Twelve-tone theory

JOHN COVACH

As scholars begin to gain a sense of historical perspective on art music in the twentieth century, it seems clear that the introduction and development of twelve-tone compositional procedures will remain one of the cardinal markers of musical modernism. The careers of Schoenberg, Berg, Webern, Boulez, Stockhausen, Babbitt, and even Stravinsky (among many others) are all at some point intimately bound up with dodecaphonic concerns, as is the course of avant-garde music generally. No matter what one may think of the twelve-tone idea – and it has been the source of considerable controversy almost from the start – understanding dodecaphony and its appeal to several generations of composers in Europe and America will continue to play a central role in understanding twentieth-century music and culture.

The twelve-tone idea has also played a pivotal role in the development of music theory as a professional discipline, especially in the United States during the post-World-War-II period. Indeed, twelve-tone theory and composition are deeply interdependent, and this is in no small measure attributable to the fact that in many cases the theorists involved were also composers. Unlike Schenkerian theory – which along with twelve-tone theory has played an important role in the professional growth of music theory in the second half of this century – twelve-tone theory often seems more prescriptive than descriptive; rather than explicating the structural features of works already established within the canon of Western art music, dodecaphonic theory is frequently speculative, suggesting structural possibilities for pieces yet to be written (or in some cases, pieces just finished by the composer himself). Thus, instead of theory following practice, twelve-tone practice has at times followed theory.

There are at least two approaches available to scholars surveying the history of twelve-tone music and theory, and since theory and practice are so intimately related in this context it will be helpful to consider these. The first approach seeks to focus on the important composers and their works, using twelve-tone theory as a means of explaining the structural features and perhaps the technical concerns that motivate such features; this produces a history of twelve-tone music. The second approach involves tracing the history of twelve-tone theoretical writing and referring to compositions only inasmuch as they clarify theoretical concerns; this produces a history of twelve-tone theory. The current chapter will take the second of these approaches, and will privilege the development of theoretical ideas over establishing a succession of
important dodecaphonic works. Despite the obvious interdependence of theory and practice in twelve-tone music, it turns out that many important theoretical documents were not produced by its most important practitioners. And this is the case already at the very beginning of our story.

The early development of twelve-tone theory, 1920-30

Josef Matthias Hauer. The "twelve-tone idea" can be defined as a systematic circulation of all the twelve pitch classes (pcs) in which no pc is repeated before all twelve have been sounded. An early statement of the twelve-tone idea (perhaps the first) may be found in a short monograph published in 1920 by the composer Josef Matthias Hauer (1883–1959). As it does in much early dodecaphonic theory, the constant circulation of the twelve pcs arises in Hauer's writing as a technical solution to a number of music-aesthetic problems with which he was grappling in the late teens and early twenties. It is thus important to understand his Zwölffergesetz in this broader music-cultural context. Hauer sets forth his aesthetic positions at various points in Vom Wesen des Musikalisches, in a number of articles published early in the 1920s, and especially in his Deutsches des Melos of 1923. A fundamental premise in Hauer's many arguments is that music, when conceived and perceived in the proper way, is essentially a mental-spiritual (geistig) phenomenon. An important distinction must be drawn between music in its pure form, which Hauer maintains is its spiritual form, and music as it occurs in the physical world around us, which constitutes its material form. For Hauer it is essential that in order to raise music to its highest, most spiritual level, the influence of the material world must be suppressed as much as possible.

Consider, for example, the way in which Hauer characterizes the musical event. For Hauer, each musical interval is considered to constitute a type of "gesture" in music, and the character of each interval is thought of as its "color." In its purely spiritual-mental state, a musical gesture resides first in the mind of some musical person, perhaps a composer. In order to share this musical occurrence with some second person, however, this first person must employ the realm of the physical – or some internally imagined physical realm – as a kind of "transmission line." But this physical or material world always alters the pure musical gesture to some extent, distorting it through instrumental noise, poorintonation, and/or other purely physical impediments. It falls then to the receiving mind, in the act of conceptualizing the musical gesture, to improve upon this physical occurrence in an attempt to restore this gesture to its original spiritual state. For Hauer, importance is placed on the inner hearing of the two persons involved, and the physically sounding music is reduced to a kind of deficient, yet necessary mode of transmission.4

Hauer's aesthetic dualism casts off the material aspect of music wherever possible. This leads Hauer to reject, for example, Schoenberg's notion of Klangfarbenmelodie, a technique in which different instruments or instrumental groups of some performing ensemble are juxtaposed in musical succession forming a kind of melody of instrumental timbres. For Hauer, this focuses the musical attention in precisely the wrong way: by relishing the physical timbres and their differences, the listener gets stuck in the physical transmission line itself, and is unable to hear through to the spiritual content of the music. According to Hauer, tone color in music resides in the character of the internally perceived interval, not in the external "noises" of the material means of conveying that inner occurrence.5 Hauer also downplays the importance of instrumental virtuosity. Here one can again become mired in the admiration of feats of instrumental prowess, and in so doing lose sight of the spiritual content of the music. According to Hauer, one must always work to suppress the attraction to the material, sensual aspect of the musical experience.

Gnostic criticism of musical materialism forms the foundation for Hauer's arguments in favor of the twelve-tone idea. First, Hauer argues for a tempered twelve-note tuning. He begins his discussion by surveying the ways in which one can generate all twelve pitch classes acoustically. Starting from C, Hauer generates the remaining eleven pitches in three ways: up from C in acoustically perfect fifths (2:3); up from C in acoustically perfect fourths (3:4); and up from C in overtones. He then reduces everything down to within an octave and compares the results. The collections of eleven pitches generated from the same starting pitch are in each case different, generating various representatives for each of the other eleven pitch classes. The tempered pitch classes, which are not to be found in nature, offer yet another of twelve pitch classes. Hauer thus asserts that the physical realm is imperfect because it produces no usable chromatic scale. Tempered tuning, on the other hand, does offer a suitable chromatic scale. And since this chromatic scale does not occur in nature, the tempered scale constitutes a kind of spiritualization of musical materials.5 Thus, by conceptualizing the physical, the mind improves upon it and takes a crucial step toward the spiritual. Hauer compares the fact that the twelve tempered pitch classes do not occur in nature with Goethe's observation in his Farbenlehre that the complete color spectrum also cannot be observed in nature. The color circle is thus a creation of the mind, and like the twelve pitch classes, constitutes an enriching of the physical.6

1 Hauer, Vom Wesen des Musikalisches. This work constitutes an expansion and reworking of the author's earlier Über die Klangfarbe, Op. 13 (published in Vienna by the author in 1918) and "Farbenkreis der Temperatur, 15 Juli 1917" (manuscript in the Austrian National Library Music Collection). Hauer published a slightly revised version in 1923 as Lehrbuch der Zwölftontechnik: Vom Wesen des Musikalisches.

2 Hauer, Vom Wesen des Musikalisches, p. 5.
3 Ibid., p. 62.
4 In a chapter of Deutsches des Melos entitled "Musikalisches Bildung," Hauer mentions that "true music" never requires virtuosity (pp. 14–15). In another chapter, "Melodie oder Gattung?" he gives instructions on the proper environment and approach to the playing of atonal music (pp. 21–23).
5 Hauer, Vom Wesen des Musikalisches, p. 23.
6 Ibid., pp. 27–28.
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5 Hauer, Vom Wesen des Musikalischen, p. 23. 6 Ibid., pp. 27–28.
Hauer's argument for the twelve-tone idea depends on his argument in favor of equal temperament. Hauer suggests that one can construct a continuum extending from pure rhythm to pure melody. At the rhythmic end, music is without pitch, and therefore, entirely material; at the melodic end music is without rhythm, and therefore, entirely spiritual. Most music exists between these two poles, because, for example, simply sounding two notes in succession implies some kind of rhythmical component. From this perspective, Hauer argues that tonality, since it involves ultimately subordinating all other pitches to a single pitch, is therefore to be placed closer to the rhythmic pole than tonality. The constant circulation of the twelve pitch classes suppresses this rhythmical component and creates a kind of music that resides closer to the melodic, spiritual end of the continuum. Thus Hauer asserts that tonality supersedes tonality, and the twelve-tone idea is used in the service of raising music to the highest spiritual level possible.7

