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Motivic Chains in Bartók's Third String Quartet

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Abstract

In his Third String Quartet, Bartók often spins out melodic lines from brief motives, and the spinning-out frequently takes the form of *motivic chains* – a linkage of two motives where the last note or notes of the first become the first note or notes of the next, and the two are related by one of the four traditional serial transformations: transposition, inversion, retrograde, and retrograde inversion. There are thus four kinds of motivic chains: transposition (T) chains, inversion (I) chains, retrograde (R) chains, and retrograde inversion (RI) chains. Chains of this kind, especially I-chains and RI-chains, shape not only the melodic lines of the quartet but also its harmonic progressions. They lend the quartet a quasi-serial organization at a time when the composer thought he was 'approaching a species of twelve-tone music'.

In his Third String Quartet, Bartók often spins out melodic lines from brief motives, and the spinning-out frequently takes the form of *motivic chains*.[1] For the purposes of this discussion, a *motive* is a series of pitches or pitch classes, usually three notes in length. A *chain* occurs when the last note or notes of one motive become the first note or notes of the next, and the two motives are related by one of the four traditional serial transformations: transposition, inversion, retrograde, and retrograde inversion. There are thus four kinds of motivic chains: transposition (T) chains, inversion (I) chains, retrograde (R) chains, and retrograde inversion (RI) chains.

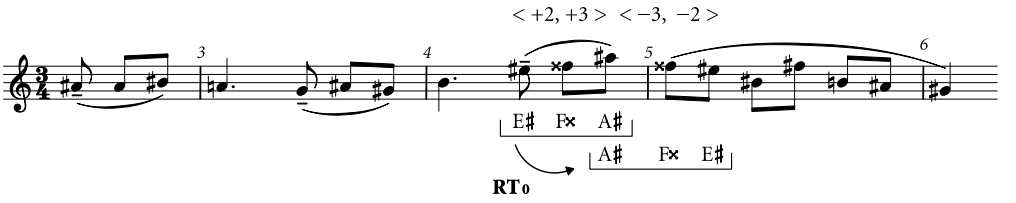
The opening melody of the quartet contains examples of all four kinds of chains (see Example 1). Example 1a shows an R-chain within the melody: E♯–F𝄪–A♯ overlapped with its retrograde, A♯–F𝄪–E♯. This R-chain comes at the high point of the melody, and the retrograde repetition of the motive serves to underscore its importance. The motive is a member of set class (025), stated first as <+2, +3>, then repeated in retrograde as <−2, −3>. These intervals and this set class emerge later as principal materials for the work as a whole.

The RI- and T-chains in Example 1b use the same intervals, which are now arranged to produce members of (013): instead of moving in the same direction to produce (025), intervals 2 and 3 move in opposite directions to produce (013). A–G–A♯ is overlapped with

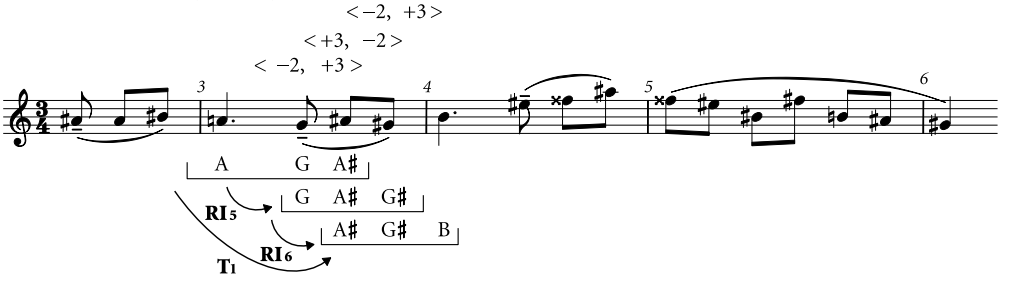
1 There is a large analytical literature on this quartet. Two sources whose approach is similar to that adopted here are Babbitt, 'The String Quartets of Bartók', and Bayley, 'The String Quartets and Works for Chamber Orchestra'. Babbitt observes that 'Bartok's thematic material [. . .] consists, characteristically, of a small number of chromatically related tones stated in their minimal linear span. Such a theme can, by alterations of relative durations, metrical placement, and dynamic emphases, serve as the elaboration of almost any one of its component elements, without sacrificing its initial character. Then, rather than functioning as a fixed unit that is acted upon, such a theme can itself act as a generator, avoiding redundancy through continual variation, but creating, at the same time, continuous phases of association' (2). Similarly, with specific reference to the Third Quartet, Bayley states that 'Bartók's technique of developing variation shows how themes are the outcome of the combination and recombination of motifs' (159).

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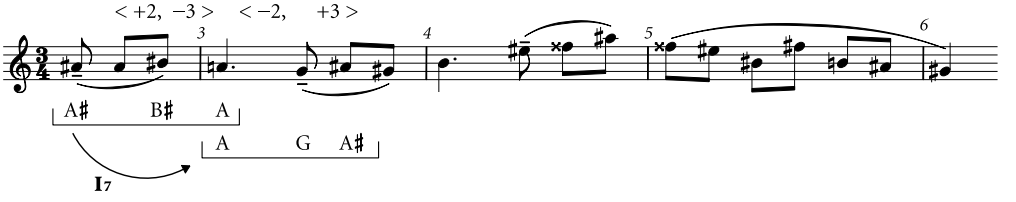
a. R-chain (sc[025])



b. RI- and T-chain (sc[013])



c. I-chain (sc[013])



Example 1 Motivic chains in Bartók, Third String Quartet, Prima parte, bb. 2–6.

its retrograde inversion, G–A♯–G♯, which is then overlapped with its retrograde inversion, A♯–G♯–B. Because two retrograde inversions combine to create a transposition, the first of the three motives in Example 1b is therefore related by transposition to the third: the last note of the first motive, the A♯, becomes the first note of its transposition up a semitone.

The inversional chain in Example 1c works in similar fashion: the last note of one series becomes the first note of the next. An inversional chain is always a cycle – it ends where it begins. In Example 1c the melody moves from A♯ through B♯ to A, and then from A through G back to A♯, where it started.

All of the motives in Example 1 involve combinations of whole tones and minor thirds. These combinations can be understood in terms of serial ordering and serial transformation: the melody begins with a three-note series, extends it into an I-chain, elaborates it further with an RI-chain, embedding a resultant T-chain, and then culminates, at its high-point, in an R-chain.

R-chains are not notably interesting theoretically: a series advances and then simply returns to its starting point. RI-chains and the T-chains they produce are extremely

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interesting, but have already been discussed extensively by David Lewin.[2] I-chains are common in this piece, are very interesting theoretically, and have not been previously discussed. They form the subject for much of the remainder of this article.

Example 2 suggests three different ways of thinking about the I-chain created by the first five notes of Bartók's melody (Example 2a). Example 2b represents Bartók's I-chain as a cycle of pitch classes: it starts on A♯, moves <+2, −3> followed by the inversion <−2, +3>, ending back on A♯.

