



Beyond Analysis

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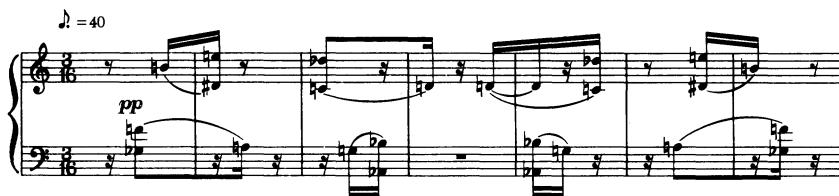
BEYOND ANALYSIS*

EDWARD T. CONE

EXAMPLES 1-3 present the beginnings of three hypothetical compositions. If they sound both oddly familiar and familiarly odd, that is because they were derived by the simple application of a mirror to three well-known sources: Schoenberg's *Klavierstück*, Op. 33a, and the first and third movements of Webern's *Variationen für Klavier*, Op. 27. Hence if the reader wishes to complete these constructions, he will find it a straightforward and even mechanical task.



Ex. 1



Ex. 2



Ex. 3

* This paper was presented in slightly different form as a lecture at the Summer Institute of Compositional Studies of the American Society of University Composers at the Berkshire Music Center, August 1967.

The possibility of such derived compositions was suggested to me by a famous passage from Schoenberg's essay "Composition with Twelve Tones":

*The unity of musical space demands an absolute and unitary perception. In this space, . . . there is no absolute down, no right or left, forward or backward. Every musical configuration, every movement of tones has to be comprehended primarily as a mutual relation of sounds, of oscillatory vibrations, appearing at different places and times. To the imaginative and creative faculty, relations in the material sphere are as independent from directions or planes as material objects are, in their sphere, to our perceptive faculties.*¹

No doubt I have taken this passage more literally than its author intended. So far as I know, Schoenberg never tried to demonstrate that the strict mirror inversion of a twelve-tone composition must be as valid as the original—but this might indeed be one conclusion that could be drawn from the quoted passage. It is also—and this is my real starting-point—a conclusion that might be drawn from reading much, and perhaps most, accepted twelve-tone analysis today.

My research into this question has been by no means exhaustive; furthermore, although I feel confident that the analytic essays I have studied constitute a representative sample, I have no way of proving this. The only fair way of presenting my case, then, is to list the actual examples I have used and the results I have obtained.

To begin with, the master's analyses of his own works in the essay just cited would apply equally well if the compositions in question were replaced by mirror inversions of themselves. One need only make the obvious adjustments: substitute for the original form of the set its inversion, for any transposition its complement, and so on, and the analysis can easily be made to read accurately. Only the references to instrumentation (which appear by way of description rather than analysis) might cease to be relevant.

One may immediately counter that what Schoenberg was presenting was not analysis but an explanation of a method—and a very primitive explanation at that. One could not expect him to have developed the sophisticated and powerful tools of analysis at our disposal today. Very well, then, look at as varied a compilation as the following: Milton Babbitt's three classic statements, "Some Aspects of Twelve-Tone Composition,"² "Set Structure as a Compositional Determinant,"³ and "Twelve-Tone Invariants as Compositional Determinants";⁴ Ernst

¹ Arnold Schoenberg: *Style and Idea*, New York, Philosophical Library, 1950, p. 113.

² *The Score*, No. 12 (June 1955), pp. 53–61.

³ *Journal of Music Theory*, Vol. v, No. 2 (April 1961), 72–94.

⁴ *Problems of Modern Music*, ed. Paul Henry Lang, New York, W. W. Norton, 1960, pp. 108–21.

Krenek's analysis of his own *Lamentatio* and *Sestina* in "Extents and Limits of Serial Technique";⁵ the entire second issue of *Die Reihe*, devoted to Webern; and, despite their promising titles, George Rochberg's "The Harmonic Tendency of the Hexachord"⁶ and his "Webern's Search for Harmonic Identity."⁷ In none of the foregoing would the line of argument have to be changed if the entire body of twelve-tone composition were magically transformed into its exact inversion, for in every case the only pitch relationships discussed are those that remain invariant under inversion. Even such extended monographs as Joseph Rufer's *Composition with Twelve Tones*⁸ and George Perle's *Serial Composition and Atonality*⁹ exhibit only a few unsystematic exceptions to this general principle. One further example that is especially indicative is Allen Forte's analysis of the Schoenberg Fantasy Op. 47 in his *Contemporary Tone-Structures*,¹⁰ for it is the only analysis in the book that foregoes some sort of Schenker-like linear reduction. In demonstrating the continuity of the Fantasy it relies entirely on connections between row-statements, all of which would work equally well for the mirror inversion of the composition.

As might be expected, *PERSPECTIVES OF NEW MUSIC* offers an unusually rich harvest of apposite examples. These include David Lewin's "A Theory of Segmental Association in Twelve-Tone Music";¹¹ John M. Perkin's "Dallapiccola's Art of Canon";¹² Babbitt's "Remarks on the Recent Stravinsky";¹³ Perle's "An Approach to Simultaneity in Twelve-Tone Music";¹⁴ Peter Westergaard's "Toward a Twelve-Tone Polyphony";¹⁵ and about a half-dozen of the "Younger Composers" series.