Having briefly explored the aesthetic context that surrounds it, we can now turn to Hauer's 1920 formulation of his Zwölftontechnik:

But in atonal music, which arises out of the "totality," only the intervals matter. They express musical character, no longer through major or minor or through characteristic instruments (through one color), but rather directly through the totality of intervals, which are best and most purely rendered on as equal-tempered instrument. In atonal music there are no more tonics, dominants, subdominants, scale degrees, resolutions, consonances or dissonances, but rather only the twelve intervals of equal temperament; their "scale" arises out of the twelve, tempered half steps. In atonal music, both the purely physical, material, and the trivial, sentimental, are, as much as possible, shut out and their "law," their "nomos," is that, within a given tone-series, no tone may be permitted to be repeated or left out (the basic law of melody anyway: in order that no tone acquires physical preponderance [talking on an] over-riding tonic significance, also so that no scale-degree functions of leading-tone tracks wise. Thus to the player and listener it is solely a matter of the purely musical phenomenon of the interval, in its "spiritualization".8

In 1924 an exchange of letters in Die Musik with Herbert Eimert, Hauer chronicled his August 1919 discovery of the twelve-tone idea, casting himself as desperately searching for some underlying objective principle, not only in his own atonal music up to that time, but also in the atonal music of Webern and Schoenberg. Driven by the hope that such a discovery would vindicate atonality against the criticisms of its many critics in Vienna at the time, he had discovered — or as he put it, "uncovered" ("entdeckt") — an objective and eternal law of music: the notion of constantly circulating the aggregate.9 The work in which Hauer claims the breakthrough occurred, his piano piece Nomos, Op. 19, does indeed begin with five statements of the same twelve-pc series, articulated melodically in units of five pcs creating twelve five-note phases. But the piece is not entirely dodecaphonic: twelve-tone sections mark out large-scale formal divisions, but many of the smaller sections seem to experiment with circulating collections of fewer than twelve pcs.

By the early 1920s Hauer's music was entirely twelve-tone, and this turn toward the exclusively dodecaphonic is likely related to his discovery in late 1921 of the forty-four tropes. First mentioned in his 1922 article "Sphärenmusik," the tropes are pairs of complementary hexachords that enabled Hauer to classify any of the 479,001,600 possible twelve-pc melodies into one of these forty-four types. Hauer subsequently discussed the tropes in greater music-technical detail, publishing his Tropentafel in 1924, and then again in his two brief books, Vom Melos zur Paume and Zwölftentechnik, both of which are filled with musical examples used to illustrate a wide variety of dodecaphonic techniques and procedures.10 Since Hauer believed that atonal music must always strive toward pure Melos, harmony must derive from melody. Hauer discusses a technique whereby melodic tones are sustained until they are displaced by new melodic tones related by a minor or major second. As a result of this procedure, Hauer in some instances is able to musically project each trope as a vertical ordering: while melodic succession is free within the hexachord, harmonic distribution is fixed according to the structure of the trope. It is important to note, however, that the trope are a way of viewing twelve-tone materials analytically and are not necessarily prescriptive in a compositional sense. The distinction often made between Hauer and the Schoenberg school — that the former's music is based on unordered hexachords while the latter's is based on an ordered series — is false: while he did write pieces that could be thought of as "trope pieces," much of Hauer's twelve-tone music employs an ordered series.

Herbert Eimert. A 1924 treatise by Herbert Eimert (1897-1973), Attone Musiklehre is a brief but important early text in twelve-tone theory; it consists of thirty-six pages of text into which forty-six musical examples are placed. Eimert was twenty-six years old and still a student when he wrote this theoretical pamphlet, the publication of which — according to Hans Oesch — led to its author leaving the Cologne Conservatory under accusations of being "frivolous know-nothing."11 In the light of the dispute with Hauer discussed above, it is ironic to note that in his foreword to the pamphlet Eimert credits two major influences on his work: one is his personal acquaintance with Russian émigré composer Jefim Golyscheff and his music, but the other is the writings and compositions of Hauer. Eimert states very clearly that he has not discovered any of what he is writing about; he merely claims to have brought it together and developed it in a systematic manner. It is perhaps interesting to note that Schoenberg and his two famous students are hardly mentioned in the book.

7 Hauer, "Atonale Musik." 8 Hauer, Vom Wissen des Musikalisichen, p. 74. The translation is mine. 9 Hauer, "Offener Brief." 
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Herbert Eimert. A 1924 treatise by Herbert Eimert (1897-1972), Atmone Musiklire is a brief but important early text in twelve-tone theory; it consists of thirty-six pages of text into which forty-six musical examples are placed. Eimert was twenty-six years old and still a student when he wrote this theoretical pamphlet, the publication of which - according to Hans Oesch - led to its author leaving the Cologne Conservatory under accusations of being a "frivolous know-nothing."11 In light of the dispute with Hauer discussed above, it is ironic to note that in his foreword to the pamphlet Eimert credits two major influences on his work: one is his personal acquaintance with Russian émigré composer Jefim Golyscheff and his music, but the other is the writings and compositions of Hauer. Eimert states very clearly that he has not discovered any of what he is writing about; he merely claims to have brought it together and developed it in a systematic manner. It is perhaps interesting to note that Schoenberg and his two famous students are hardly mentioned in the book.

7 Hauer, "Atonale Musik."
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The Atonale Musiklehre is rich in musical examples, and Eimert's concerns are set in the pragmatic context of compositional application throughout the theoretical discussions. Eimert divides the book into two major sections: the first is devoted to theoretical and practical aspects of atonality; the second takes up historical and aesthetic concerns. The first, more theoretical section is divided into five chapters. While the first two brief chapters, entitled "General Foundations" and "The Atonal Law of Twelve-Tonality," are at points clearly paraphrases of passages from Hauer's Vom Wesen des Musikalisichen, Eimert begins to go his own way in the third chapter, entitled "The Atonal Principle of Melody." Eimert's discussion of twelve-tone melody emphasizes the almost infinite number of melodies that can arise when the nearly 500 million possible orderings of the twelve pcs are combined with an unlimited freedom in rhythmic configuration. The only caution he offers is that twelve-tone melodies should avoid creating tonal associations and references. Eimert's twelve-tone melodies can be termed "melodic aggregates"; and while each melodic aggregate could also be thought of as an ordered twelve-tone series, Eimert does not directly invoke the notion of ordering; for Eimert, it is enough that each melodic aggregate circulate all twelve pcs. In one of his examples (No. 15), Eimert seems to come very close to what we would understand as a simple employment of serial technique: because he has set his four-voice example as a canon, the same ordered series is repeated in each voice. However, the second melodic aggregate that follows in each voice is a free reordering of the first and does not conform to the any of the systematic transformations that became standard practice in the Schoenberg circle by the late 1920s. Eimert argues that so long as the music progresses according to melodic aggregates, the harmonic dimension of the music is free from restrictions (except, one might expect, from creating tonal associations).

In Chapter 4, Eimert takes up the "Harmonic Principle of Twelve-Tonality, the "Complex."" The complex can be thought of as a "harmonic aggregate" in which the defining feature is that all voices in a texture, when taken together, complete the twelve-pc aggregate. In a four-voice texture, for instance, all four voices taken together unfold a harmonic aggregate even though each voice alone does not unfold a melodic aggregate. In the course of considering the ways in which the harmonic aggregate can be distributed among two or more voices, Eimert calculates the number of possible partitionings per number of distinct voices, prefacing the discussion of arrays that arose in American twelve-tone theory in the 1960s and 1970s and that finds its most complete formulation in the work of Robert Morris (discussed below). Eimert shows, for instance, that in two voices there are eleven possible partition patterns: these would be 1 + 1 (one note in one voice, eleven in the other), 2 + 10, and so on, ending with 11 + 1. In three voices there are 55 possible partitionings and in four voices there are 165. He then shows how many different possible orderings there are for each voice based on how many pcs it contains: a voice with eleven pcs, for example, could be reordered almost 40 million ways, but a voice with three pcs can only be reordered six ways. This is all by way of demonstrating that as the number of voices in a partition increases, the number of possible melodic permutations decreases; and as the number of melodic permutations increases, the number of voices in a partition decrease.

