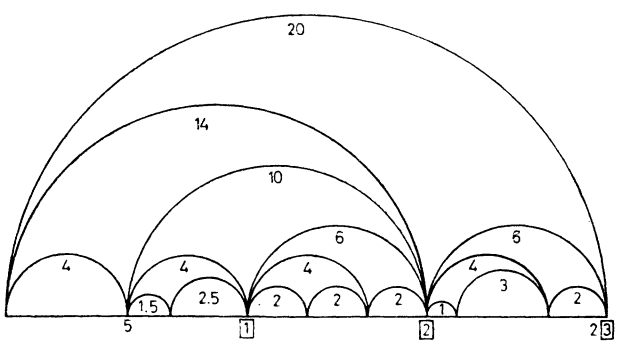


Fig. 12

Although here the actual numbers of measure-units do not match those of the eighth-note-units in the microstructure, the proportions between them are similar. Later on in the piece, there are very close approximations to the microstructure, but no literal repetitions.

Note that while the eighth-note-units are uniform in a given tempo, the length of the measure-units, even within a section of uniform tempo, may vary tremendously (e.g., in these twenty measures : 6/8, 9/8, 5/8, 7/8 etc.). This kind of flexibility with regard to the basic unit is paralleled by the flexible proportions of some of the larger sections. The adoption of uniform measures has been a fairly recent development in the history of western music, and its arbitrariness is attested to by the fact that the music of this period abounds in off-beat accents and across-the-bar line phrases (e.g., *hemiolas*), for musical ideas do not always fit into this uniform division of the time span. Mainly because of language structures that are different from those of the Germanic and Latin languages of Western Europe, much of the Hungarian — and East European — folk music is especially difficult to notate with fixed units of time. As a rule, Hungarian folk songs follow the natural rhythm and accents of the Hungarian language very closely,[40] and as a result, a significant number of them are notated in everchanging meters in the transcriptions of Béla Bartók, Zoltán Kodály and others. On the model of these transcriptions, Bartók was among the first ones at the beginning of our century to emancipate his musical thinking and imagination (both inspired mostly by folk traditions) from the rigidity of the fixed measure.[41] Thus the bar lines in his scores function not so much as mechanical time divisions but rather as demarcation points between stresses. And as the stresses do not necessarily follow one another at uniform intervals, the measures are not the same in length either. This does not mean, however, that they cease to function as fundamental temporal units.[42]

Let us now look at the pitch material of these twenty bars. Of the first two notes of the piece, F-sharp in the piano and E in the violin, it is the former which represents the immediate tonal center (counter-

[40] In Hungarian (not an Indo-European but a Finno-Ugric language), accents always fall on the first syllables of words, regardless of the rhythmic structure of these, and every sentence begins with that word which is being emphasized, the word order being very flexible (the only exeption to this is the unaccented, monosyllabic article). Consequently, upbeats are practically nonexistent in the Hungarian folk music.

[41] Note that often it is not the meter that keeps changing but the length of the beats within the measure (e.g., Six Dances in Bulgarian Rhythm, nos 148—53 of the Microcosmos).

[42] Just as in language where the basic unit is the word, however, much its length may vary.

pole of C). First, it is the lower pitch of a minor seventh.[43] Second, it is marked *forte* versus the *mezzoforte* in the violin part. Third, it is the lowest pitch of this whole section. Fourth, it is not only the first but also the last note of these twenty bars.

The F-sharp-E are taken up by the violin, in reversed order, and these two notes, together with the first note in measure 5, A, constitute the smallest golden section or alpha formation, E-F-sharp-A, identified as the basic set.[44] The notes C-D-E-F-sharp-G-sharp-A, occupying the first two beats of measure 5, constitute not only mode VII of the acoustic scale on C but, when inverted, also an alpha formation:

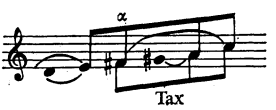


Fig. 13

The G-sharp and the D are not only passing tones in this alpha formation but also constitute the principal branch of the subdominant axis whose secondary branch, F-B, is played by the piano. These, in turn, together with the next G-sharp-C-sharp chord, make up an incomplete C-sharp alpha:

Fig. 14

which establishes locally the tonality of C-sharp in the piano part. Here too, as in the preceding F-B chord, the proportion between the two pitches is 3 ! : 2 !, but this time the dominance of the G-sharp is balanced out by the repeated C-sharp at the end of the measure. The tonality of C in the violin is thus supported by the tonality of C-sharp, the C's upper leading tone.