Especially interesting is another essay of Babbitt's, "Twelve-Tone Rhythmic Structure and the Electronic Medium,"¹⁶ which develops a method of deriving a rhythmic row from the intervals of the basic set. Perhaps here one can find a criterion for distinguishing the original composition from its inversion. But no: since the direction we choose for counting notes or for calculating intervals is a matter of pure convention, an inverted set can always be made to yield the same rhythmic row as its original (i.e., by counting intervals *down* rather than up from the origin).

⁵ *Ibid.*, pp. 72-94.

⁶ *J.M.T.*, Vol. III, No. 2 (Nov. 1959), 208-30.

⁷ *Ibid.*, Vol. VI, No. 1 (Spring 1962), 109-22.

⁸ Translated by Humphrey Searle, New York, The Macmillan Co., 1954.

⁹ Berkeley, University of California Press, 1962.

¹⁰ New York, Teachers College, Columbia University, 1955, pp. 110-27.

¹¹ Vol. 1, No. 1 (Fall 1962), pp. 89-116.

¹² Vol. 1, No. 2 (Spring 1963), pp. 95-106.

¹³ Vol. 2, No. 2 (Spring-Summer 1964), pp. 35-55.

¹⁴ Vol. 3, No. 1 (Fall-Winter 1964), pp. 91-101.

¹⁵ Vol. 4, No. 2 (Spring-Summer 1966), pp. 90-112.

¹⁶ Vol. 1, No. 1 (Fall 1962), pp. 49-79.

Allen Forte's "Context and Continuity in an Atonal Work"¹⁷ shows, by its treatment of Schoenberg's Op. 19, that my suggested transformation need not be limited to twelve-tone works. From this essay (as well as from appropriate sections of Perle's book) one might go much further and conclude that, barring purely instrumental difficulties, a new composition can always be constructed to fit any purely contextual analysis merely by inverting the original—regardless of its style and technique.

(It should perhaps be pointed out here that the aforementioned instrumental obstacles to literal inversion are not so formidable as one might think. Much twelve-tone music is conceived in a texture that, even when not strictly polyphonic, nevertheless depends on an equalization of voices and registers. When the analyses refer to instrumentation they usually do so to point out identities and contrasts that can easily be maintained under inversion.)

So far I have said nothing about the possibility of another kind of systematic transformation, namely, complete retrogression, which, if accepted, would in turn imply the availability of retrograde-inversion as well. Although Schoenberg insists that, just as there is theoretically no "absolute down," there is no absolute "forward or backward," there are nevertheless occasions (as often when a row is divided among two or more voices) when an exact reversal would fail to produce a correct set-form. The reversion of a twelve-tone piece, then, cannot always be depended on to produce another "correct" twelve-tone piece. On the other hand, there are certainly many examples that can be reversed with impunity, especially if one is not doctrinaire and allows the reversal of approximate attack-points as an alternative method to the reversal of time-values. And slight modifications of the rules governing note-counting (such as the option of counting a note on its *last* appearance in a given context) would open the door to universal retrogression.

To be sure, the distinction between forward and backward ought to be made from a wider point of view than that of pure note-counting. Schoenberg himself, later in the above-quoted essay, implies that, regardless of theory, practice may require such a distinction. His statement that "One could perhaps tolerate a slight digression from this order [of the basic set] . . . in the later part of a work, when the set had already become familiar to the ear,"¹⁸ suggests that a composer must, sometimes at least, take into account the order in which musical events take place. But this rule is vague and by no means self-evident; besides, there are many compositions to which it does not apply, since they never depart from the original set except in canonical ways. And when these methodical departures are used, Schoenberg's rule is frequently disre-

¹⁷ Vol. 1, No. 2 (Spring 1963), pp. 72–82.

¹⁸ *Op.cit.*, p. 117.

garded. We have his own example, in the Fantasy Op. 49, of a composition that begins by developing a single hexachord, stating the definitive set only when the piece is well under way. And Milton Babbitt's Composition for Four Instruments reserves its definitive statement for the end, after a systematic treatment of derived sets.

One may nevertheless feel intuitively that something is wrong: that retrogression in music, whatever its technique, should have as little general validity as in literature or in cinema. And certainly compositions planned according to traditional rhetoric—e.g. introduction, statement, development, climax, restatement, peroration—hardly admit of intelligible reversal. Yet it is just these elements of form in the music of those composers, such as Schoenberg and Berg, who relied on older models, that a later generation has found old-fashioned and is trying to purge from its own music. Accordingly, it is just these elements that are ignored in many analyses today.

If we search the above-cited essays, we find very little help in deciding just why those compositions lacking a text move in the direction that they do, or—a related question—why they end just when they do. The analyses, with few exceptions, demonstrate connections—how one section is related to another—rather than progressions—how one section follows from another. Such relationships as repetition, similarity, contrast, common-tone linkage, and the like, are as independent of temporal as of pitch direction. Similarly, discussions of harmony concern themselves with the derivation of simultaneities, but hardly with the justification of the motion from one to another; criteria for melodic construction are never mentioned. Thus, for purely instrumental compositions lacking passages where the exigencies of strict note-counting determine the direction of events, forward and backward indeed seem to be indistinguishable. Webern's fondness for the palindrome, which celebrates musical reversibility, may be an indication that his own thought was moving in this direction.

(In this paper I have not considered the systematic transformations effected by equating the chromatic scale with the circle of fifths. I leave to others the exercise of determining to what extent the cited analyses would remain applicable to versions so derived.)