This concern with the harmonic and melodic dimensions leads, in Chapter 5, to the consideration of the "Bringing Together of Harmonic and Melodic Principles in Free Composition." Up to this point, Eimert has argued that when the music is unfolding according to melodic aggregates, there is great freedom in the harmonic dimension; when the music is unfolding according to harmonic aggregates (complexes) there is great freedom in the individual voice parts. In Chapter 5, however, Eimert begins to explore ways of coordinating the melodic and harmonic dimensions. Eimert presents a number of examples, including one in which three harmonic aggregates are created by unfolding three melodic aggregates according to a 4 + 4 + 4 partitioning scheme (Example 29). If these melodic aggregates were standard serial transformations of one another (which they are not), this would be an example of a simple two-dimensional array based on tetrahedral combinatoriality. As it stands, though, it is at least a noteworthy precursor to this later organizational principle and an important early instance of coordinating the melodic and harmonic dimensions in twelve-tone music.

Unlike that of Hauer, Eimert's consideration of the twelve-tone idea is not driven by spiritual concerns. Instead, Eimert casts his systematic atonality as a natural development out of chromatic tonality and his focus is clearly on the pragmatic dimension of his ideas. And while Eimert admits he owes a good deal to Hauer's theoretical writings, it is also interesting to note that the future co-editor of Die Reihe does not mention an ordered series at any point in his Atonale Musiklehre. There is good reason for this: until late 1924 Schoenberg's "method of composing with twelve tones related only to one another" had not been made public outside of the Schoenberg circle in Vienna.

Arnold Schoenberg. While the writings of Hauer and Eimert offer systematic approaches to the constant circulation of the twelve-pc aggregate, these approaches never caught on with other composers to a significant extent. Instead, it is Arnold Schoenberg's (1874–1951) twelve-tone method that has come to define classic twelve-tone practice, with its ordered series and forty-eight row forms based on transposition, inversion, retrograde, and retrograde-inversion. It is thus perhaps surprising that Schoenberg's method was the last to be articulated in print, and when it does appear it is explained not by the composer himself, but rather by one of his students. Erwin Stein's article, "Neue Formprinzipien," appeared in the September 1924 issue of
The Atonale Musiklehre is rich in musical examples, and Eimert's concerns are set in the pragmatic context of compositional application throughout the theoretical discussions. Eimert divides the book into two major sections: the first is devoted to theoretical and practical aspects of atonality; the second takes up historical and aesthetic concerns. The first, more theoretical section is divided into five chapters. While the first two brief chapters, entitled "General Foundations" and "The Atonal Law of Twelve-Tonality," are at points clearly paraphrases of passages from Hauer's Von Wesen des Musikalischem, Eimert begins to go his own way in the third chapter, entitled "The Atonal Principle of Melody." Eimert's discussion of twelve-tone melody emphasizes the almost infinite number of melodies that can arise when the nearly 500 million possible orderings of the twelve pcs are combined with an unlimited freedom in rhythmic configuration. The only thing he offers is that twelve-tone melodies should avoid creating tonal associations and references. Eimert's twelve-tone melodies can be termed "melodic aggregates"; and while each melodic aggregate could also be thought of as an ordered twelve-tone series, Eimert does not directly invoke the notion of ordering for Eimert, it is enough that each melodic aggregate circulate all twelve pcs. In one of his examples (No. 15), Eimert seems to come very close to what we would understand as a simple employment of serial technique: because he has set his four-voice example as a canon, the same ordered series is repeated in each voice. However, the second melodic aggregate that follows in each voice is a free reordering of the first and does not conform to the any of the systematic transformations that became standard practice in the Schoenberg circle by the late 1920s. Eimert argues that so long as the music progresses according to melodic aggregates, the harmonic dimension of the music is free from restrictions (except, one might expect, from creating tonal associations).

In Chapter 4, Eimert takes up the "Harmonic Principle of Twelve-Tonality, the 'Complex.'" The complex can be thought of as a "harmonic aggregate" in which the defining feature is that all voices in a texture, when taken together, complete the twelve-pc aggregate. In a four-voice texture, for instance, all four voices taken together unfold a harmonic aggregate even though each voice alone does not unfold a melodic aggregate. In the course of considering the ways in which the harmonic aggregate can be distributed among two or more voices, Eimert calculates the number of possible partitionings per number of distinct voices, prefiguring the discussion of arrays that arose in American twelve-tone theory in the 1960s and 1970s and that finds its most complete formulation in the work of Robert Morris (discussed below). Eimert shows, for instance, that in two voices there are eleven possible partition patterns; these would be 1 + 1 (one note in one voice, eleven in the other), 2 + 10, and so on, ending with 11 + 1. In three voices there are 55 possible partitionings and in four voices there are 165. He then shows how many different possible orderings there are for each voice based on how many pcs it contains: a voice with eleven pcs, for example, could be reordered almost 40 million ways, but a voice with three pcs can only be reordered six ways. This is all by way of demonstrating that as the number of voices in a partition increases, the number of possible melodic permutations decreases; and as the number of melodic permutations increase, the number of voices in a partition decrease.

This concern with the harmonic and melodic dimensions leads, in Chapter 5, to the consideration of the "Bringing Together of Harmonic and Melodic Principles in Free Composition." Up to this point, Eimert has argued that when the music is unfolding according to melodic aggregates, there is great freedom in the harmonic dimension; when the music is unfolding according to harmonic aggregates (complexes) there is great freedom in the individual voice parts. In Chapter 5, however, Eimert begins to explore ways of coordinating the melodic and harmonic dimensions. Eimert presents a number of examples, including one in which three harmonic aggregates are created by unfolding three melodic aggregates according to a 4 + 4 + 4 partitioning scheme (Example 29). If these melodic aggregates were standard serial transformations of one another (which they are not), this would be an example of a simple two-dimensional array based on tetrahedral combinatoriality. As it stands, though, it is at least a noteworthy precursor to this later organizational principle and an important early instance of coordinating the melodic and harmonic dimensions in twelve-tone music.

Unlike that of Hauer, Eimert's consideration of the twelve-tone idea is not driven by spiritual concerns. Instead, Eimert casts his systematic atonalism as a natural development out of chromatic tonality and his focus is clearly on the pragmatic dimension of his ideas. And while Eimert admits he owes a good deal to Hauer's theoretical writing, it is also interesting to note that the future co-editor of Die Reihe does not mention an ordered series at any point in his Atonale Musiklehre. There is good reason for this: until late 1924 Schoenberg's "method of composing with twelve tones related only to one another" had not been made public outside of the Schoenberg circle in Vienna.

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Musikblätter des Anbruch celebrating Schoenberg's fiftieth birthday. While Schoenberg had lectured his students on his new method already in 1923, Stein's article is the first public articulation of it.

Stein cast Schoenberg's method in the context of the "crisis" of modern composition, by which he means the collapse of tonality and the loss of the form-building potential of tonality. There is a strong sense of the historical inevitability of the rise of atonality, as chromatic tonality gives way to the free use of the twelve pcs. In what was to become an oft-repeated historical account of the rise of dodecaphony, Stein argues that modern music is turning away from harmony as its principal structural determinant and toward counterpoint, reversing the stylistic change that occurred from Bach to Mozart by returning again to polyphonic thinking. In this context, then, Stein introduces inversion, retrograde, and retrograde-inversion transformations into the discussion. But these arise not as operations on twelve-pc rows—an idea that would figure prominently in Rabin's writing—but rather more generally as melodic transformations of motives. As elements of Schoenberg's new formal principles, according to Stein, these transformations offer melodic variety in the context of motivic unity (see also Chapter 29, pp. 911–13).