Example 2c represents the same I-chain in a slightly different way, as a progression of overlapping trichords. The trichords in the north and south of the circle are the I-related trichords under discussion here: A♯ – B♯ – A and A – G – A♯. Both represent set class (013). The trichords in the east and west of the circle are formed in the interstices of the I-chain. These are I-related forms of set class (025). If the intervals 2 and 3 move in opposite directions, (013) results, but if they move in the same direction, (025) is produced. Different set types thus interact within an I-chain.

Example 2d represents Bartók's I-chain on a *Tonnetz*. The usual *Tonnetz*, used so extensively by the neo-Riemannians and their historical predecessors, is designed to show the interplay of major and minor triads and is thus built from intervals 3 and 4, the minor and major thirds. The *Tonnetz* in Example 2d is designed to show the interplay of trichord types (013) and (025) and is thus built from intervals 2 (within the columns) and 3 (within the rows).[3] The I-chain is described as a square within the *Tonnetz*, and any I-chain that involves (013) and (025) may be found as a square on this 2 × 3 *Tonnetz*.

Within the I-chain of Example 2, (013) interacts with (025). Can (013) interact with other set classes within an I-chain? As Example 3 illustrates, the answer is yes. Example 3a presents the opening chord of the piece – a simple four-note cluster but arranged in register as an I-chain. The lowest three notes are C♯–D–E, another member of set class (013), this time ordered as <+1, +2>. Overlapping that, starting on the cello's D, the highest three notes are D–E–D♯, or <+2, −1>. As Example 3b shows, the registrally ordered notes thus describe an I-chain. In Example 3c, (013) occupies the northern and southern positions, just as in Example 2c, but now (012) occupies the eastern and western positions. On the 2 × 3 *Tonnetz* in Example 3d, this new I-chain describes not a square but a parallelogram.

The opening music of the quartet thus features two I-chains that involve (013). The first, within the opening chord (Example 3), combines (013) with (012). As the first violin melody takes over, another I-chain combines (013) with (025) (Example 2). Then, as the music continues, (025) itself becomes the generator for two further I-chains (see Example 4).
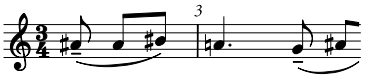
The second phrase of the opening melody (Example 4a) is analysed in terms of I-chains and RI-chains (Example 4b). The melody begins with G–C–A – the principal motive of the entire quartet heard in its central, 'tonic' form. Via a partial I-chain, G – C – A, a member of (025) generates C – A – E, a member of (037), the set class of the major or minor triad. That triad initiates an RI-chain that alternates minor and major triads (A minor, A major, C♯

2 See Lewin, *Generalized Musical Intervals and Transformations*, 180–8.

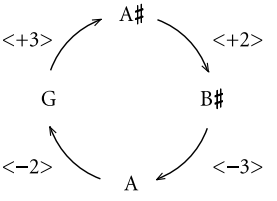
3 For a discussion of Riemannian *Tonnetze* built from non-triadic intervals see Morris, 'Voice-Leading Spaces'.

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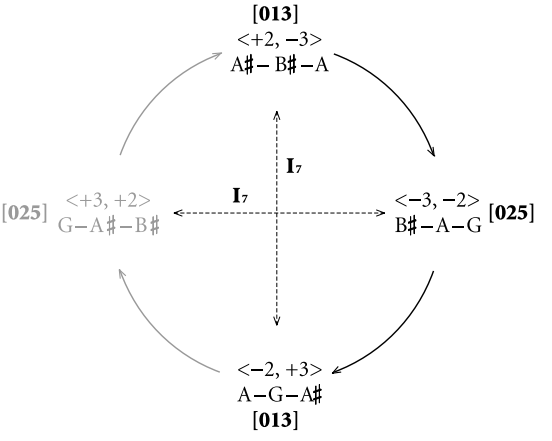
a. Opening melody, bb. 2–3



b. Cycle of pitch classes



c. Cycle of trichords



d. Square on the 2 X 3 *Tonnetz*
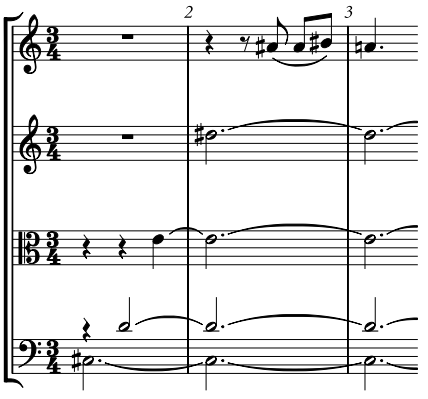
A	**B♯**	D♯	F♯
G	**A♯**	C♯	E
F	G♯	B	D

Example 2 (a) The first notes of the opening melody, and (b–d) three representations of an I-chain.

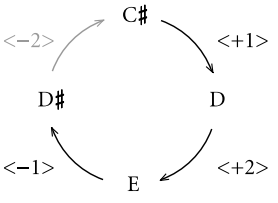
minor, and C♯ major). Those triads impart a hexatonic flavour to this part of the passage. The RI-chain of triads ends on F on the downbeat of b. 10. At this point a second I-chain begins, producing members of (027) in its interstices, and the music moves around the resulting cycle two full times, concluding back on F. The two I-chains in Example 4 are both

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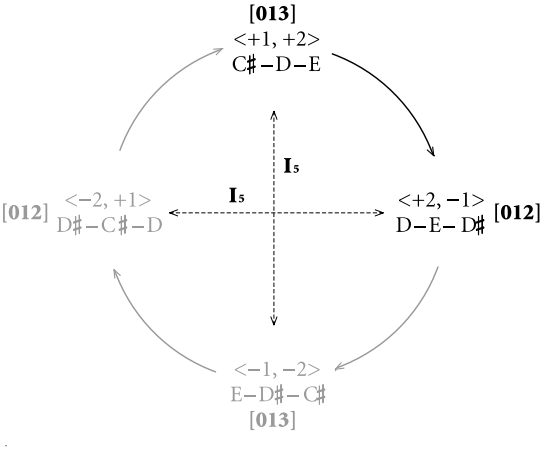
a. Opening chord, bb. 1–3



