Portmantonality and Babbitt's Poetics of *Double Entendre* *

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ABSTRACT: This essay presents a theory of musical and verbal *double entendre* inspired by and applicable to the late-period music of Milton Babbitt. Rather than assuming the appropriateness of any single method (which might tend toward singularity of meaning), a number of approaches are applied to three late works: primarily his *Whirled Series* (1987), and secondarily his *Canonical Form* (1983) and *Gloss on 'Round Midnight* (2001). These are interpreted through various kinds of analysis, not only serial, but also tonal (chordal and voice-leading), associational, pitch-permeational, and form-functional. Connections to Tin-Pan-Alley song lyrics, jazz improvisation, hermeneutics, and Gibsonian affordances are discussed in relation to these musical analyses. All this is done to infer and cultivate connections (represented as *conceptual integration networks*) between Babbitt's extra-theoretic verbal expression and extra-dodecaphonic aspects of his music, connections that suggest an underlying poetics (a tacit motivational philosophy implicitly fueling his creativity) that provides pragmatic benefit to the artistic ambitions of diverse personal identities.

I. Introduction

[1.1] The association of Milton Babbitt's name with the 12-tone system has tended to overshadow other intriguing facets of his compositions. Moreover, this association has brought with it much baggage: on the one hand, for those less intimately familiar with the inner workings of Babbitt's compositional practice, presuppositions about the role that 12-tone structures play in his music, and, on the other hand, for those more intimately familiar, some ambiguities as to the extent to which those 12-tone structures influence (or determine) the sound, flow, and meaning of his music. As these are substantial issues, almost all writing about Babbitt's music has dwelled on one or the other of them, rarely moving to issues beyond. Recently, however, the situation has started to shift. In this article, I draw on and advance this shift toward issues beyond Babbitt's 12-tone structures, focusing especially on the surface euphony of his works since the 1980s and its mysterious connection to the playful multivalent titles he gave to many of his compositions.

[1.2] In this shift toward exploring the sound and meaning of Babbitt's music beyond its 12-tone structures, there is a wealth of foundational scholarship to build on. To distinguish, at least in principle, what is beyond versus what is inherent to these structures, the writings of Andrew Mead (1994) and Joseph Dubiel (1991, 1992) have been essential, especially regarding *Whirled* Series (1987), which is the focus of this essay, as well as *A Gloss on 'Round Midnight* (2001) and *Canonical Form* (1983), which are also discussed. The determinacy versus indeterminacy of Babbitt's 12-tone precompositional structures (in regard to affecting note-to-note details), hovering somewhere between an undeclared ambiguity and a secret controversy, was addressed obliquely by Dubiel (1997) and is addressed more directly in my own recent article (Mailman 2019), which likens Babbitt's surfaces to improvisation. In this way that same article considers the noteworthy playful qualities of Babbitt's works, which have been discussed by Mead (2009), and then became the subject of penetrating inquiry in Alison Maggart's (2017) recent study, which in several respects provides inspiration for the project I undertake here. (Also on the topic of "beyond-the-12-tone-structure," Zachary Bernstein's [2017] suggestion of closing and opening rhetorics inspires my own discussion of form functionality.) Not until relatively recently, in the writings of Daphne Leong (2011), Zachary Bernstein (2015), and Alison Maggart (2017), did the tonal and triadic aspects of Babbitt's surfaces (mostly in music from the 1980s onward) receive significant attention;[1] these form the backdrop for the more general investigation of euphony and what I call *portmantonality*. (Where a *portmanteau* is a word that fuses the sound and meaning of two other words, I define *portmantonality*, explained more extensively below, as music that fuses a non-tonal syntax with tonal features.) Without making a connection to tonality, tertian harmony, or other stylistic genres, Leong (2011, [1]) instead relates Babbitt's verbal puns to interior (intra-opus) cross-referencing between row segments of arrays, and she shines the light on the importance of multiple meanings: "The multiple referents supplied by the sound of a word—*Whirled Series*, *My Complements to Roger*—or suggested by the sound of a word—*Phonemena*, *Transfigured Notes*, *The Joy of More Sextets*—exemplified [Babbitt's] delight in uncovering multiple layers of meaning within a single structure." Generally, however, scholars had shied away from reading meaning into Babbitt's music and had treated puns in the titles of some of his compositions as mere curiosities, until Maggart's (2017) daring and well-researched hermeneutical treatment, which also serves as a springboard and inspiration for some of the interpretive analyses I present.