The central component holding Schoenberg's new atonal music together is the Grundgestalt (basic shape), which, appearing early in a work, is the source of all subsequent musical material. Stein offers a series of often detailed analytical excerpts drawn from Schoenberg's Op. 23–25 to demonstrate the wide variety of ways in which the composer establishes formal logic and structural unity in these pieces. Since the new works that Stein considers are not all dodecaphonic, the new formal principles have to generalize across both twelve-tone and non-twelve-tone works; this makes it clear that the Grundgestalt and the row are not necessarily the same—a Grundgestalt need not be twelve-tone. It is important to note then that Stein presents the twelve-tone method not as the only way, but rather as one approach among many. It thus seems that even within his own circle it was not clear that Schoenberg would turn to exclusively twelve-tone composition after his first extended dodecaphonic work, the Wind Quintet, Op. 26 (completed in August 1924). And even when articles by Stein, Felix Greisler, Theodor Adorno, and others began to explore twelve-tone music, it is not clear that these members of the Schoenberg circle ever understood the row as more than a melodic resource; the idea that a row could function as a background in Schoenberg's music, establishing structural hierarchy and row disposition within a given piece, would have to wait for the later theoretical work of Schoenberg's American exegeses led by Milton Babbitt.

In all the discussion around Schoenberg's twelve-tone method in the decade after its public introduction by Stein, the composer himself is strangely silent. Schoenberg had published his Harmonielehre in 1911 and prepared a revised and enlarged third edition in 1922; he was thus no stranger to music-theoretical discussion. His most extended treatment of his twelve-tone method appears in his essay "Composition with Twelve Tones," which developed out of a 1934 lecture given at Princeton but was not published until 1950—a year before the composer's death. Still, by 1925 Hauer and Schoenberg had discussed beginning a school of twelve-tone composition in which Hauer would teach the introductory classes and Schoenberg the more advanced ones; they also considered bringing out a book together, alternating chapters with one another. In 1926 Schoenberg left Vienna for a teaching position in Berlin and these plans to collaborate came to nothing.

In comparing the dodecaphony of Hauer, Eimert, and Schoenberg, certain contrasts and similarities arise. Hauer thought of the twelve pcs as a kind of spiritual universe; thus, twelve-tone composition was a way of communing with the infinite—the structure of any given work was only ever part of a much greater structure that could never be projected in any single piece but was nevertheless already and always present. For Schoenberg, his twelve-tone method provided a means for projecting the musikalischer Gedanke of a work, though Stein only hints at this; and while there was nothing especially spiritual about the method itself, the expression of the Gedanke was something of a mystical undertaking for Schoenberg. Reflecting on his method some twenty years after he first employed it, Schoenberg likens artistic creation to divine creation (paraphrasing Genesis in the process) and refers his idea of the unity of musical space to Emanuel Swedenborg's characterization of Heaven. Eimert, though influenced by Hauer's writing, seemed unconcerned with the spiritual dimensions of composition or dodecaphony; he focused his efforts instead on the purely technical and pragmatic aspect of twelve-tone composition. The picture of twelve-tone theory that emerges in the first half of the 1920s is thus one of a wide variety of approaches; the dodecaphony of Hauer, Schoenberg, and Eimert are at once contrasting and related, often hitting on similar technical solutions as responses to very different sorts of questions. And there were other approaches as well: in 1925, for instance, Berg's student Fritz Heinrich Klein (1892–1977) published his "Die Grenze der Halbtonwelt," an essay in which he discusses a number of techniques—some of which are twelve-tone—that he employed in his 1921 composition "Die Maschine." Despite the variety of music-theoretical writing on dodecaphony and atonality that appeared in Germany and Austria in the 1920s, however, Schoenberg's serial method became the most widely known. Brief analyses of some early twelve-tone works from the Second Viennese School appeared in music journals and prefaced the published scores, explaining the idea of the row and its transformations, providing a guide to form in these pieces, and introducing many musicians to the technical aspects of dodecaphony.

13 Stein, "Neue Formprinzipien." Stein's English translation appears in his Opusae in Neues Geist, pp. 57–77.
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**Twelve-tone notation**

Composers of chromatic music often complain that standard notation makes reading their music more difficult than it needs to be. Shown below are three different approaches to twelve-tone notation that were designed in the early part of the twentieth century to make atonal music easier to read. The first of these is Hauer’s Zwölftonschrift, which is based on the keyboard, reading like a keyboard standing sideways and going from low to high, the lines stand for the black keys, while the spaces stand for the white ones (the second excerpt is a transcription of the first). A second form of dodecaphonic notation was developed by Jefim Golyscheff (1887–1970): all notes with solid note heads are natural, while all those with an “x” inside the notehead are raised one half step (the example is drawn from Eimert’s Atonale Musiklehre). The third is from Schoenberg and features three lines, the lowest of which is C, the next highest E, and the top line G♭/A. Slanted lines are used to show the notes in between these, with a line above a note indicating a half step above the lower line, a line below indicating a half step below the upper line, and line through the note showing the note a whole step above the lower and below the higher. Schoenberg provides a transcription drawn from his Pierrot Lunaire.

A  Hauer, Vom Wesen, p. 56

B  Eimert, Monale Musiklehre, pp. 3, 9

C  Schoenberg, “A New Twelve-Tone Notation” (1924), in Style and Idea, pp. 356, 359

**Pierrot Lunaire, No. 2**

Further development of twelve-tone theory, 1930–45

While Schoenberg’s particular method would come to dominate the public perception of twelve-tone music in the decades that followed its inception in the early 1920s, many composers and theorists devised their own ways of engaging the twelve-tone idea, in some cases appropriating aspects of Schoenberg’s method. Numerous essays could be written on the wide variety of idiosyncratic approaches to twelve-tone theory and composition that arose in the 1930s and 1940s, but the rise of twelve-tone modality during this period provides a representative instance of ways in which Schoenberg’s method was adapted and extended.

Richard S. Hill. While in many instances the use of modes in music of the first third of the twentieth century is derived from late nineteenth-century musical evocations of folk and exotic styles, the notion of mode when used in the context of counterpoint has clear ties to Western music’s pretonal past. Stein had already argued that atonality was a logical successor to chromatic harmony, casting this development in a historical context that suggested that atonality was an inevitable consequence of late nineteenth-century and early twentieth-century extended tonality. While one may question the Hegelian teleology of Stein’s position, it is clear nonetheless that he – like many of his generation – evinced a pronounced concern for history. It is perhaps not surprising in this context that some composers and theorists in the 1930s looked to history to provide suggestions for the further development of the twelve-tone idea.
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Hill begins his theoretical consideration of modality with a C major scale, pointing
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content, but also information about the ways in which the elements relate to one
another in a musical sense, this would be far more useful and more representative of
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tone," and lists both prime and mirror forms of the C major scale by way of
illustration. In the prime form, middle C is followed by the G a fifth above (instead of
D), and then by the E a third below G. This suggests that in a functional sense G is more
closely related to C than D is, and in the same way that E is more closely related to G
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Hill was not a composer, and so while he may have thought he could see the promised land of dodecaphonic milk and honey, he could not himself lead twelve-tone music in to it. Instead, it would fall to two composers, Ernst Krenek and his student George
Perle, to further develop the notion of twelve-tone modality. Hill's essay sets out the
two most important issues to be taken up by Krenek and Perle: the notion that preto-
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and the idea that the row can establish a meaningful musical context while not having
to appear as an ordered series on the surface of the piece.

Ernst Krenek. Hill's essay had an important impact on Ernst Krenek's (1900–91)
thinking about twelve-tone composition. Krenek addressed Hill's writing in his Music
Here and Now, as well as in his 1940 address "A Study of Cadential Formations in Atonal
Music." Hill and Krenek corresponded privately on dodecaphonic concerns, and in the
opening paragraphs of his 1943 article, "New Developments of the Twelve-Tone Technique," Krenek acknowledges the influence of Hill's essay and especially his functional
modes. Krenek seems to have struggled most with the notion of dodecaphonic functional modes, which Krenek calls "extra-motivally"—a term that does not appear in
Hill's essay but is used by Perle in his 1941 article discussed below.