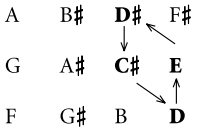
b. Cycle of pitch classes



c. Cycle of trichords



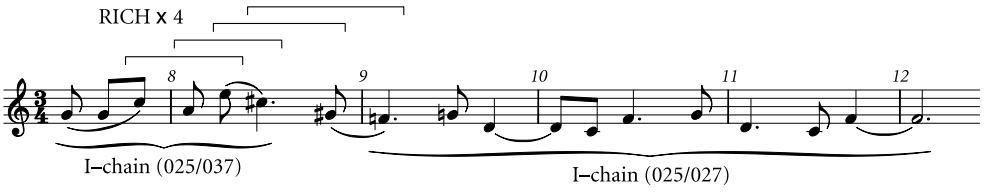
d. Parallelogram on the 2 x 3 *Tonnetz*



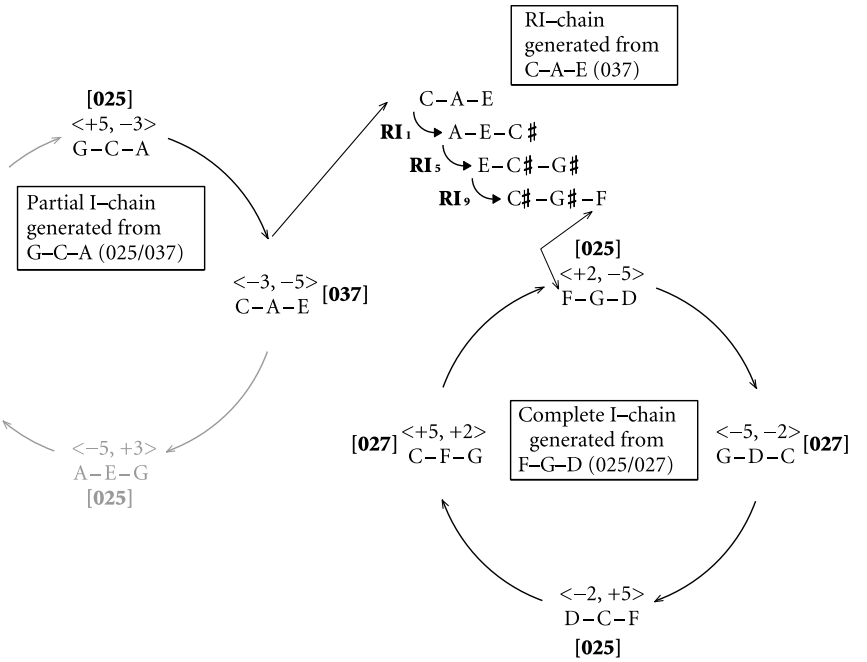
Example 3 (a) The opening chord and (b–d) three representations of an I-chain.

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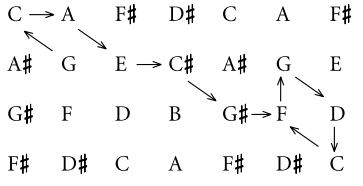
a. Opening melody, bb. 7–12



b. Chains of trichords



c. Progression traced on 2 x 3 *Tonnetz*
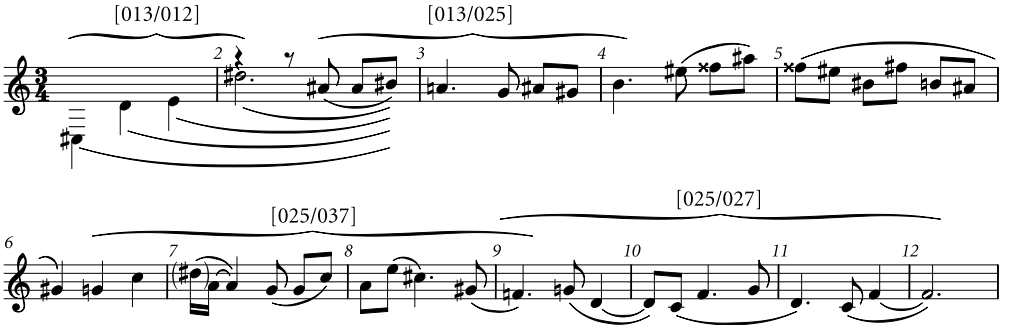


Example 4 (a) Continuation of the opening melody, and (b–c) two I-chains generated from set class (025).

generated from (025), but they produce different set classes in their interstices: first (037) and then (027).

In Example 4c the entire progression is traced on the 2 × 3 *Tonnetz*. It begins with the parallelogram at the upper left – that is the I-chain that combines (025) with (037). The RI-chain of triads that follows traces a zigzag path from the upper left to the lower right,

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Example 5 A series of I-chains in the two opening phrases: (013/012) – (013/025) – (025/037) – (025/027).

where we find the second I-chain, the one that combines (025) with (027). Thinking about the melody in Example 4 as a whole, we might say that it maintains a focus on (025) throughout, but that (025) is first enchained with (037) and later with (027).

Example 5 summarizes the discussion so far and identifies four distinct I-chains in the opening twelve bars of the quartet. In the first phrase, (013) is the generator, interacting first with (012) in the opening chromatic chord and then with (025) as the melody begins. In the second phrase, (025), formerly a by-product, asserts itself as a generator, interacting first with (037), amplified by its own RI-chain, and finally with (027). We can thus hear this passage as opening out from the dense, chromatic initial chord to the spacious, open feeling of the concluding melody. The motives change shape, opening up intervallically, but they are always connected to each other through enchaining.

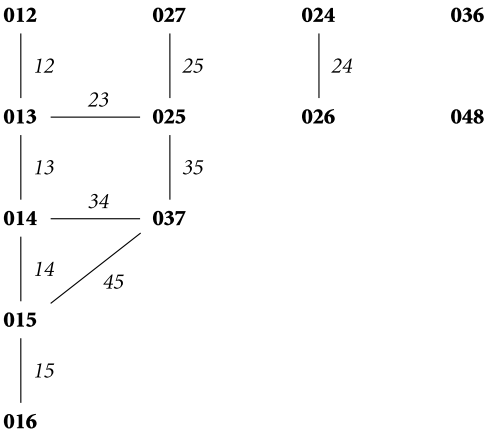
To provide a larger perspective on the trichordal I-chains in use in Bartók's Third String Quartet, an Appendix to this article contains a list of all trichordal I-chains. Each chain consists of four notes (represented by nodes) connected by intervals (represented by arrows). The generating set classes are listed above each chain, and the cumulative set class (the aggregate tetrachord formed from the combination of these trichords) is listed below. In the middle of each chain the interval classes found as series adjacencies are listed in the form of what Allen Forte calls a 'basic interval pattern' or BIP.[4] Some of the chains, indicated with an asterisk, are *degenerate*, in the sense that the cycle contains a trichord and a dyad rather than two trichords. Most trichords produce three distinct I-chains, but the inversionally symmetrical trichords produce either two chains (012, 024, 027, 036) or only one chain (048).

Example 6 provides a compressed summary of the world of trichordal I-chains. In Example 6a pairs of trichords that mutually produce an I-chain are connected by a line, and the line is labelled with the shared basic interval pattern. Some trichords obviously have greater co-generative capacity than others. (014), for example, when ordered as a combination of intervals 1 and 3, can join with (013) to produce an I-chain. If, however, it is ordered as a combination of intervals 3 and 4, it can join with (037) to produce a different I-chain, and if ordered as a combination of intervals 1 and 4, it can join with (015) to produce a third

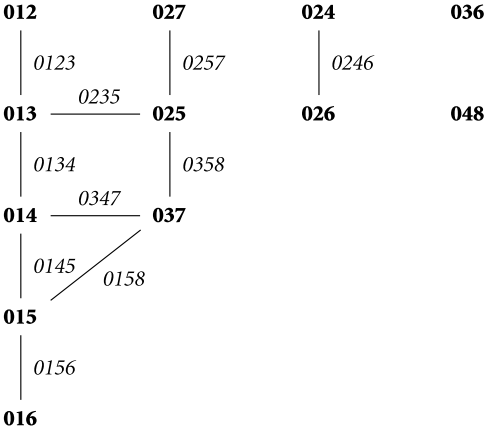
4 Forte, *The Structure of Atonal Music*, 60–73.