So far, none of the transformations I have discussed has affected the internal structure of the compositions in question. Now, however, I should like to suggest the possibility of operations of this kind. One of the points that emerges from a recent colloquy among Babbitt, Perle, and Lewin on the Schoenberg Violin Concerto¹⁹ is that, although it may be imprecise to treat transposition as analogous to tonal modulation (as Perle at

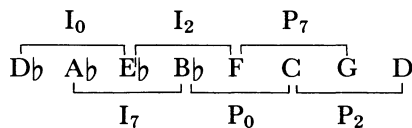
¹⁹ Lewin, *op.cit.* Perle, "Babbitt, Lewin, and Schoenberg: A Critique," *PERSPECTIVES OF NEW MUSIC*, Vol. 2, No. 1 (Fall-Winter 1963), pp. 120-27; followed by Babbitt's reply, pp. 127-32.

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one point seems to try to do), transpositions can nevertheless create the effect of a more or less wide departure from an originally stated quasi-harmonic area—not just by differences in register, but also and especially by common-tone relationships among segments of two or more forms of the set. The number of such common tones, e.g. between the first hexachord of the original statement and that of a given transposition, might be a measure of the “harmonic” distance of the transposition; and measures of this kind might then form a basis for “harmonic” progression through a piece. To return now to a composition to which I have already done violence, and which I intend to manhandle still further, let us see how this concept applies to Schoenberg’s Op. 33a, and how it can be used to compose an alternative development to Schoenberg’s—an alternative that, according to the accepted principles, should be an adequate substitute for the original. Here are the set-forms Schoenberg uses (with P and I reading left to right, R and RI right to left):

P ₀ : $\overbrace{B\flat \quad F \quad C}$ B	A	F $\sharp$	C $\sharp$	D $\sharp$	G	A $\flat$	D	E	:R ₀
I ₀ : $\overbrace{E\flat \quad A\flat \quad D\flat}$ D	E	G	C	B $\flat$	G $\flat$	F	B	A	:RI ₀
P ₂ : $\overbrace{C \quad G \quad D}$ C $\sharp$	B	G $\sharp$	D $\sharp$	F	A	B $\flat$	E	F $\sharp$	:R ₂
I ₂ : $\overbrace{F \quad B\flat \quad E\flat}$ E	F $\sharp$	A	D	C	A $\flat$	G	C $\sharp$	B	:RI ₂
P ₇ : $\overbrace{F \quad C \quad G}$ F $\sharp$	E	C $\sharp$	G $\sharp$	A $\sharp$	D	E $\flat$	A	B	:R ₇
I ₇ : $\overbrace{B\flat \quad E\flat \quad A\flat}$ A	B	D	G	F	D $\flat$	C	F $\sharp$	E	:RI ₇

First trichords arranged in fifths:



Common tones in first hexachords of P₀ and I₂: B $\flat$ F A F $\sharp$

Common tones between end of development and beginning of recapitulation: C F B $\flat$ E $\flat$ A $\flat$

Of the above forms, the exposition employs only the T₀; the development uses the T₂ and T₇; the recapitulation returns to the original forms.

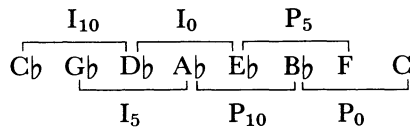
Now, it can be shown that, in making his first transposition (T₂), the composer has exploited two relationships, both indicated in the above chart: the common tones of the first hexachords of P₀ and I₂, and the series of fifths implied by the first trichords of P₀ and I₀ and explicitly stated in m. 25. These fifths, extended, then help to make the connection

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between T_2 and T_7 . But in this piece every statement of a P-form (or R) is complemented by its combinatorial I-form (or RI). The same common-tone and fifth relationships, then, could equally well have been exploited by the composer in the reverse direction by using T_{-2} (i.e. T_{10}), followed by T_{-7} (i.e. T_5). Thus:

P_{10}	$A\flat$	$E\flat$	$B\flat$	A	G	E	B	$C\sharp$	F	$G\flat$	C	D	:R ₁₀
I_{10}	$D\flat$	$G\flat$	$C\flat$	C	D	F	$B\flat$	$A\flat$	E	$D\sharp$	A	G	:RI ₁₀
P_5	$E\flat$	$B\flat$	F	E	D	B	$F\sharp$	$G\sharp$	C	$D\flat$	G	A	:R ₅
I_5	$A\flat$	$D\flat$	$G\flat$	G	A	C	F	$E\flat$	B	$B\flat$	E	D	:RI ₅

First trichords arranged in fifths:



Common tones in first hexachords of I_0 and P_{10} : $A\flat E\flat G E$

Common tones between end of development and beginning of recapitulation: $F B\flat E\flat A\flat D\flat$

I have written out a hypothetical new development section along these lines (Ex. 4).

Schoenberg's development initially exploits the $E\flat$ - $B\flat$ -F fifths; mine, the $A\flat$ - $E\flat$ - $B\flat$. For his common-tones between R_0 and I_2 , I have substituted those between RI_0 and P_{10} . The rest of my development can easily be followed by comparison with the original. At the recapitulation, Schoenberg makes a connection from the last tetrachords of R_7 and RI_7 to the first of P_0 and I_0 . My version, leading from R_5 and RI_5 , preserves the same number of common tones between the tetrachords of the development and those of the recapitulation—five; four of them, including the important connectives $B\flat$ and $E\flat$ (the first notes of the recapitulation) are the same as in the original. (In fact, of the eight tones constituting the end of my development, all but one are the same as those of the original.)