Krenek's solution to the question of extra-motivally modal was to use the two com-
plementary hexachords of a row to systematically generate a larger collection of hexa-
chords. Thus, beginning with the complementary and ordered hexachords <F, G, A,
Bb, D, Eb>, <B, C, D, E, F, G#,> and the inversions of each, Krenek performs two
types of transformation. The first is rotation, which transforms the first ordered
hexachord, for instance, to <G, A, Bb, D, Eb, F> and then <A, Bb, D, Eb, F, G#>, and so on
until the rotation produces the original hexachord. This process results in six modes
Krenek terms "diatonic." In a second type of transformation procedure, Krenek then
transposes each of these rotated hexachords obtained in the first procedure such that
each hexachord begins on the same pitch class as the first; the first rotated hexachord
given above thus becomes <F, G, A, C#, D, Eb> and the second <F, F#, A, B, C#, D#>. This
second operation produces modes Krenek calls "chromatic." Using these procedures,
Krenek forms six diatonic modes each from the original row and its inversion, and
six chromatic modes from the row and its inversion, making twenty-four possible
modes. Krenek employs these twelve-tone modal materials in his Lamentatio Jeremiae

16 Hill, "Schoenberg's Tone-Rows," p. 33. 17 Ibid.
18 A discussion of the Hill–Krenek correspondence may be found in Stewart, Ernst Krenek, pp. 224–25.
in atonality was an important problem—and many clearly thought it was—perhaps turning to the European music that preceded tonal harmony could provide some answers or suggest some alternative "roads not taken" that could now be explored in the wake of tonality's perceived exhaustion. And among the first theorists to begin working out the consequences of viewing dodecaphony through the lens of modal counterpoint was Richard S. Hill (1901–61).

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Hill begins his theoretical consideration of modality with a C major scale, pointing out that merely writing an ascending major scale tells us very little about its musical properties. If we were to notate the scale in such a way that we provide not only its content, but also information about the ways in which the elements relate to one another in a musical sense, this would be far more useful and more representative of the aural experience of music in C major. Hill calls this way of construing C a "functional mode," and lists both prime and mirror forms of the C major scale by way of illustration. In the prime form, middle C is followed by the G a fifth above (instead of D), and then by the E a third below G. This suggests that in a functional sense G is more closely related to C than D is, and in the same way that E is more closely related to G than to D is as well. D occurs as the penultimate tone in the functional mode, appearing a major second above the final C (which is an octave above middle C). While one may disagree with Hill's functional ordering, one can still see how such an ordering might provide more useful information than the usual strictly ascending ordering does.

For Hill, simply running off the tones in a twelve-tone row or any of its transformations is the parallel to the standard notion of a scale—it provides content with no sense of functional relationships between the elements. This is why Schoenberg's twelve-tone music is so hard to understand, Hill argues. The rows are used in a motivic way and in practice Schoenberg's disposition of row forms becomes excessively complicated, obscuring motivic relationships. What is needed instead is the development of dodecaphonic modes: "Twelve tone composers... might well fabricate their own rows of functional modes, as they, in fact, are now doing. As time went on, a body of these modes would come to be recognized as superior to the rest. These in turn would probably be whittled down until finally only a chief and a couple of subsidiary modes would be left." Hill then mentions that these new twelve-tone modes might be used to establish contrapuntal lines, "as in medieval times."

Hill was not a composer, and so while he may have thought he could see the promised land of dodecaphonic milk and honey, he could not himself lead twelve-tone music in to it. Instead, it would fall to two composers, Ernst Krenek and his student George Perle, to further develop the notion of twelve-tone modality. Hill's essay sets out the two most important issues to be taken up by Krenek and Perle: the notion that pre-tonal counterpoint could be used as a model for further development of dodecaphony and the idea that the row can establish a meaningful musical context while not having to appear as an ordered series on the surface of the piece.

Ernst Krenek. Hill's essay had an important impact on Ernst Krenek's (1900–91) thinking about twelve-tone composition. Krenek addressed Hill's writing in his Music Here and Now, as well as in his 1940 article "A Study of Cadential Formations in Atonal Music." Hill and Krenek corresponded privately on dodecaphonic concerns, and in the opening paragraphs of his 1943 article, "New Developments of the Twelve-Tone Technique," Krenek acknowledges the influence of Hill's essay and especially his functional modes. Krenek seems to have struggled most with the notion of dodecaphonic functional modes, which Krenek calls "extra-motival"—a term that does not appear in Hill's essay but is used by Perle in his 1941 article discussed below.

Krenek's solution to the question of extra-motival modality was to use the two complementary hexachords of a row to systematically generate a larger collection of hexachords. Thus, beginning with the complementary and ordered hexachords <F, G, A, Bb, Dl, E>, <B, C, D, E, F#, G>, and the inversions of each, Krenek performs two kinds of transformation. The first is rotation, which transforms the first ordered hexachord, for instance, to <G, A, Bb, Dl, E, F> and then <A, Bb, Dl, E, F, G>, and so on until the rotation produces the original hexachord. This process results in six modes Krenek terms "diatonic." In a second type of transformation procedure, Krenek then transposes each of these rotated hexachords obtained in the first procedure such that each hexachord begins on the same pitch class as the first; the first rotated hexachord given above thus becomes <F, G, A, Bb, Dl, E> and the second <F, F#, A, B, C#, D>. This second operation produces modes Krenek calls "chromatic." Using these procedures, Krenek forms six diatonic modes each from the original row and its inversion, and six chromatic modes from the row and its inversion, making twenty-four possible modes. Krenek employs these twelve-tone modal materials in his Lamentatio Jeremiae

16 Hill, "Schoenberg's Tone-Rows," p. 33. 17 Ibid.
18 A discussion of the Hill–Krenek correspondence may be found in Stewart, Ernst Krenek, pp. 224–25.
Perle focuses his approach on each tone and its immediate neighbors; the row establishes functional relationships for each pc that the composer may employ freely without regard to the literal serial ordering of the pcs in the twelve available transformations. Perle organizes these clusters of neighbor tones by combining row forms into modes. Inversion forms starting on C and F, G and B♭, and D and B♭ (reflecting the dyads forming the first hexachord of the original series) produce neighbor-tone collections of stacked fifths, thirds (minor-minor seventh chords), and fourths respectively, as do transpositions starting on C and G, F and D, and B♭ and A (the dyads from the inverted form). While the manner in which Perle combines his materials may seem complicated, the results produce a palette of possible combinations that are limited in comparison with Schoenbergian procedures (owing in large part to the symmetry of the central row) and match closely Hill's call for a small number of modes that would be superior to the rest. Most importantly, Perle offers a solution to organizing dodecaphony in which the row creates musical context without appearing in any literal way on the surface of the work. Though he insists he was unaware of Hill's article when he developed his approach, Perle ended up addressing Hill's concerns in a very systematic and comprehensive manner. Perle's later articulations of twelve-tone modality did not differ much from the form presented in 1941. The most widely known discussion is probably the one found in his *Serial Composition and Atonality* of 1962, reproduced in subsequent editions of that book until Perle later published an expanded version of his theory—a result of his work with the composer Paul Lansky—in 1977 as *Twelve-Tone Tonality*.

**Twelve-tone theory since 1945**

The Second World War and the events leading up to it significantly impeded the dissemination of twelve-tone music and theoretical writing. Printed scores of the works of Schoenberg, Berg, and Webern were especially difficult to come by, particularly for those outside Germany and Austria; this prevented the careful study of these works by many interested scholars and composers and greatly attenuated the benefits of the articles one could find, often concerning pieces readers had neither heard nor played. Both Babbitt and Perle have commented on the paucity of scores and information regarding twelve-tone music during this period. Perle even attributes the development of his own dodecaphonic theory to his misunderstanding of Schoenbergian practice. As this chapter has made clear, there was nonetheless some music-technical writing available to readers during wartime: Krenek's *Studies in Counterpoint* or Hill's article in *The Musical Quarterly*, for instance. The period after the war, by contrast, saw the publication and widespread availability of a number of books devoted to twelve-tone music:

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Footnotes:


Prophetae, op. 93 (1941–42), and his 1943 article includes a number of examples drawn from that work to illustrate his application of the modal hexachords.