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a. Trichords that mutually produce an I-chain (and the BIP they share)



b. Trichords that mutually produce an I-chain (and the cumulative set class that results)

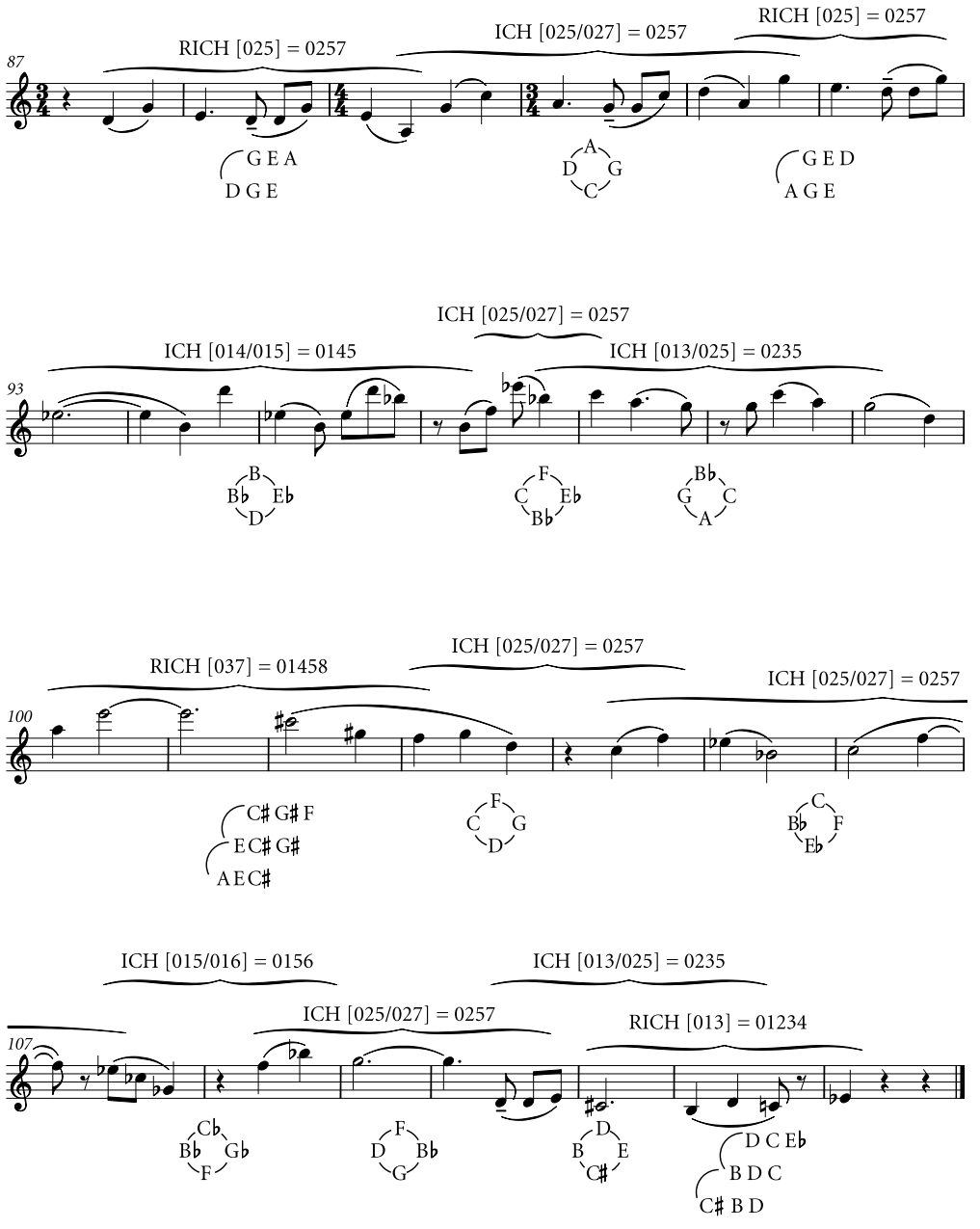


Example 6 Trichord types and the I-chains they mutually produce.

I-chain. Some set classes, like (012), can combine with only one other trichord to generate an I-chain. Others, like (036) and (048), are incapable of combining with any other trichord to generate an I-chain.

Example 6b follows the same layout, but now the pairs of trichords are identified with the tetrachord they jointly produce. All of these tetrachords are inversionally symmetrical, and many of them are favoured harmonies not only in the Third Quartet but in much of Bartók's music.

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Example 7 RI-chains and I-chains in the melody that ends the Prima parte (and leads *attacca* into the Seconda parte).

Example 7 analyses the long melody that ends the Prima parte in terms of RI- and I-chains.[5] It mostly recalls material from the opening of the movement, but greatly extends it. The extension is achieved through the use of motivic chains, and the enchaining of the chains

5 In this example and elsewhere I follow Lewin in abbreviating RI-chain as RICH; in the same spirit, I abbreviate I-chain as ICH.

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themselves. The melody begins with that familiar ascending 5 followed by descending 3: D–G–E. That melodic motive is repeated, continuing this time to the low A, creating an RI-chain of (025) that produces a larger (0257). The low A in the third bar of Example 7 concludes one chain and begins another. Now the music circles around the I-chain shown beneath the stave. This I-chain conjoins (025) with (027) to produce a larger (0257), and the chain extends all the way to the high G at the end of b. 91. The end of this I-chain overlaps with a new RI-chain, again involving (025).

This first line of melody uses only five notes – the five notes of the pentatonic scale C–D–E–G–A. These five notes are arranged, as Example 7 shows, in interlocking RI- and I-chains derived from (025). Beginning with the E♭ in b. 93, the pitch field expands, eventually taking in all twelve notes, and so does the motivic vocabulary. I-chains that include (025) are prevalent, but other trichords also appear. Amid the intervallic variety, however, Bartók continues to rely on motivic chains to create melodic extension. In this way he is able to spin out a melody of considerable length.

The melodies discussed thus far are all interrelated – they comprise what we might call the 'A-material' of the Prima parte. But there is also a contrasting 'B-theme' in the Prima parte, shown in Example 8a. The B-theme consists of a chromatic four-note idea presented simultaneously by the first violin and, in inversion, by the second violin. Each of these four-note motives describes the by now familiar I-chain that conjoins (012) and (013). A comparison of the melodic idea in Example 8a with the harmonic idea in Example 8b (i.e. the opening chord – see Example 3a) shows that the two I-chains they represent are related by retrograde.[6] Motivic chains, particularly I-chains, may thus be expressed harmonically as well as melodically.