Before going further, I must insist that my attempt in none of these rewritings has been to improve on, or even to equal, the original. I am merely trying to show that the analytical methods used by the essays cited offer no criteria for deciding in each case between the two versions.

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m. 27

8va - 7

sf *p* *f*

8va - - - - - 7

8va - - - - -

8va - 7

mp *ff*

Ex. 4

It is now time for a brief look at those analyses that do try to offer criteria for distinguishing up from down, forward from backward. My admittedly incomplete survey disclosed several worth noting for their efforts in this regard. Claudio Spies's discussion of Stravinsky's *Abraham and Isaac*,²⁰ like Edward Laufer's account of Sessions' *Montezuma*,²¹ can call on the demands of text-setting and on other associations between music and words; but deprived of these, Spies's analysis of the "Huxley" Variations²² has to fall back on such concepts as those of antecedent and consequent phrases—usefully evocative, perhaps, but undefined in this context. In the same spirit, René Leibowitz, in his *Qu'est-ce la Musique de Douze Sons*,²³ makes vague analogies between Webern's phrase-construction and Beethoven's. His *Introduction à la Musique de Douze Sons*,²⁴ in its long analysis of Schoenberg's Variations for Orchestra Op. 31, points out the traditional models the composer used to give shape and temporal

²⁰ PNM, Vol. 3, No. 2 (Spring-Summer 1965), pp. 104–26.

²¹ PNM, Vol. 4, No. 1 (Fall-Winter 1965), pp. 95–108.

²² *Ibid.*, pp. 62–74.

²³ Editions Dynamo, Liège, Pierre Aelberts, 1948.

²⁴ Paris, L'Arche, 1949.

direction to his large-scale designs but evokes no further criteria of the kind we are seeking—save the quotation of the BACH motif. Even the discussions of orchestration emphasize symmetries, parallelisms, similarities, and contrasts that, as I have already suggested, can easily be retained under inversion.

Peter Westergaard gives us a glimmer of hope in his attempt to justify the meter of the second movement of Webern's Piano Variations Op. 27.²⁵ He suggests that here the invariable appearance of the lower of each pair of three-note chords at the beginning of the measures in which they appear emphasizes the two-four meter. But even if one decides that Boulez is wrong in maintaining that Webern's meters are purely conventional and not meant to be observed in performance,²⁶ one must point out that the placement of low chords in the other two movements gives us no indication whatsoever of their meters. One would also question whether the regular appearance of the *higher* of each pair of chords on strong beats might not equally well establish the meter. In fact, this movement, the inversion of which is such a trivial operation that it can almost be performed at sight, offers a simple and complete demonstration of the problem I am raising. (It should be noted that Westergaard, in his mention of "the Haydnesque wit" of the two-quarter rest just before the end, does give us one reason for preferring the original direction of this movement to its reversal. But one might wonder why, if such a gesture so clearly—and so wittily—marks the end, the entire section is then repeated. And might not the same gesture wittily serve as an introduction?)

Of the remaining critiques that I have considered, most of those that make a structural distinction between soprano and bass—to put the problem of total inversion in its simplest form—and concern themselves with progression—to do the same with reversal—do so by means of linear and harmonic outlines vaguely derived from Schenker's methods. Attempts of this kind may be seen in two articles on Sessions: one by Andrew Imbrie²⁷ and the other by Edward Laufer.²⁸ Richard Swift also moves in this direction in his account of J. K. Randall's *Demonstrations*.²⁹ But what right has one to call on such devices in this context? In tonal music, the motion of the bass can be derived from some expansion³⁰ of the tonic chord; that of the soprano, by passing-motion within the scale. But what does either tonic or passing-note mean when there are no previously or permanently defined chords, and no functionally operative

²⁵ "Webern and 'Total Organization,'" PNM, Vol. 1, No. 2 (Spring 1963), pp. 107–20.

²⁶ "Propositions"; *Polyphonie* 2me cahier, 1948, p. 67.

²⁷ "Roger Sessions: In Honor of His Sixty-Fifth Birthday," PNM, Vol. 1, No. 1 (Fall 1962), pp. 117–47.

²⁸ *Op.cit.*

²⁹ PNM, Vol. 2, No. 2 (Spring-Summer 1964), pp. 77–86.

³⁰ I.e., by the elaboration of the interval between root and fifth.

scales? Can this music really be approached through attitudes and habits derived from listening to tonal music? And would a tentative and qualified assent to that question commit us to an acceptance of the tonal analogies Spies finds in the late Stravinsky,³¹ or to approval of Martin Boykan's still bolder tonal approach to the same composer³²—not to speak of Hindemith's rigid application of his own tonal principles in his well-known analysis (or mis-analysis) of a passage from our old friend Op. 33a?³³ Or should we put all such interpretations in the same category as the explanation of the French word-sequence *Pas de lieu Rhône que nous* as making sense in spoken English?