It is important to note that with his notion of diatonic and chromatic transformations, Krenek introduces the idea of rotation into twelve-tone theory, though the procedure of rotation had been present in the dodecaphonic music of Hauer, Schoenberg, and Berg for over a decade by this time. Far more significant is the way in which the row itself recedes from its role as a motivic entity on the surface to one that generates material from the background—to return to Krenek's language, it is no longer motivic, but now extra-motivational. The row in its original form need not be literally present in the piece, and the use of chromatic modes even allows the possibility that some passages will not use all twelve tones. This is a clear departure from Krenek's motivic approach to twelve-tone composition as it appears in his Studies in Counterpoint of 1940, in which the row is subject to the Schoenbergian operations of transposition, inversion, and retrograde. While Krenek's motival and extra-motivational approaches each arise from a desire to extend historically validated contrapuntal practices into twelve-tone music, they produce highly contrasting results. While Studies in Counterpoint may be grounded in the thinking of Schoenberg's students from the twenties and thirties, Krenek's extra-motivational procedures are the ones that most clearly take up Hill's vision of a tonal system of the future.

George Perle. Fascinated especially with the dodecaphonic structure of Berg's Lyric Suite, George Perle (1915–) also developed a way of employing the row in an extra-motivational context. Perle acknowledged that Hill's article was the first to suggest the notion of twelve-tone functional modes, but he insisted that he was unaware of the essay until after he had worked out his particular version of twelve-tone modality. Perle was also a student of Krenek's at the time the latter was developing his approach, but he may have had much more influence on Krenek in this regard than the older composer had on him. In many ways, in fact, Perle's twelve-tone modality is much closer to what Hill proposes than are the diatonic and chromatic modes of Krenek.

Perle understands modality in a very general sense and his theoretical writing makes no attempt to reconfigure elements of modal counterpoint in a dodecaphonic context. He begins with a series of descending fifths—C, F, Bb, Eb, Ab, Db—and ascending fifths—C, G, D, A, E, B, F♯—from which he constructs a row by interleaving the two (allowing for enharmonic notation): C, F, G, Bb, D, Eb, A, C♯, E, D♯, B, F♯. Because of the structure of the row, its transposition beginning on F♯ is identical with the retrograde of original form beginning on C. Since Perle does not consider retrograde forms to be distinct entities in his approach, there are only six discrete transpositions of the row available. Perle does employ inverted forms of the row, and there are likewise six discrete inversion forms available. This row serves as the basis for Perle's system—no others are used—and as a consequence he is able to employ a limited number of possible forms, twelve as opposed to the Schoenbergian forty-eight.

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A  Hill, “Schoenberg’s Tone Rows,” p. 21

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René Leibowitz. With his Schoenberg et son école in 1947, René Leibowitz (1913–72) offered the first attempt at a comprehensive study of the music of Schoenberg, Berg, and Webern. Following a familiar mode of presentation and arguing his position at some length, Leibowitz casts the three composers in a teleologically driven historical context with Schoenberg as the pivotal figure. According to Leibowitz, the history of polyphony can be seen to focus first on contrapuntal concerns (medieval and Renaissance music) and later on harmonic ones (Classical and Romantic music); only the harmonic counterpoint of Bach seems to hold these two sets of concerns in a perfect, if historically precarious, balance. It thus turns out that counterpoint is mostly a secondary concern in music after 1750, appealing occasionally but almost always subject to harmonic and tonal concerns. It is Schoenberg who “reactivates” polyphonic “evolution” with his turn to atonality, and with his twelve-tone method establishes organizing principles for a “new world of sound.” Leibowitz subtitles the section of his book dealing with Schoenberg and his music “The Origins and Foundations of Contemporary Music.” The following section devoted to Berg’s music is subtitled “The Awareness of the Past in Contemporary Music,” while the section on Webern’s music runs “The Awareness of the Future in Contemporary Music.” Thus with Schoenberg the master at the center of a new era in the development of music, one of his students looks to its rich past while another points the way to the future.

While Leibowitz places tremendous emphasis on the historical importance of the music he discusses, he also devotes a significant amount of attention to the music itself, providing detailed if often fragmentary analyses of dozens of works by the three composers. His next book, Introduction à la musique de douze sons, takes Schoenberg’s Variations for Orchestra, Op. 31 as its central analytical example; here Leibowitz presents even more detailed analysis, offering at times measure-by-measure, row-by-row accounts of this extended twelve-tone work. While he occasionally hits upon systematic properties in dodecaphony (he notices the consequences of odd and even index numbers under inversion, for instance), his thinking on twelve-tone music remains—like Perle’s term—motivational. At the end of his second book, in fact, Leibowitz addresses the Perle and Hill articles discussed above (also briefly mentioning Krenek’s writing in Music Here and Now). He rejects the notion of establishing the kind of twelve-tone modality Perle describes, calling it “static” and claiming that such ideas have
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| ![Extents and Limits Diagram](image) |

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European serialism. Before his work was available abroad, Leibowitz’s dodecaphonic advocacy was felt first in Paris and then at Darmstadt; and it is likely that his books provide an accurate view of the seminar teaching and compositional instruction in which he was engaged in the late 1940s. But there was another influential approach to modern compositional thinking that affected composers in Paris at the time, as well as at Darmstadt in the early fifties (following Leibowitz’s tenure there), and this came from Olivier Messiaen (1908–92). The French composer had published his *Technique de mon langage musical* in 1944—an important work in twentieth-century theory but one that does not engage twelve-tone composition at all. In the late 1940s Messiaen was fascinated with Stravinsky’s use of “personnages rythmiques” as they could be found in his *Le Sacre du printemps*, and he spent a good deal of time working through this with many of the same students who had attended Leibowitz’s sessions. Pierre Boulez (1925—) assumed the role as spokesman for this group of young composers and much of what Messiaen was teaching regarding Stravinsky’s rhythmic practice can be found in Boulez’s 1948 article, “Propositions”; Boulez later expanded his work on Stravinsky’s music with his “Stravinsky demure” of 1953. The crucial point for Boulez was to establish that rhythm could be separated from pitch, and thus be seen to engage in a kind of counterpoint between domains. This constituted, for Boulez at least, the basis for his strong break with Leibowitz and his more traditional, pitch-based thinking: while some accounts have attributed the rift to Boulez’s advocacy of Webern’s music over that of Schoenberg—best seen in Boulez’s controversial essay, “Schönberg is Dead” of 1952—the central issue has more to do with what might be called the “emancipation of the rhythmic domain.”

In part under the influence of Messiaen’s idiosyncratic adaptations of ordering (but not twelve-tone) practices in his *Modes de valeur et d’intensités* (1945), composers at Darmstadt in 1951 began developing an approach to serialism that extended the use of an ordered series to rhythm, dynamics, and timbre. The logic behind this extension of the twelve-tone idea to non-pitch domains is spelled out initially by Boulez in his “Eventuellement...” of 1952. According to Boulez, Schoenberg’s twelve-tone method constitutes a tremendous advance in modern composition, but it is innovative only in the pitch domain; in regard to rhythm, timbre, and form it is still hopelessly mired in the past. Stravinsky’s music has demonstrated that rhythm can be an independent component in musical composition. It thus makes sense to bring these two practices together, creating rhythm with as much serial consideration as has been reserved traditionally for pitch. Boulez goes on to cite examples from his own *Polyphonie X* (1951) and *Structures*, Book 1 (1951–52) to illustrate his recent practice of employing rhythmic series of both twelve and less than twelve values.