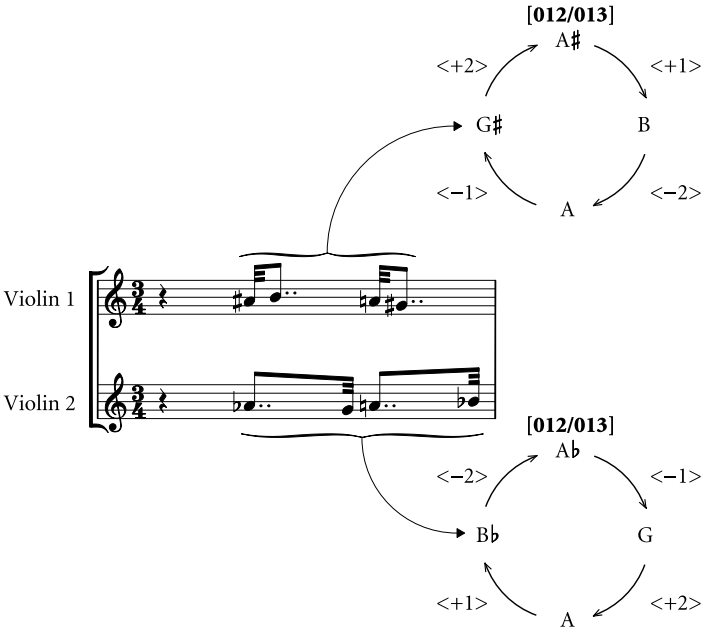
The contrasting Seconda parte of the quartet culminates in the wild chordal passage shown in Example 9. Eight chords are identified on the score (I imagine Chords 1A and 1B to be two parts of a single harmony, one that features the dyad C♯–D♯ on top). After Chords 1A and 1B, the chords are presented in pairs: 2 alternates with 3, 4 with 5, and 6 with 7. The passage concludes as it began, with a single harmony featuring C♯–D♯ on top. The circled chords all represent either (0134) or (0235). These are inversionally symmetrical tetrachords, and they are familiar from their melodic use earlier in the quartet. What is more, they are arranged registrally in the same sorts of I-chains and RI-chains that we noted in the melodic organization of the Prima parte.

Example 10 offers a comparison of the opening violin melody of the quartet with Chords 1 and 2 from Example 9. As previously discussed, the violin melody (Example 10a) begins with an I-chain that involves overlapping of (013) and (025) to produce (0235). It continues with an RI-chain that involves overlapping (013)s to produce a (0134). The two chords in Example 10b are organized in very much the same way, only now the I-chain and the RI-chain appear in the registral order of the notes of the chord. Chord 1, for example, reading from the bass up, is F♯–E–C♯–D♯. This is not only an I-chain, but is virtually the same I-chain as the one from the violin melody that begins the quartet.

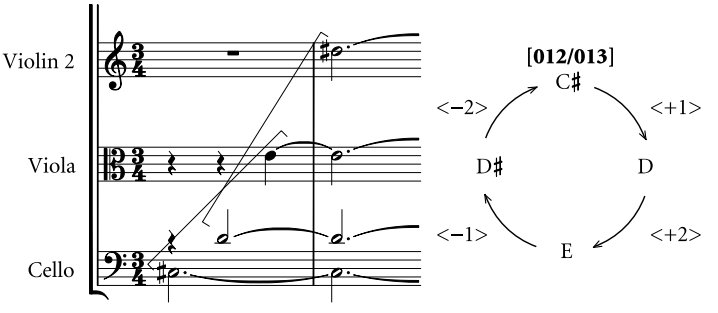
6 Stephen Walsh makes the same point, in slightly different terms, in *Bartók Chamber Music*, 42.

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a. Prima parte, 'B-theme'
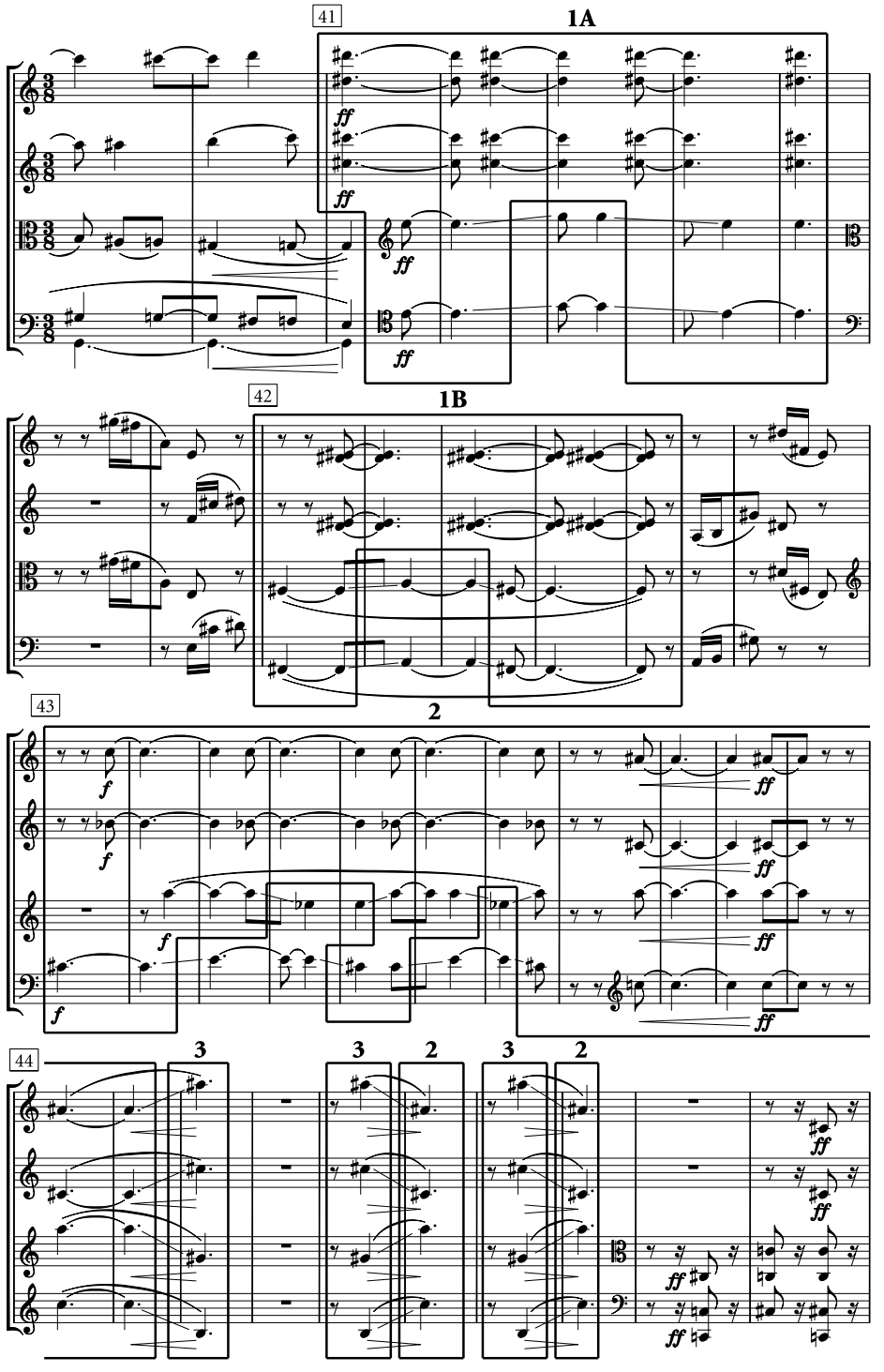