Again, should even the presence of clear triadic references be taken at tonal face-value? Leibowitz recognizes the possibility of their creating a "tonalité *vague*, incertaine," especially in the works of Berg, although ultimately it is the "logique du maniement sériel" that must provide justification for all that happens.³⁴ Rufer, on the other hand, seems to believe that such tonal impressions are more illusory than real, and at any rate are useless for our purposes:

Thus triads of tonal structure can appear too, as, for instance, the "Ode to Napoleon" shows. But these, like *all* chord-structures in twelve-note music, are of purely local importance and do not produce harmonic progressions which have the effect of creating form, as happens in tonal music; for the relationship to the key-note is missing.³⁵

Who is right?

The fact that one can raise such questions shows that we have arrived at a crucial point in the history of Western music. Up until now there has been no ambiguity between up and down—at least not since the fourth was distinguished in effect from the fifth; there has been no question of choice between forward and backward since the appearance of the melodic cadence—and, later and a fortiori, the harmonic cadence; there has been no transpositional relationship that could not be explained by reference to some sort of tonic. But these aspects of composition, hitherto accepted as basic, are apparently unaccounted for by twelve-tone theory.

If one accepts this conclusion, one can adopt one of three attitudes toward it. One can welcome it wholeheartedly, agreeing that there really is no basis for choice among my hypothetical versions beyond the con-

³¹ "Some Notes on Stravinsky's Requiem Settings," PNM, Vol. 4, No. 2 (Spring-Summer 1967), pp. 98–123.

³² "Neoclassicism' and Late Stravinsky," PNM, Vol. 1, No. 2 (Spring 1963), pp. 155–69.

³³ *The Craft of Musical Composition*, Book 1, New York, Associated Music Publishers, Inc., 1937, pp. 217–19.

³⁴ *Introduction*, pp. 282–85.

³⁵ *Op.cit.*, p. 126.

venience of accepting what is already given and the comfort of familiarity. But that only throws the problem back where it really belongs in the first place: on the shoulders of the composer. How did he make his decisions in these matters?

This leads us to a second point of view: that twelve-tone theory is as yet incomplete, and that the superiority of one version of a composition over another depends on purely formal factors as yet unanalyzed but nevertheless eventually analyzable, analogous to the laws of linear and harmonic progression in tonal music, possibly similar to those but not necessarily so. A composition is successful insofar as its composer has made his implied choices among conceivable alternatives in accordance with his intuitive, or, better, his partly rational understanding of these presumed laws.

Finally, one can accept the primacy of the composer's concrete choices but insist that, far from being made in obedience to laws known or unknown, they are so fundamental to the composer's conception of his work as to belong, so to speak, among its basic assumptions. They are determined by what may be called *absolute decisions*, i.e. decisions for which no adequate analytical reasons can ever be adduced.

If many of us at first glance opt for the second point of view, it is because the success of theorists of tonality, notably Schenker and his followers, has given us hope that all the secrets of contemporary composition await analogous types of explication. But a more sophisticated generation of theorists—as exemplified by Milton Babbitt and Michael Kassler—has been pointing out what a flimsy systematic basis even Schenker's splendid construction rests on.³⁶ In trying to establish tonal theory more firmly, they dismiss Schenker's appeals to Nature, the Human Spirit, and the Overtone Series, in favor of a strictly logical system derived from a limited number of axioms and rules of inference. For these axioms they offer—naturally—no proof whatsoever. But if we accept this approach, we must admit the possibility of equally consistent systems that we might call anti-tonal. By regular and easily definable modifications of the axioms and rules of inference such systems could lead to compositions that are the total inversions, retrogressions, or inverted retrogressions, of conventional tonal compositions. Other transformations too, are possible. Deprived of all natural bases, what appeals could the conventional system make against such rivals save those of convenience, tradition, custom, and familiarity? (It is instructive here to note that in

³⁶ See Milton Babbitt, "The Structure and Function of Musical Theory: I," *College Music Symposium* v, Fall 1965, pp. 49–60; Michael Kassler, "A Trinity of Essays," a dissertation for the Ph. D. in the Department of Music, Princeton University, 1967. The essay dealing with the twelve-tone system was published in *PNM*, Vol. 5, No. 2 (Spring-Summer 1967), pp. 1–80, as "Toward a Theory That is the Twelve-Note-Class System."

the earlier case we could perform the hypothetical operations on individual works, for the operations themselves constitute "rules of inference" of the system. Since this is not true of tonal music, the operations must be applied to the system as a whole, not to individual works—a possibility adumbrated in the case of inversion by proponents of harmonic dualism from Zarlino to Riemann.)

We can perhaps recognize here one motive that has driven so many theorists to find some kind of support in the existence of the overtone series, and we can sympathize with them even though we cannot follow them. They seem to consider the role of the series as somehow analogous to that of gravity in architecture: a raw fact of physics that must be taken into account in creating viable structures. But the analogy can be turned against them: every building is a success insofar as it defeats gravity. Moreover, the gothic vault and the cantilever attest the futility of arguing that good design is necessarily based on the *visual* exploitation of physical principles. True, the overtone series does indeed make a distinction between up and down within the individual tone, since overtones are, after all, above the fundamental. Furthermore, one must take account of the series in the physical construction and practical use of instruments. Neither of these facts, however, justifies the claim that the *auditive* structure of music, whether tonal or not, necessarily depends on the composition of the series. In fact, only today, through electronic means, is it becoming possible to integrate, in a systematic and thoroughgoing way, overtone spectra, whether natural or artificial, into musical structures.³⁷ Ironically, the same media now offer for the first time the theoretical possibility of inverting the audible spectra. Such complete tone-color inversion would at last deprive the individual tone itself of the possibility of distinguishing up from down!