Toward the end of his essay Boulez refers to the new possibilities for the control of duration and timbre that tape composition offers, a topic he takes up in more detail in his “Au der Grenze der Fruchtländes (Paul Klee)—his contribution to the first volume of *Die Reihe*, edited by Herbert Eimert and Karlheinz Stockhausen (1928–). In 1952, Eimert published his *Lehrbuch der Zwölftontechnik*, now organizing his thinking around an ordered row (which had not played a role in his earlier *Atomale Musiklehre*). Eimert had begun working on establishing an electronic music studio in Cologne in 1951, and Stockhausen began composing electronic pieces there in 1953, after having spent a year working at the ORTF studio in Paris with Pierre Schaeffer. Eimert and Stockhausen founded *Die Reihe* in 1955, a journal that acted as the central voice of the European avant-garde and which over the next few years devoted attention to a number of topics. The first volume is devoted to electronic music, and Eimert’s contribution offers a clear and well-argued statement of the ways in which electronic music extends the twelve-tone idea to all domains of musical creation, making it the perfect medium for integral serialism. A number of Stockhausen’s early theoretical essays also appear in *Die Reihe*, including his important discussions of electronic music and serial procedures in “...wie die Zeit vergeht...” (See also Chapter 20, pp. 717–18.)

Despite the stated intention of many European serialist writers to move beyond Leibowitz’s dodecaphonic approach, the general approach to the ordered series—in whatever domain—continued to be primarily motivial. The emphasis tends to fall less on creating a single ordering that is projected in a number of domains and more on creating a number of orderings, each assigned—predominantly—to a single domain. The resulting serial counterpoint between domains is the result of elevating rhythm, timbre, and dynamics to the level of pitch in compositional importance, and marks a general distinction between the European approach advocated by Boulez, Stockhausen, and Eimert and the American one advanced by Babbitt and his students, which keeps pitch as the primary element. In this context it is interesting to note that
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European serialism. Before his work was available abroad, Leibowitz’s dodecaphonic advocacy was felt first in Paris and then at Darmstadt; and it is likely that his books provide an accurate view of the seminar teaching and compositional instruction in which he was engaged in the late 1940s. But there was another influential approach to modern compositional thinking that affected composers in Paris at the time, as well as at Darmstadt in the early fifties (following Leibowitz’s tenure there), and this came from Olivier Messiaen (1908–92).22 The French composer had published his Technique de mon langage musical in 1944—an important work in twentieth-century theory but one that does not engage twelve-tone composition at all. In the late 1940s Messiaen was fascinated with Stravinsky’s use of “personnages rythmiques” as they could be found in his Le Sacre du printemps, and he spent a good deal of time working through this with many of the same students who had attended Leibowitz’s sessions. Pierre Boulez (1925—) assumed the role as spokesman for this group of young composers and much of what Messiaen was teaching regarding Stravinsky’s rhythmic practice can be found in Boulez’s 1948 article, “Propositions”; Boulez later expanded his work on Stravinsky’s music with his “Stravinsky demeure” of 1953. The crucial point for Boulez was to establish that rhythm could be separated from pitch, and thus be seen in a kind of counterpoint between domains. This constituted, for Boulez at least, the basis for his strong break with Leibowitz and his more traditional, pitch-based thinking; while some accounts have attributed the rift to Boulez’s advocacy of Webern’s music over that of Schoenberg—best seen in Boulez’s controversial essay, “Schönb erg is Dead” of 1952—the central issue has more to do with what might be called the “emancipation of the rhythmic domain.”

In part under the influence of Messiaen’s idiosyncratic adaptations of ordering (but not twelve-tone) practices in his Modes de valeur et d’intensités (1949), composers at Darmstadt in 1951 began developing an approach to serialism that extended the use of an ordered series to rhythm, dynamics, and timbre.23 The logic behind this extension of the twelve-tone idea to non-pitch domains is spelled out initially by Boulez in his “Eventuellement...” of 1952. According to Boulez, Schoenberg’s twelve-tone method constitutes a tremendous advance in modern composition, but it is innovative only in the pitch domain; in regard to rhythm, timbre, and form it is still hopelessly mired in the past. Stravinsky’s music has demonstrated that rhythm can be an independent component in musical composition. It thus makes sense to bring these two practices together, treating rhythm with as much serial consideration as has been reserved traditionally for pitch. Boulez goes on to cite examples from his own Propostions X (1951) and Structures, Book I (1951–52) to illustrate his recent practice of employing rhythmic series of both twelve and less than twelve values.

Toward the end of his essay Boulez refers to the new possibilities for the control of duration and timbre that tape composition offers, a topic he takes up in more detail in his “Au der Grenze der Fruchtlands (Paul Klee)” - his contribution to the first volume of Die Reihe, edited by Herbert Eimert and Karlheinz Stockhausen (1928—). In 1952, Eimert published his Lehrbuch der Zweifachtechnik, now organizing his thinking around an ordered row (which had not played a role in his earlier Atonale Musiklehre). Eimert had begun working on establishing an electronic music studio in Cologne in 1951, and Stockhausen began composing electronic pieces there in 1953, after having spent a year working at the ORTF studio in Paris with Pierre Schaeffer. Eimert and Stockhausen founded Die Reihe in 1955, a journal that acted as the central voice of the European avant-garde and which over the next few years devoted attention to a number of topics. The first volume is devoted to electronic music, and Eimert’s contribution offers a clear and well-argued statement of the ways in which electronic music extends the twelve-tone idea to all domains of musical creation, making it the perfect medium for integral serialism. A number of Stockhausen’s early theoretical essays also appear in Die Reihe, including his important discussions of electronic music and serial procedures in “... wie die Zeit vergeht... ” (See also Chapter 20, pp. 717–18.)

Despite the stated intention of many European serialist writers to move beyond Leibowitz’s dodecaphonic approach, the general approach to the ordered series—in whatever domain—continued to be primarily motivic. The emphasis tends to fall less on creating a single ordering that is projected in a number of domains and more on creating a number of orderings, each assigned—in the least initially—to a single domain. The resulting serial counterpoint between domains is the result of elevating rhythm, timbre, and dynamics to the level of pitch in compositional importance, and marks a general distinction between the European approach advocated by Boulez, Stockhausen, and Eimert and the American one advanced by Babbitt and his students, which keeps pitch as the primary element. In this context it is interesting to note that
the approach to rhythmic independence put forward first by Boulez was anticipated by Berg's student Fritz Heinrich Klein in 1923; Klein's theoretical article "Die Grenze der Halbtonwelt" (mentioned briefly above) describes his use of both a twelve- and an eleven-attack rhythmic motive in his 1921 composition, "Die Maschine." In fact, at the conclusion of his 1964 reworking of his 1952 twelve-tone book, Eimert points out that not only Klein, but also both he and Golyscheff were working with rhythmic organization in a twelve-tone context.25

Milton Babbitt. In the United States the development of the twelve-tone idea followed the path toward extra-motival use of the row set down first by Hill. In one of Milton Babbitt's (1916-) first publications as a writer on music, the composer offers a review of Leibowitz's Schönbergs Ausflug in eine andere Klasse. Babbitt's complaints regarding Leibowitz's work not only serve to highlight what was to become an important distinction between American and European approaches, but also touch on what would become the central tenets in Babbitt's later writing on dodecaphony. Babbitt makes two distinct but clearly related points. He argues that while it is fascinating to reflect on the historical aspects of Schoenberg's music and career, the fact is that this has nothing to do with what is most important about the twelve-tone idea; when Schoenberg hit upon his twelve-tone method, he discovered a rich musical context that offered a wealth of structural possibilities. In coming to terms with the consequences of Schoenberg's method, one discovers that the structure of any given row, combined with the standard four operations, produces a system of relationships that can be characterized theoretically and that create an extra-motival context that is newly established with each work. The problem with Leibowitz, as Babbitt sees it, is that his analyses never scratch the surface of this extra-motival structure, and that all the discussion of Schoenberg's place in history is beside the point.