b. Comparison with opening chord



Example 8 Contrasting material in the Prima parte.
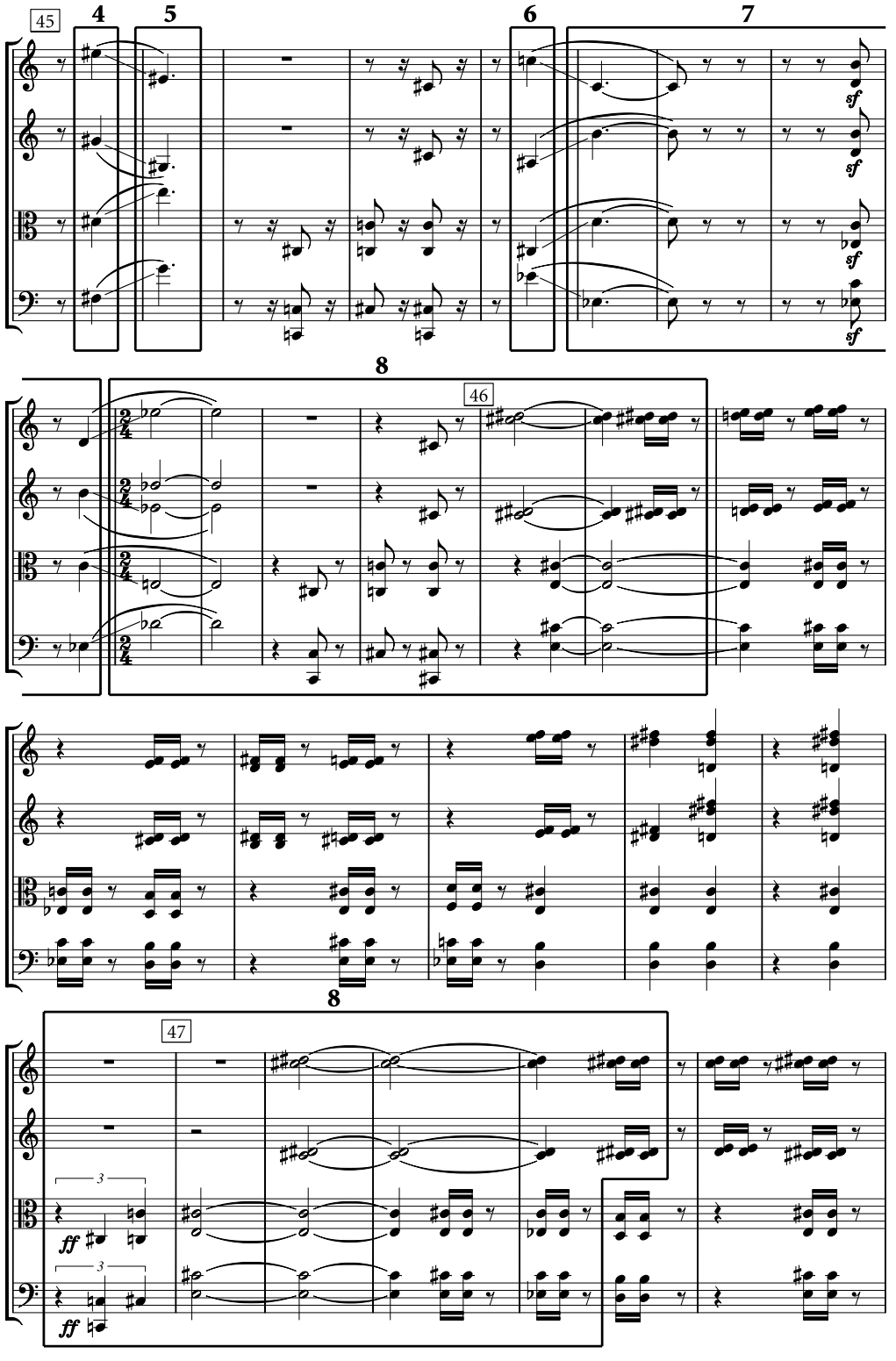
Example 11 displays a network of all eight chords from the passage in Example 9. All are members of (0134) or (0235) – the (0134) are displayed along the top of the circle and the (0235) along the bottom. All are inversionally symmetrical and arranged registrally as either an I-chain or an RI-chain (with the description of Chord 8 permuted to reveal this relationship). The upper pathway begins with a near-T_{-3}: the asterisk and the dotted line indicate that the transposition is not exact, that only three out of the four notes are literally transposed. Then the chords are transposed down five semitones, again five semitones, and finally up one semitone. The lower pathway follows a chain of T_5 and ends with a near-T_{+3}. The

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Example 9 Climax of the Seconda parte (Fig. 41^{-2}– Fig. 47^{+5}): a progression of eight chords. Copyright 1929 by Universal Edition. Copyright renewed 1956 by Boosey & Hawkes, Inc., New York. Reproduced by permission. All rights reserved by the owners.

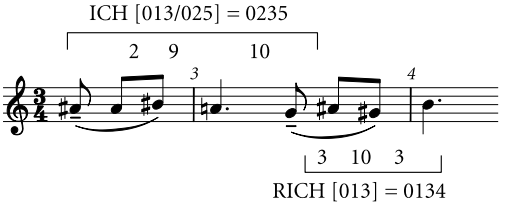
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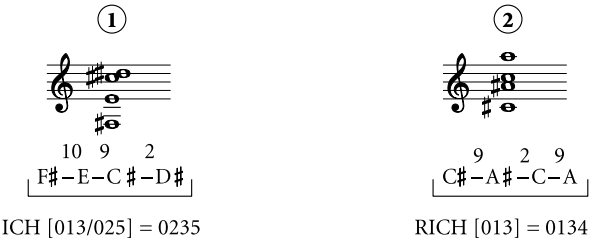
Example 9 *continued.*