If now, in spite of the discouraging example of the tonal system, we still insist on seeking some basis for making distinctions that we still feel to be somehow essential, let us turn to the third alternative: that there is, and can be no analytical ground for concrete musical choices, i.e. no ground within the internal structure of the music itself; yet that these choices are crucial in determining musical values, i.e. salient characteristics that afford a basis for distinction, comparison, and judgment. (Critical listeners, as well as composers, must also make such choices, although in a slightly different sense; for all judgments are based on implicit comparisons between actual and possible compositions, and hence on a choice among concrete values. Indeed, it was from this point of view that we initially approached the problem.) To put the position succinctly:

³⁷ See, for example, J. K. Randall: "Three Lectures to Scientists," *PNM*, Vol. 5, No. 2 (Spring-Summer 1967), pp. 124-40. The third of these, "Operations on Waveforms," deals with this possibility.

concrete musical values depend on absolute decisions. Remember that by absolute I do not mean arbitrary: there may be, as we shall see, good reasons for making one choice and not another. By absolute I mean independent of purely analytical considerations and unsusceptible of purely analytical justification.

Let me try to clarify this point by referring to another art, this time painting. Suppose an artist is painting a monochromatic picture, or simply making a drawing. Every formal element of the pictorial structure will then depend on line and light-value, not on color-relationships. But how does the painter decide what color to use? He might rule out certain colors as incapable of sustaining his design—yellow might be too light, for instance; but he would still have a wide range of choice. If the decision is not a purely capricious one, it must be based on reasons; but these reasons cannot be analytical, since the internal structure of the picture will be the same in any case. The reasons must therefore be external to the structure. The picture may be intended for a room with a given color-scheme. The artist may feel that a warm or a cool color might be more appropriate to the subject of the picture. He may even feel that one color has a vague expressive value consonant with the subject. Or he may simply revel in the sensuous quality of one color.

Let us take another example, one somewhat analogous to the problem with which our discussion began. How does an artist (or an observer) decide which way a picture should hang—which way is right-side up? Good design seems often to be independent of whether or not it is inverted—an assumption supported by the habit, common among painters, of testing their compositions by viewing them upside-down, as well as by the frequency of mistakes in the hanging of abstractions. (We seem to measure balance with reference to a vertical axis, possibly because of our own physiological orientation, so that ninety-degree rotation is seldom a live option—although Carl Pickhardt has experimented with free-form abstractions that can be hung at *any* angle.) In the case of a representational picture the answer to our question is obvious—unless the artist is Chagall (or, apparently, sometimes Matisse, whose *Le Bateau* hung upside-down in the Museum of Modern Art in New York City from Oct. 18 to Dec. 4, 1961).³⁸ But we arrive at this answer by a reference outside the picture—to the depicted subject. Indeed, from the point of view of pure design, the orientation of a picture must often be based on an absolute decision—one made with reference to representational rather than to structural values. Apparent arguments from design will in such cases merely conceal external references. For example, to the claim that a landscape must hang as it does because the lighter area looks better at

³⁸ Norris and Ross McWhirter, *Guinness Book of World Records*, Rev. and enlarged edition, New York, Bantam Books, 1966, p. 157.

the top, one can counter that the only justification for this preference is that this is the way landscapes look in nature, and one can point to many abstractions in which the lighter areas are below. How, in fact, does one determine the orientation of an abstraction? How does the artist himself make that decision? In the absence of any clear indication from the design, the decision must be absolute. The reasons on which it is based will be external to the pictorial structure, whether the artist says simply, "This is the way I like it," or more specifically, "The expressive effect of the picture would be harmed if it were inverted."

We have arrived here at an important point. Expressive values in any art—if they exist at all—depend on concrete values. They cannot arise from analytical values alone. How could they? Unless one wishes to explain what it could possibly mean for a work of art to "express itself," then one must agree that expression, by its very definition, implies a relationship between the work of art and something else; while analytical values are derivable purely from internal structure. This is in no way meant to suggest that structure has nothing to do with expression. Just as communication in a verbal language depends on both semantics and syntax, so artistic expression must involve both concrete and analytical values. Without the former, the structure could convey no message; without the latter, the message would be limited to the equivalent of primitive substantives and exclamations. Thus the expressive power of an abstract canvas cannot stem from its design alone; it must depend in part on some covert representational or other associative element (as, for example, the illusion of "mass" or "movement").

The foregoing suggests that those who wish to make special claims for the role of the overtone series in tonal music, or for what can be much more easily defended, the primacy of the fifth, a more fruitful analogy than that of gravity in architecture might be that of representation in painting. For whereas gravity is a law of nature that controls all construction even though it may be apparently refuted to the eye, representation is merely a reference to nature that can be utilized or not according to the purposes of the artist. Similarly, even if one holds that the supremacy of the fifth in tonal harmony derives from a natural law, one must admit that a great deal of music ignores it; hence it must be a law in a different sense of the word than the law of gravity. Yet it could still be a law to this extent: that in all music that exploits the fifth in a tonal sense, the special relation of fifth to fundamental, whether due to definite though ill-defined roots in physical and anatomical nature, or simply to the growing force of conventional habit over several centuries, inevitably determines the orientation of the music, i.e. its direction both in pitch and in time—just as representation determines the orientation of a picture.