[43] Vid. Hindemith's theories on the roots of intervals.

[44] It is an unordered set and thus the terms prime, inversion, retrograde and retrograde inversion are not meaningful in their usual sense. A subset, consisting of a major and a minor second, can also be derived by inverting one of the intervals of the basic set. None of these have structural significance by themselves in spite of the fact that they are omnipresent which is due to the fact that they are parts of both the golden section formations and the acoustic scales. This means that they may assume double functions.

In measure 5, the F in the violin is not only an *appoggiatura* resolving to E and having the same function as that of the C-sharp discussed above, and it is not only a passing tone between the F-sharp and E in the acoustic scale but also part of both the transposed basic set C-D-F and a subset D-E-F.[45] This figure, D-F-E, on the analogy of the preceding two beats, brings out the D=E dyad. This is significant, for this dyad and some of its transpositions play an important structural role.

The B-flat in measure 6 is a lower neighbor tone of C (on the analogy of the D to E) which does not fit, however, into mode VII of the C acoustic scale; it is "borrowed" from mode I to generate a symmetrical formation:

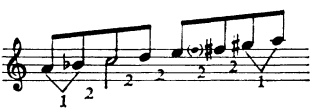


Fig. 15

whose frame is the tonic axis without the E-flat:

Fig. 16

The end of the first phrase and the beginning of the second in measure 6 together form a descending major mode of the C pentatonic scale E-(D)-C-A-G whose last member, G, is displaced by an octave:

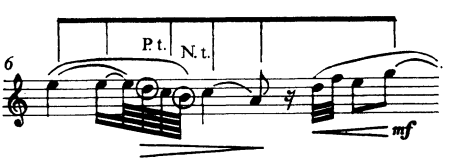


Fig. 17

[45] It is also reminiscent of an inverted *nota cambiata* (C—D—F—E). It is immediately repeated, transposed and incomplete, in the piano (C-sharp—A—B), in connecting the components of the C-sharp alpha.

and is supported by the missing F-sharp in the piano.[46] The role of the B-flat neighbor tone has been discussed; the passing tone D is missing in the next reiteration in measure 11 (it is tonicized at (1)) and the G is also brought down from the higher register, not only to prepare the way for the F-double sharp in the next measure but also for the G on the minor mode of the C pentatonic scale in the piano in measure 13: G-E-flat-C-B-flat. While in measure 6 it is the major mode, built into mode I of the acoustic scale on C, here it is the minor mode, part of the C alpha formation through the added E-natural:

Fig. 18

In measures 6—7, the F-sharp in the piano, to which the already discussed C-sharp alpha is resolved, comes in the form of the transposed basic set C-sharp-D-sharp-F-sharp combined with components of the C-sharp alpha, this time including the earlier missing D (figure 14). At the end of measure 7, the B is locally supported by its lower major second which, together with the subdominant axis, generates a B alpha:[47]

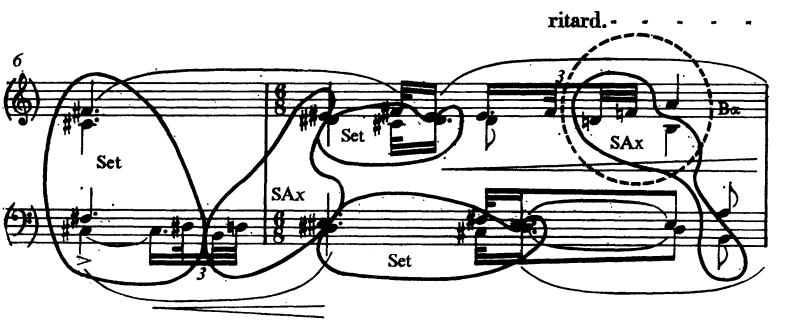


Fig. 19

This reinforced B is also part of the first chord of measure 8 played by the piano: B-sharp-G-sharp-B are nothing but an incomplete G-sharp alpha which is, in turn, completed at the end of the measure by the trans-

[46] The pentatonic scale is an incomplete acoustic scale as well as a golden section structure. For this reason, it should not be thought of as a separate entity.
[47] Cf. with the alpha played by the violin in measure 5 (figure 13).

posed inverted basic set D-sharp-F-sharp-G-sharp. The E-sharp in the middle of the measure has a multiple function. First, it shifts temporarily the tonic G-sharp of the alpha to that of E-sharp of an alpha:

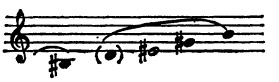


Fig. 20

Thereby it not only brings out again the F-B branch (cf. with measure 5, piano) but also makes the A-C-D-F formation in the violin at (1) part of the incomplete G-sharp alpha:[48]

Fig. 21

Second, this E-sharp is also part of the E alpha in the piano at (1) (figure 22) and, finally, it paves the way for the tonicized E-sharp in measures 11—12. The violin in measure 8 brings out the dominant axis (figure 22), the D-E dyad with the escape tone F and, through the two notes of the *Nachschlag* (D-sharp and F-sharp) and the last two notes of the dominant axis (C-sharp and A-sharp), a pentatonic scale on F-sharp that functions as the counterpole of the C pentatonic scale of measure 6:

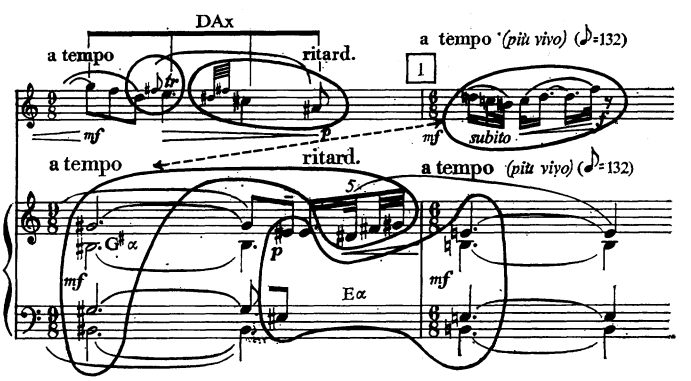


Fig. 22

[48] The G-sharp alpha is not suited for this purpose, for it has a D-sharp and F-sharp instead of a D and F (E-sharp).

The first four measures of the main theme, up to (1), consists of the exposition of the tonic and the dominant axes in the violin and of the elaboration of the F-sharp (counterpole of the tonic axis principal branch) through an incomplete pentatonic scale (i.e., through the combination of two transposed basic sets). The C-sharp, B and G-sharp of the basic set are connected with one another by the secondary branch of the subdominant axis, F-B. The D-E dyad serves the purpose not only of connecting the C of the violin with the piano's F-sharp by means of a tetrachord of the acoustic scale (C-D-E-F-sharp), but also of connecting the tonic axis with the dominant axis in the violin; the E and the G of the latter function locally as parts of the tonality of C, and the introduction of the two missing components in measure 8 results in an effect that is equivalent to a half cadence in traditional tonality:

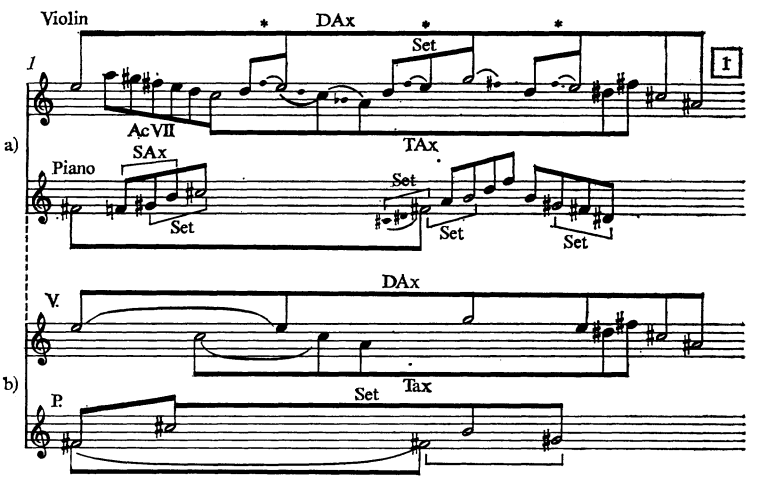


Fig. 23

The violin part of the three measures following (1) has already been discussed; the D-E dyad is here not only verticalized but also both of its components are tonicized. The D-sharp-C sonority in the piano functions as a kind of pivot between the two tonal centers; in E, its components form the lower and upper leading tones of E and B, respectively, and in D, the upper leading tone and lower major second of D (subset).