In his "Some Aspects of Twelve-Tone Composition"—published in 1955—and in the wake of the first published theoretical articles from Boulez and Stockhausen—Babbitt continues to distinguish his approach from the European one, but now he sets his thinking in contrast not to Leibowitz's motival dodecaphonic orthodoxy, but rather to the new wave of continental serialists. Basing his theoretical remarks on his unpublished 1946 dissertation, "The Function of Set Structure in the Twelve Tone System" (which was not accepted at Princeton University until 1952), Babbitt introduces two ideas that would come to be central to American twelve-tone theory in the decades that followed: combinatoriality and derivation. The first of these relates to any pair of the forty-eight possible rows in which the first six pcs of each together form an aggregate of all twelve possible pcs. The same property can arise using the first four pcs of three rows (tetrachordal combinatoriality) or the first three pcs of four rows (trichordal combinatoriality). Babbitt lists the six "all-combinatorial" hexachords and discusses Schoenberg's use of "semi-combinatorial" hexachords in many of his twelve-tone works.26 Derivation refers to a process whereby, for instance, the initial trichord of a row can be used to arrive at a new, "derived" row by employing the standard twelve-tone operations of transposition, inversion, retrograde, and retrograde-inversion.

In the articles that followed, Babbitt continued and extended his discussion of the structural properties of the twelve-tone system. In "Twelve-Tone Invariants as Compositional Determinants," for instance, he draws attention to the ways in which both segmental and non-segmental collections of pcs remain invariant under the standard operations. This is crucial, according to Babbitt, because the twelve-tone system is a "permutational" system, not a "combinatorial" one like tonality; while one key can be distinguished from another on the basis of content (some pcs are diatomic while others are not), twelve-tone rows differ only in terms of the ordering of identical content (all twelve pcs). It is thus important to attend to the specific ways in which the pcs are reordered—when a collection of pcs from one row form map back into the same places in a second one, that constitutes a special property that can have compositional consequences. In order to keep track of both the pcs and the spots in the row they occupy, Babbitt represents each element in integer notation as an ordered pair: the first integer stands for order position, while the second represents the pitch class. The first element in a row beginning on G, for instance, might be 0,9, while the second is 1,9. Thus from the first element to the second, the G (represented by the second 0 in the first pair) moves to E (nine half steps up, represented by the 9 in the second pair). By using integer notation and assigning values to represent both pitch class and order position, Babbitt is able to reduce the number of operators in his system to two: transposition and inversion. A retrograde is simply an order-number inversion, while a rotation is an order-number transposition. A retrograde inversion is simply an instance of inversion applied to both pc and order-number domains.

By approaching the twelve-tone system in this way, Babbitt is able to argue that the row is not only extra-motival in Perle's pitch-oriented sense (though Babbitt does not use this term), but also extra-motival in any musical dimension the composer chooses. Serialization of non-pitch domains can be based on a single row, which having been formulated mathematically becomes an organizational structure that is no longer specifically pitch-oriented anyway. Babbitt's approach to rhythmic organization, which appears first in his "Twelve-Tone Rhythmic Structure and the Electronic Medium," relies on an order-number/pitch-class isomorphism and contrasts the polyphony of domains found in tonal serialism with a more organic representation of the same neighborhood.
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**American theory in the wake of Babbitt.** Babbitt’s theoretical writing, which continued to appear in the decades after the first important articles, was enormously influential for American composers and theorists. Along with Allen Forte, Babbitt was instrumental in establishing the conceptual bases for the discipline of music theory in the 1960s and 70s. While Forte’s 1973 book, *The Structure of Atonal Music*, served as the basis for much work in atonal music generally, Babbitt’s thinking was taken up and extended by a number of younger theorists. David Lewin’s “A Theory of Segmental Association in Twelve-Tone Music,” for instance, extends Babbitt’s work on segmental invariants in Schoenberg’s twelve-tone music, and his “A Study of Hexachord Levels in Schoenberg’s Violin Fantasy” expands Babbitt’s notions of combinatoriality and hexachordal invariants. Donald Martino’s “The Source Set and Its Aggregate Formations” offers a detailed exploration of derivation, while Andrew Mead’s study, “Some Implications of the Pitch Class/Order Number Isomorphism Inherent in the Twelve-Tone System,” exhaustively explores the dialectic between order and pitch operations. Much of this work appeared in *Perspectives of New Music*, which was founded at Princeton in 1962, in part as a response to *Die Reihe*, and became the leading publication in American dodecaphonic theory for three decades. In fact, the 1960–90 period saw a tremendous explosion in writing and theorizing on twelve-tone music—a flood of dodecaphonic information and discussion like no other time in the history of twelve-tone theory.

While many articles or books could serve to represent this phase of theoretical activity, perhaps the most cumulative one is Robert Morris’s *Composition with Pitch Classes* of 1987. In one volume, Morris pulls together much of the theory generated by American dodecaphonic theorists in the period since Babbitt’s “Some Aspects,” and while he casts his book as a composition treatise meant to appeal to a readership beyond that of twelve-tone composers and theorists, his study still serves as the best single introduction to American twelve-tone theory, and may, in time, be viewed as the culmination of Babbitt’s project in dodecaphonic thinking. Morris’s book, like John Rahn’s *Basic Atonal Theory* of 1980, addresses both twelve-tone and atonal theory, betraying the influence that Babbitt’s rigorous— and some would complain “mathematically oriented”—mode of inquiry has had beyond the bounds of serial theory since the early 1960s. Indeed, Babbitt’s early support for Schenker’s tonal theory helped fuel interest in an area that has been a central topic for American theorists since the beginnings of the discipline in the late 1950s, while his mathematical modeling has influenced recent neo-Riemannian theory.

**The decline of twelve-tone theory?**

We return at the end of this chapter to one of the points from which we started out: namely, the relationship between dodecaphonic music and theory. Most twelve-tone writing—no matter how descriptive it may be—at least carries with it a prescriptive aspect. Such a prescriptive dimension is useful so long as there are a significant number of composers who write music that somehow relates to dodecaphonic thinking. But as composers have turned to new ways of thinking about their music in recent years (and perhaps in reaction to modernism generally, with which dodecaphonic thinking is seen to be joined at the hip), the prescriptive component in twelve-tone theoretical writing has tended to recede. American music theory in the 1990s has tended to focus on new ways of understanding familiar dodecaphonic works (Schoenberg, Berg, Webern, Stravinsky) or on ways of understanding less familiar twelve-tone music (Hauer, Klein, Krenek). Thus the trend—at least in English-language twelve-tone writing—seems to be of theory following practice, treating the repertory it addresses no longer as a vital concern, but rather as a historical subject. This probably signals more a transformation of twelve-tone theory than its decline. Whatever the future of dodecaphonic theory may be, it would be difficult to deny that its past plays a central role in our understanding of concert music in the twentieth century.

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Music Here and Now, New York, Norton, 1939.


*Studies in Counterpoint*, New York, G. Schirmer, 1940.


Eimert, H. Atonale Musiklehre, Leipzig, Breitkopf und Härtel, 1924


Lerihub der Zwölftontechnik, Wiesbaden, Breitkopf und Härtel, 1952

Buchmann, K. Changing Forms in Modern Music, Boston, E. C. Schirmer, 1945

Forte, A. The Structure of Atonal Music, New Haven, Yale University Press, 1973


"Lerihub der Zwölftontechnik: Vom Wesen des Musikalischen, Berlin-Lichterfelde, Schlesinger, 1923

"Offener Brief," Die Musik 17/2 (1924), p. 157

"Sphärenmusik," Melos 3 (1924), pp. 122–33

"Die Tropen," Musikblätter des Anbruch 6 (1924), pp. 18–21

Vom Melos zur Pause: Eine Einführung in die Zwölftonmusik, Vienna, Universal Edition, 1925

Vom Wesen des Musikalischen, Vienna, Waldeism-Eberle A. G., 1920


Headlam, D. "Fritz Heinrich Klein's 'Die Grenze der Halbtonwelt' and 'Die Maschine'," Theoria 6 (1922), pp. 55–96


Music Here and Now, New York, Norton, 1939

"New Developments of the Twelve-Tone Technique," Music Review 4 (1943), pp. 81–97

Studies in Counterpoint, New York, G. Schirmer, 1940

"A Study of Cadential Formations in Atonal Music," paper presented to the Greater New York Chapter of the American Musicological Society, November 13, 1940