Such a view of tonality is by no means inconsistent with the recent attempts to explain the system axiomatically. It merely insists that such explanations can never adequately deal with the problem of orientation. If tonal music carries with it its built-in orientation, then it is built in absolutely, not analytically. It rests, not on the internal consistency of the system, but on some connection between the axioms and rules of inference on the one hand, and the external world on the other—whether that world is represented by acoustics, psychology, physiology, or history. The orientation is, so to speak, semantic rather than syntactic.

One who accepts the analogy implied in the last sentence may be willing to go further and admit the relevance of tonal orientation to the problem of musical expression. If the effect of the fifth in tonal music is, to some extent at least, independent of context and external to pure design, then elements of musical form inferable from the role of the fifth (e.g. tonal cadences) could serve as vehicles of some of the associative elements necessary to expression (e.g. the association of a perfect cadence with fulfillment or satisfaction). It is tempting to say of such instances that the structure alone is the vehicle of the expression; and from this error it becomes easy to generalize to the extent of basing all musical expression on pure syntax. That is because tonal music marries the semantic and syntactic aspects so closely that it is difficult to conceive of the semantic element in isolation. One should really speak here, not of syntactic and semantic, or of analytic and concrete, but of *fused* values; for in the best tonal music the two aspects of tonality are indeed indissoluble. But recent music has suggested new possibilities. Just as representational implications (such as those of mass and motion) can impart some meaning to a pictorial abstraction, so tonal references can function in non-tonal music, not so much syntactically as associatively, bringing with them implications of the orientational and expressive values inhering in tonal contexts. At the same time these references, arising as they do from syntactical origins in tonal music, must, if they are to be successfully employed, satisfy whatever syntactical expectations of this nature they arouse. Such references may vary from, say, a bald statement of consonant triads to a generalized adaptation of melodic-harmonic relationships and phrase-structure.

Thus music whose syntax is primarily twelve-tone may nevertheless legitimately call upon implicit tonal functions to clarify its concrete values—so long as the functions, once summoned, are permitted, so to speak, to fulfill their tonal responsibilities. A complete explication of this music must then take these tonal allusions into account—whether they are overt, as is often the case with Berg, or concealed, as in much of Schoenberg. (Note, for example, in Op. 33a, the V-I effect created by the bass connection B $\flat$ -E $\flat$ from the development into the recapitu-

lation—an effect signally, and perhaps disastrously, lacking in my version.)

Today composers can choose for themselves whether or not to utilize tonal references. For centuries, of course, the individual composer had no such option. The decision was already made for him, just as the decision as to the use of representation was already made for the painter. Nations and historical periods, as well as individuals, choose concrete values through absolute decisions; hence we can speak of national and historical as well as individual styles. That is what style is: the totality of the concrete values characterizing a given body of work as a whole. The stylistic decision of a group may seem to be so completely determined by evolution, environment, or culture, that it should not properly be called a decision at all; yet it functions in the same way as an individual decision, for it results in one mode of action that rules out all alternative modes. Perhaps because of their deterministic origin, these decisions are even more binding on the individual than his personal choices, which may vary from work to work. Thus if tonality carries with it certain associations, then these associations are bound to leave their mark on all music of the tonal period just as inevitably as the presence of the realistically depicted human figure is bound to affect the content of painting from the Renaissance up to the end of the nineteenth century.

Tonal functions are, to be sure, not the only source of associative values. Once one admits the relevance of these values at all, one finds them involved in almost every area of concrete musical choice. And once we leave the specific problems of tonality, we find that many concrete values have been equally at the disposal of composers in many styles, using diverse techniques. But all these values presuppose absolute decisions; so, although the tonal composer may never have had to wonder whether or not his composition was running in the right direction, even he, like his present-day successor, was constantly confronted by choices that could never be made on analytical grounds alone. How did he determine tempo? The internal structure of most compositions imposes certain limits within which a tempo must be sought, but these limits are often very broad indeed. We can all think of compositions that would still make perfect musical sense if taken at a tempo twice as fast or twice as slow as that indicated; why then should the indicated tempo have precedence? Because the composer chose it? But why did he choose it?

Register is another example. How would the structure of the Chopin C minor Prelude, or of his Funeral March, suffer if the piece were written a fifth higher—or even an octave higher? Yet such transpositions would manifestly alter the effect of the pieces, and hardly for the better. (Roger Sessions reports that he once succeeded in turning Scriabin's

"Black Mass" Sonata [No. 9] into a White Mass by playing it an octave higher, and in turning the "White Mass" [No. 10] into a Black Mass by reversing the process.)

Even instrumentation depends to a large extent on absolute decisions. This is especially easy to demonstrate with regard to monochromatic media, where the problems of interrelationships among colors hardly arise. Beethoven, for practical purposes, was willing to transcribe his *Grosse Fuge* for piano four-hands. Brahms did the same for his two string sextets. They are fun to play that way—but it is hard to get anyone to listen. Why? What crucial analytical values, present in the string version, are lost in the transcriptions?