Also, it is perhaps not too far-fetched to assume that, as the B-E and the D-sharp-C together form an incomplete alpha on C, the D-sharp-C chord is a subtle reference to the basic tonality:

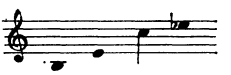


Fig. 24

The reason for this assumption is that the tonality of C is, explicitly or implicitly, stated in all but these two measures of this section.

Up to this point, the D appeared only in conjunction with the E and was subordinated to it. In the two measures following (1), it becomes, for the first time, more significant. First it belongs to the same alpha formation as the E:

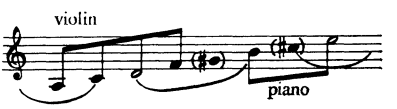


Fig. 25

but then it becomes, through the tripling in the piano and through the combination of it with its own dominant seventh, locally independent from E. (The two D's in the piano are also part of the E alpha (figure 22)). The complete separation of the D from the E takes place on the first beat of measure 11:

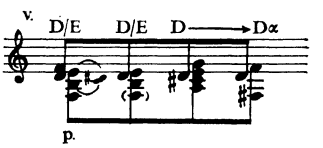


Fig. 26

This separation, however, does not last long, for after the caesura following the first beat, the E is picked up again by the violin.

The D is also the counterpole of the G-sharp (alpha) introduced in measure 8 (figure 22, dotted arrow); the secondary branch of the subdominant axis appears in the following measures: in 11, the F (spelled as E-sharp) in the piano, supported by its two leading tones, F-sharp

and E[49] and in measure 13, the B in the violin, locally tonicized by its upper leading tone C and by the alpha at the end of the measure, supported by the G-sharp (grace notes).[50] Simultaneously, the tonic axis is outlined in the violin in measure 12, each member of the axis being emphasized (tonicized) by either an alpha formation (F-double sharp-C-sharp-*D-sharp-F-sharp*) or by the inverted basic set (E-G-*A* and G-B-flat-*C*).[51] This tonic axis is then continued in the next two measures in the piano — these have been discussed earlier (figure 18) in connection with the pentatonic scale:

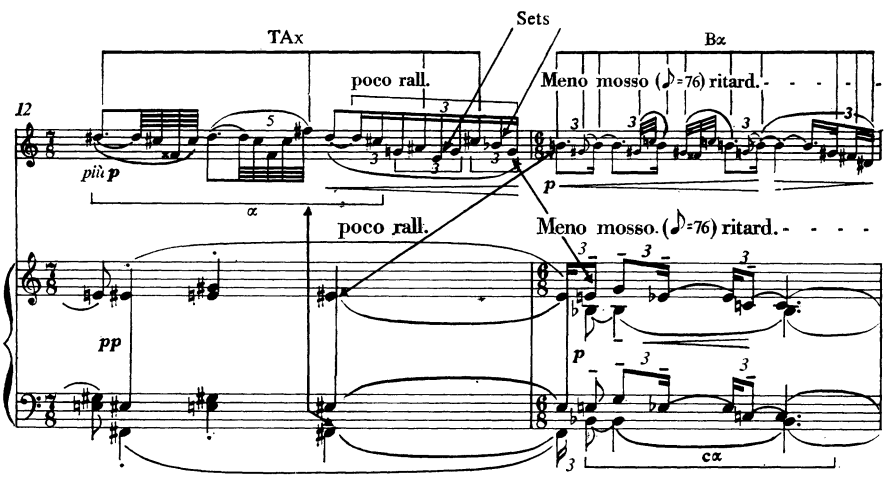


Fig. 27

[49] Note that the E is again connected to the G-sharp and that these two not only resolve to C in measure 13 but are also simultaneous with the tonic axis played by the violin in measure 12.

[50] The F-double sharp is the lower leading tone of G-sharp and the F-double sharp—*G-sharp*—*B*—C formation is analogous with and is the continuation of the *B*—C—D-sharp—*E* formation in measure 9. The *B*—C dyad serves as the pivot between the two. Note also that this is the same alpha formation as that in the piano of measure 8, except that this time the tonal center is not G-sharp but B and that both belong to the subdominant axis.

[51] The F-sharp in the bass, part of the F—B branch of the subdominant axis, discussed above, is also part of this tonic axis. The connection is corroborated by the fact that both the highest and lowest pitches of this passage are F-sharps, by the cross relation between these F-sharps and by the fact that the F-sharp in the violin is the only member of the axis that is not emphasized.