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a. Opening violin melody



b. Chords 1 and 2 from Example 9



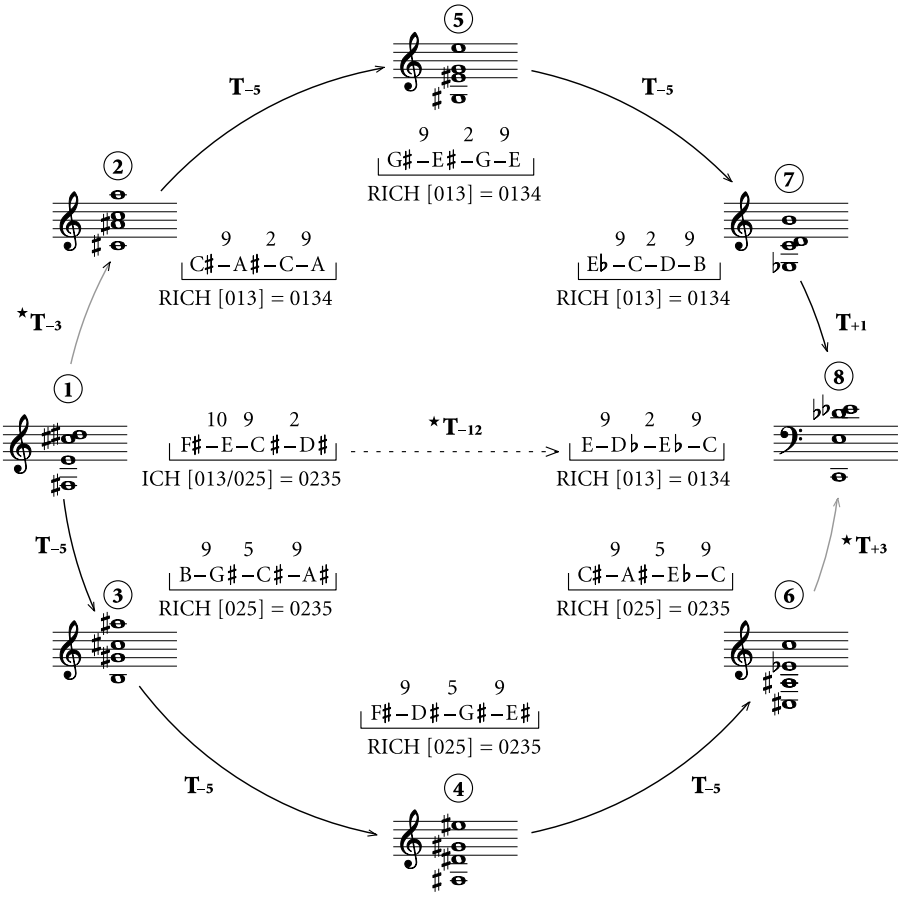
Example 10 I-chains and RI-chains in melody and harmony.

consequence of this motion is that Chord 8 is virtually the same as Chord 1, but an octave lower.

To some extent, these successive transpositions create a larger chain, the T-chain shown in Example 12. Example 12 imagines Chord 1 as a filled-in perfect fourth, and arranges its notes in descending order, ending on C♯. The combination of Chords 2 and 3 is also a filled-in perfect fourth, but it begins on C♯. This is therefore a T-chain, where the last note of one unit becomes the first note of the next. And the chain continues through the remaining chord pairs, as the example shows. So each chord, internally, is either an I-chain or an RI-chain, and the progression of chords can be understood as a T-chain.

Example 13 represents the progression on the 2 × 3 *Tonnetz*. The squares are all (0235) and the parallelograms are all (0134). The progression begins on the square labelled 1 (for Chord 1). Each move down and to the right is a transposition by T_{-5}, and it is easy to follow the progression of the squares. Starting with chord 3, each square is overlapped with a parallelogram, sharing a common minor third. In the case of chords 2 and 3, for example, the minor third A♯–C♯ is shared between the two chords. As we move down and to the right, we are also, of course, gradually returning to our starting point – the *Tonnetz* circles back on itself, although that is not readily apparent from the two-dimensional display in Example 13. Nonetheless, it is apparent that Chord 8 contains C♯, D♯, and E, just as Chord 1 did. The *Tonnetz* helps us to see that Bartók is working with a restricted group of musical materials: certain intervals, trichords, and tetrachords. More importantly, it shows that he is manipulating those materials in a fairly systematic and distinctly serial way: chords and motives are combined and enchained through transposition, inversion, and retrograde inversion.

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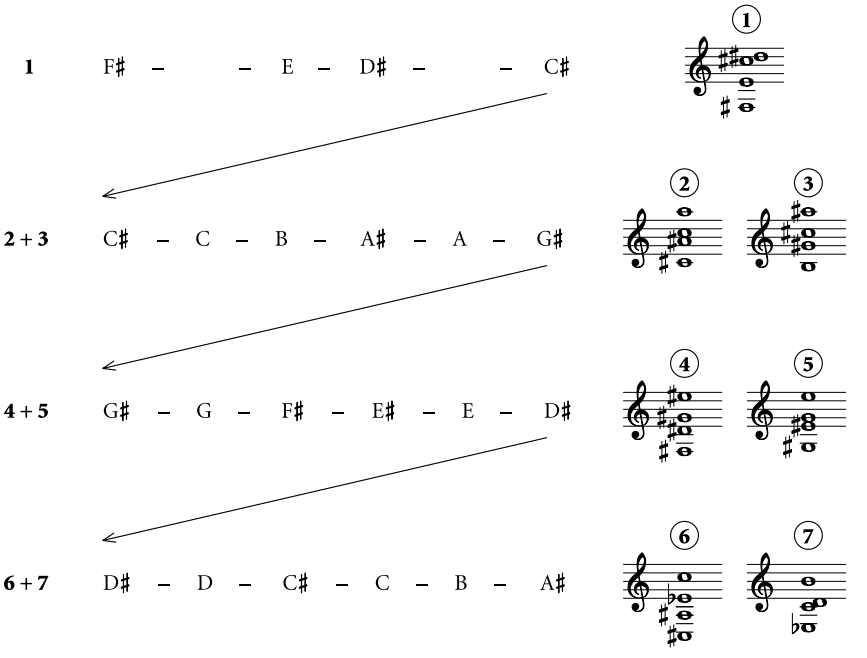


Example 11 Progression of eight chords from the Seconda parte.

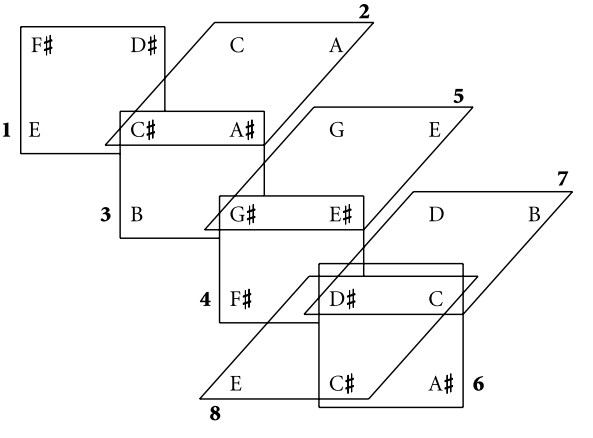
The apparent serial organization of melodies and harmonies in Bartók's Third String Quartet brings to mind a widely quoted comment from the composer dating from 1928, a year after the completion of this quartet: 'I must admit, however, that there was a time when I thought I was approaching a species of twelve-tone music'.[7] He made this comment at a time when there was very little twelve-note music in existence. Bartók was unusually well informed about developments in contemporary music, but how much twelve-note music could he have known in 1928? His personal library contained a large number of contemporary scores, including music by Schoenberg and Webern, but none of their twelve-note music.[8] Bartók had heard a performance of Berg's *Lyric Suite* not long before he composed his Third Quartet, and several commentators have drawn plausible connections between these two works. But it is hard to imagine that Bartók could have gleaned much knowledge of the twelve-note organization of the *Lyric Suite* from hearing a performance of it.

7 Bartók, 'The Folk Songs of Hungary', 338–9.
8 See Lampert, 'Zeitgenössische Musik in Bartóks Notensammlung'.

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Example 12 T-chain (Chords 1–7 of Example 9).



Example 13 Progression described on a 2 × 3 *Tonnetz*.