Decisions in these matters must be made by all composers, regardless of style and technique. Each one of them determines certain concrete values that, moreover, are associative values; and whether we like it or not, these associations are bound to inhere in the music itself. Tempo is inevitably measured by unconscious comparisons with rates of human action; register relates itself to our concepts of height, weight, and mass; tone-color brings with it obvious connotations of all kinds, from our tendency to identify melody with the human voice to resemblances of the sort that so delighted the little Stravinsky in the "dubious" noises produced by the red-haired peasant.³⁹ Many other areas in which associative values are unavoidably implied will come to mind: absolute dynamics, melodic direction, rhythmic and metric patterns. Again, whether the associations are in some sense "natural" or whether based on generations of conditioning, they cannot be escaped by anyone musically trained in the Western tradition.

To be sure, choices in these areas are influenced by structure—but they control structure as well. Insofar as they characterize even the primitive gestures of the composer's initial ideas, and hence precede the musical design itself, they are independent and necessarily defy analysis. The design must take shape in accordance with their directions.

If one accepts the possibility and the relevance of musical expression, one may indeed feel that one's decisions here are governed, consciously or unconsciously, by the expressive potentialities of the associations inherent in one's concrete choices. Or one may insist that the decisions are, in every sense of the word, absolute. What I suspect, but am unable to prove, is that any concrete choice made on the basis of pure personal preference functions in the same way as one made with expressive intent and that the two may indeed be equivalent. To put the case at its most trivial: Why is my composition superior to its inversion? Because its melody descends. Why should the melody descend rather than ascend? Because I like it that way! But why do I like it that way? Because I want it

³⁹ Igor Stravinsky, *An Autobiography*, New York, Simon and Schuster, 1936, pp. 3-4.

to have the effect that can be produced by descent but not by ascent. Or—because I want it to express whatever it is that descent can express and ascent cannot express.

It should now be obvious that what I have been calling concrete choices are in many cases not choices at all, in the sense of representing the exercise of a live option. The absolute decisions of a composer—for *this* melody, in *this* tempo, in *this* register, for *this* instrument—are seldom the result of the conscious dismissal of other alternatives, even though any voluntary action implies the rejection of every other action possible on that occasion. The composer decides what piece he is going to write, not all the pieces he is not going to write; what I have been calling choices are really the assumptions basic to his concept of that piece. Yet there are certain occasions, especially frequent in connection with the development of previously stated ideas, that do seem to offer several workable alternatives. As I tried to show by means of a change in the development of Op. 33a, it is often difficult to advance analytical reasons to justify one's choice at such a point; we may perhaps now be willing to admit the example as evidence that the domain of a composer's absolute decisions embraces even the internal structure of a twelve-tone piece. As a final task, I shall try to show the same principle at work in tonal composition.

For obvious reasons, it would rarely be possible to invert successfully the harmonic direction of a tonal development as I tried to do with Schoenberg's. But one field of choice presents itself with a high degree of regularity: the opportunity of changing mode. Once the convention of the *tierce de Picardie* was overthrown, it became a matter of the composer's choice whether a piece in minor ended in major or minor; later on, in the nineteenth century, it became increasingly common for works in major to end in minor. In many cases it seems impossible to find adequate analytical reasons for the ending actually adopted. Think over Schubert's *Moment Musical* No. 3 in F minor. Can you adduce any analytical evidence for the inevitability of its conclusion? Could you not rewrite the coda so that it ended convincingly in minor? Compare the C# minor *Moment Musical* No. 4 with Chopin's Etude in E minor Op. 25 No. 3 and his Nocturne in C minor Op. 48 No. 1. All three of them move to the tonic major in the middle section, so that all have, so to speak, a motive for ending in major. Only the Etude does so; the Nocturne remains in minor; while the *Moment Musical*, after a short reference to the major section, returns to minor. And what of Chopin's Nocturne in B major Op. 32 No. 1? Is there any necessary reason for its conclusion? (And just what is this conclusion, by the way? Some editions end in minor, some in major. Historical evidence seems to favor one over the other. Would you be willing, on analytical grounds, to decide which?)

If you deny that these romantic examples are in the front rank of tonal structures, then work on Beethoven's String Quartet in F minor Op. 95. You can perhaps justify certain aspects of the coda by analysis, but that is not the same as proving its inevitability. Can you, on internal evidence, show that just this coda, in this tempo, above all in major, is the only possible ending for this quartet?

Whether Schubert, Chopin, and Beethoven—or, to return to our original problem, Schoenberg and Webern—made their decisions on expressive grounds or whether they wrote their compositions the way they did simply because they liked them that way, my point is the same: their reasons are beyond analysis. And if we as critical listeners conclude that the composers were right, it should not disturb us to find that our own reasons are often beyond analysis, and that, when we try to explain the superiority of a composition over any alternative version, sometimes all we can say is, "It sounds better."

A great deal of current writing on music seems to imply that nothing about composition, or nothing important about composition, is beyond analysis. But surely the single most important thing anyone can say about any composition is beyond analysis: namely, "I like it." It is especially disturbing to find that many young composers, who presumably write about the music of others the way they think about their own, are either insensitive to non-analytical values or—as I think more likely—afraid to admit their importance. As a result they often seem to be writing, not about actual compositions, but about abstractions derived from compositions. Now, I recognize the great debt we all owe to increasingly rigorous methods of analysis, and I am fully awake to the dangers of impressionistic criticism; yet I find myself completely on the side of the young composer—a rather well-known one—who, when asked why he wrote as he did, replied, "I like the tunes."