The D-E dyad in measure 14, as earlier, connects the C and the F-sharp; both are explicitly stated in the piano at (2). The D-E-F-E-flat formation (in the violin, at both sides of (2)) is a combination of the acoustic scale and the golden section. This is followed again by the transposed basic set D-E-G, this time without the escape tone F (cf. with measure 6), and by the tonic axis without the A. The last note of this section, E, is identical with the first note; the underlining harmony in the piano in measures 16—19 is the exact retrograde of the opening measures, with only two differences in the G-sharp-C-sharp formation, namely, its registral displacement and the addition of the two leading tones on the model of the B-E formation of measure 9:

Fig. 28

In opposition to the "half cadence" of the first half, the second half closes with a "full cadence":

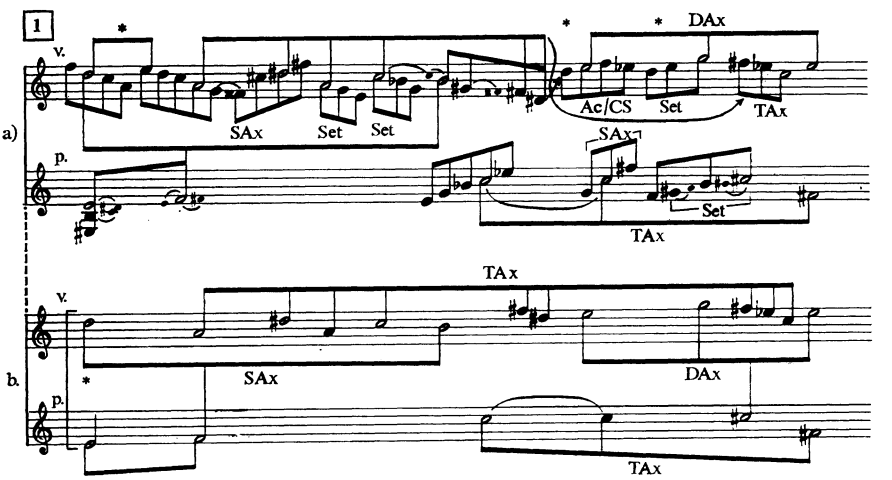


Fig. 29

While the first half is built mainly on the dominant axis and while the tonic is represented only by mode VII of the C acoustic scale, in the second half, it is the tonic axis that predominates. The subdominant

axis is missing both at the beginning and at the end, having the function of connecting the two halves. It is also apparent that the formations present in the foreground are to be found also at the background level:

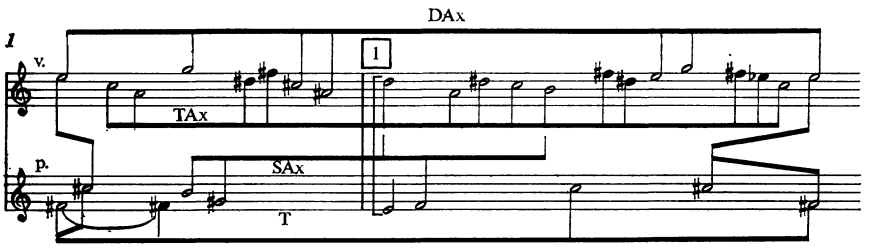


Fig. 30

Figure 31 shows the tonal centers of the section. While the structural points of the violin's melodic lines do not necessarily correspond to their underlining tonal centers and while these differences become clear by comparing figures 30 and 31, the piano's homophonic texture yields almost identical results in both diagrams:

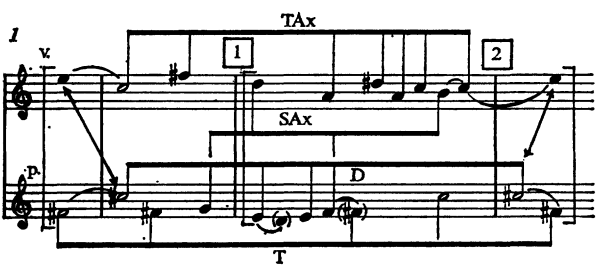


Fig. 31

Except for the primary branch of the tonic axis in the piano, all members of the axes are grouped together with their adjacent members. The melody is built mainly on the tonic axis whose C and A are the most pronounced; the F-sharp and D-sharp appear only once. The interpolated D and B of the subdominant axis in the violin are matched by the G-sharp and F in the piano. The dominant C-sharp-E in the piano provide a quite symmetrical frame, especially if the opening and closing E's of the violin are added to it. The D following the E at (1) in the piano is in parenthesis in figure 31, for it represents the dominant seventh of

D in measure 10 but this formation can also be easily interpreted in the tonality of E as an incomplete mode VI of the acoustic scale: E-(F-)G-A-(B-)C-sharp-D. The F-sharp of measure 11, although not tonicized, is included, also in parenthesis, for it is pronounced enough through its register and its role as a kind of pedal point to strengthen the primary branch of the tonic axis.