So what does Bartók mean when he refers to 'twelve-tone music' or 'a species of twelve-tone music'? The most likely answer is that he is thinking about music that is based on the aggregate of twelve pitch classes rather than on traditional scales or modes. And certainly the Third Quartet is among the most chromatic works that Bartók ever wrote. The aggregate of all twelve pitch classes is frequently heard within short spans of time, and seems often to function as a basic harmonic unit for the piece. So this is one sense in which this quartet is 'a species of twelve-tone music': it treats the twelve notes as a referential harmonic unit.

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But I would argue that this piece is a species of twelve-note music not so much because of its use of the twelve-note aggregate but because of its interest in serial ordering. Serial ordering is a prominent feature of the sort of twelve-note music that Bartók might have had in mind, and it is an extremely prominent feature of this quartet, both in its melodies and its harmonies. The Third Quartet refers to a small number of pitch-class motives or series. It combines and enchains those series through the familiar twelve-note operations of transposition, retrograde, inversion, and retrograde inversion. The resulting combinations may extend over large musical spans, and they may be found either melodically or harmonically. In this very specific sense, this piece certainly approaches a species of serial music, a uniquely and wonderfully Bartókian species of serial music.

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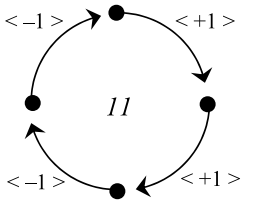
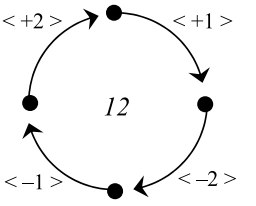
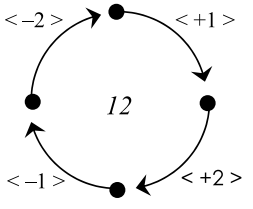
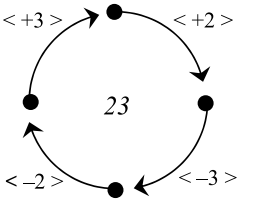
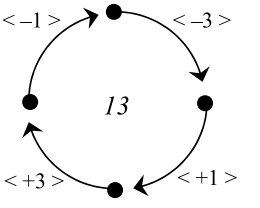
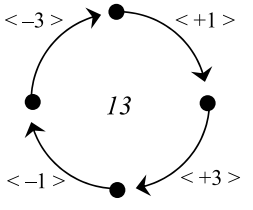
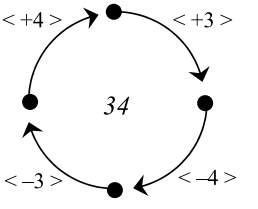
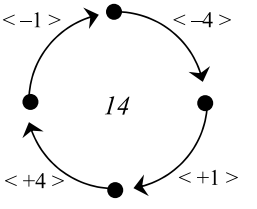
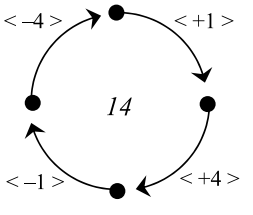
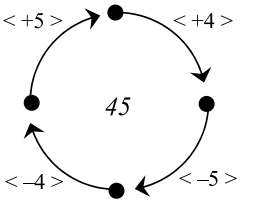
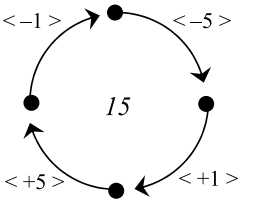
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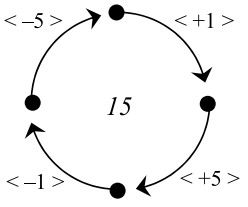
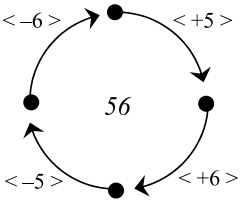
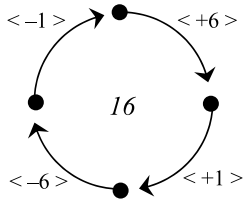
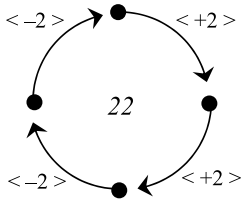
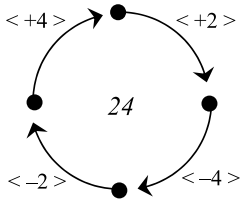
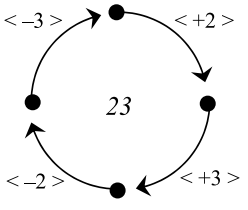
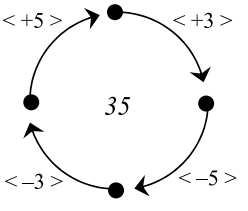
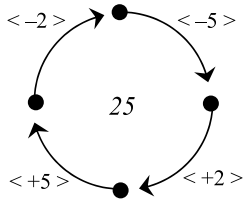
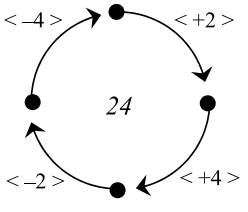
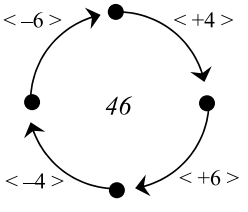
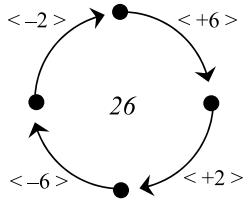
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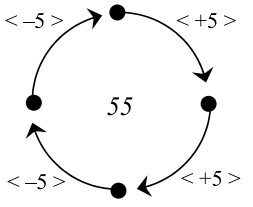
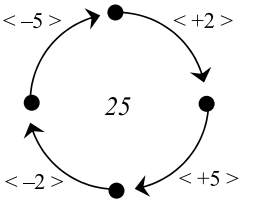
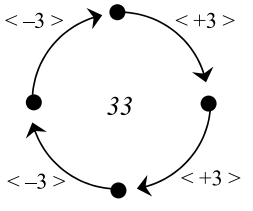
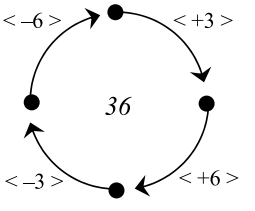
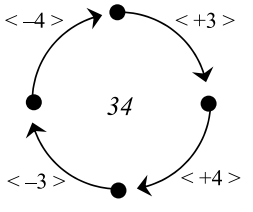
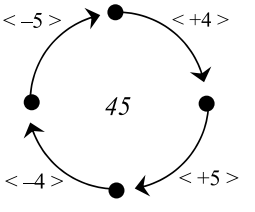
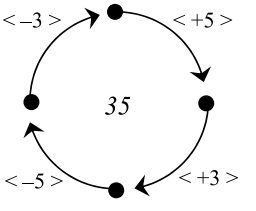
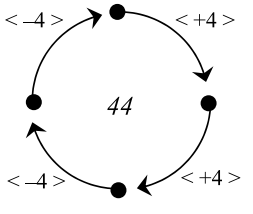
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*degenerate cycle (contains a trichord and a dyad rather than two trichords)

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