The relations shown in figures 23, 29, 30 and 31 are pitch class relations, the actual registers not being consistently indicated. These diagrams may be supplemented by the following. Of the two instruments, it is the violin that plays the more predominant role in this section (quasi an accompanied song) whose most background structure is centered on the pitch e^2, its very first note, within the span of an octave, by the fusion of three sets:

Fig. 32

The components of this formation are arranged quite symmetrically: E (opening note) — A (measure 5) — G (measure 7) — D (measure 9) — B (measure 13) — D-E (measure 14) — G (measure 16) — E (measure 18):

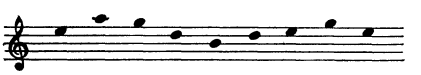


Fig. 33

While in the first half, up to (1), the register is confined to the octave of a^1—a^2, in the second half it is expanded by the descendingA-G-E-E-flat-D-C line which is a combination of the major mode of the C pentatonic scale, the C alpha and the basic structure shown in figure 33. The A in measure 6 is picked up at (1) and then again in measure 11 where it is immediately followed by a G. The E comes in the following measure where it is part of the basic set; the E-flat (spelled D-sharp) at the very end of measure 13 is followed by the D of the following measure. This D-sharp would not be significant were it not repeated as part of the identical E-flat-D dyad at (2) and in measure 16 and once more by itself (spelled E-flat) at the end of measure 17. The C in measure 18 brings this *Urlinie* to a close.

This expansion of the register is somewhat paralleled by the piano which, after remaining consistently in the same — relatively low — register, brings out the two upper registers while also maintaining the original one. The role of the D-E dyad has already been discussed;[52] maybe it is worth pointing out that it is also part of all three sets shown in figure 32.

There is a final commentary to be made. It has been mentioned earlier that the two instruments, as a rule, do not share the thematic material. This statement is corroborated by the discussion above: the violin carries the theme which is "accompanied" by the piano with seemingly unrelated material. It must be stressed, however, that *all* of the thematic material is generated by and stems from the same micro-structures (formations) whose smallest units are the basic set and the subset. This diversity of the thematic material is counterbalanced on the one hand, by close tonal interrelations between the instruments and, on the other hand, by the fact that the pitch content of any given passage in one instrument is always complemented by the pitch content of the simultaneous or adjacent passage in the other instrument, to form a more or less complete alpha or acoustic scale structure. For example, in measure 5, while the violin plays mode VII of the C acoustic scale, the piano has a C-sharp alpha and these can be put together to form a three-layered alpha formation:

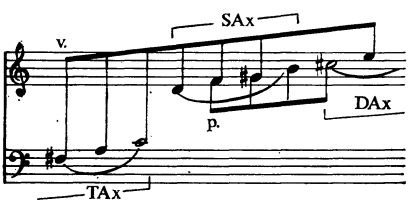


Fig. 34

The last third of measure 6 and measure 7 yield the following alpha:

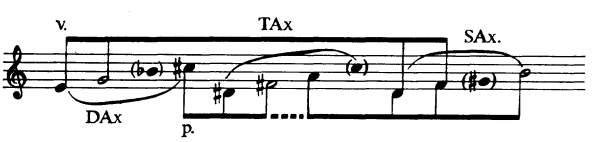


Fig. 35

[52] Vid. the asterisks in figures 23 and 29.

and so forth. Two adjacent formations are seldom identical, similar or connected with one another in any significant way, e.g., with the continuation of an incomplete axis at the end of one formation in the following formation. This means that they generate exclusively the immediate local contexts and have no larger-scale significance and that the tonal meaning of each individual passage is not determined by them. For the tonal center of a multi-layered alpha is difficult to determine at best. Most often, it is the upper pitch of the major second (i.e., the lowest pitch of the axis) that carries the tonal weight; but, then, each axis has its own "tonic" and these in turn do not always correspond to the "tonics" of the passages these formations generate.