[1.3] Influenced by the cultural politics of the 20th century, many of us are in the habit of regarding tonality and serialism as having been in a mutually antagonistic struggle for dominance, an oppositional stance prompted by some of Schoenberg's own remarks, and perpetuated in ongoing polemics by, among others, Pierre Boulez, Charles Wuorinen, John Adams, and Richard Taruskin. Yet there is no compelling reason why such politics should limit our view of Babbitt's music.[2] Instead, it is more generous and more plausible to view Babbitt's achievement as having partly surmounted that conflict, by using his own creative ingenuity to blend and integrate features of serialism with features of tonal practice, to produce musical results that reach beyond what previously existed. After all, such blending and integrating is a well-recognized aspect of creativity, including artistic creativity, as well as mathematics,[3] an aspect that we recognize every time we encounter, for instance, coinage of new verbal expressions, from portmanteau neologisms (*smog, brunch, motel, podcast, workaholic, happenstance, transponder, positron, Oxbridge, mansplaining,*

hacktivism, Bollywood, bioneer, frenemy, bromance, earworm) to news headlines ("Bridgegate," "Monicagate," based on the Watergate scandal, "Nightmare on Main Street," or "How do you solve a problem like Korea?") or a song, an opera, or program music whose emergent expressive qualities transcend music and text components considered separately, by instead blending them. We wouldn't hesitate to attribute the latter to many works of Schubert, Schumann, Wagner, or Berlioz.

[1.4] Although not typically applied to portmanteaus, over the last twenty years a theory and analytical technology have arisen to address such conceptual blending and integration, and have been applied numerous times to music. I am referring to Gilles Fauconnier and Mark Turner's (1998, 2002) *conceptual blending* theory, including the analytical technology of *conceptual integration networks* (CINs), and applications to music by Lawrence Zbikowski (1999, 2018), Michael Spitzer (2018), and others. I will both explain and apply their theory of *conceptual blends* as realized through *conceptual integration networks*.

[1.5] Besides referencing the substantial pre-existing literature about Babbitt's music, the current study seeks to expand the range of analytical methods applicable to it. Thus, in addition to *conceptual integration networks*, several other analytical methods (some of my own devising) are applied here for the first time to shed light on Babbitt's compositions.[(4)] I use two distinct kinds of recomposition to reveal alternate possibilities of his precompositional structures.[(5)] I also apply a new technique of *reduction*, using a filter that is based systematically on the presence of *pitch permeation* (Mailman 2010), which is defined based on a rule. A mathematical model for this same property, *pitch permeation,* is provided, which quantifies it numerically so that its flux can be reckoned as imbuing the flow of Babbitt's surfaces with fuzzy formal functions (which are subtly and loosely correlated with his precompositional structures). Finally, two Schenkerian-style graphic analyses are presented, to illustrate tonal readings of passages from Babbitt's music of the 1980s.

[1.6] The work proceeds in three main parts, which are preceded by this introduction and followed by an extended conclusion. Although as much as it groups into these parts, it also forms a long chain of somewhat cumulative developments which interweave and cross reference each other. Part II addresses the question of freedom and agency with respect to Babbitt's pre-compositional structures. Part III presents numerous analyses of *Whirled Series* (as well as *Canonical Form* and *A Gloss on 'Round Midnight*) centering around the *musicking* of *portmanteau*, specifically what might be called a *portmantonality*. Part IV addresses the issue of Babbitt's compositional titles, and, combining this with conclusions drawn from the preceding music analyses, theorizes a poetics of *double entendre* attributable to Babbitt. The conclusion reflects on *portmantonality* and double meaning as exemplifying broader themes in Babbitt's influence as a mentor and model of musical thinking.

II. Freedom and Agency regarding Babbitt's precompositional (pre-notational) structures

[2.1] Babbitt's precompositional (pre-notational) structures are primarily arrays of pitch-classes and time-points; they impose some degree of constraint on the ordering of pitches and on rhythms that could be composed into the surface of his compositions.[(6)] In other words, the rules of play that he sets out through his arrays allow infinite choices but not every choice.[(7)] This is true also of musical instruments, on which one improvises.[(8)] An array is a *partial ordering*; **Example 1** is the beginning of the array for Babbitt's *Whirled Series* (1987) for alto saxophone and piano. By asserting this partial ordering (array) as a pre-compositional (or pre-notational) structure, Babbitt is imposing on himself only the rule that pitch classes (pcs) within a *lyne* (a pre-designated series of pcs[(9)]) must occur in the order specified while the ordering of pcs among different lynes is totally free to be played with. [(10)] Furthermore, each pc can recur (repeat) indefinitely up until the time the next pc in that lyne is played.

[2.2] There is nothing comparable in any other compositional style or system of the past or present. Composing with the partial ordering is like improvising on a dynamic instrument that physically presents and withdraws pitches as one plays. This hypothetical instrument, which I conceived of

and call a *posetinomium*, is demonstrated in **Video Example 1**. (The partial ordering in the video is drawn from Babbitt's *Composition for Four Instruments* of 1948.) When a pitch is played for the first time, a new pitch (the next one in its lyne) is made available; once that pitch is played, however, the previous pitch in that lyne is withdrawn.[11] The playing of pitches from one lyne has no effect on the availability of pitches from other lynes.

[2.3] The pitches of Example 1's partial ordering can be played as almost a descending scale, as in **Example 2**. Yet the same partial ordering is playable as an arpeggiation of tertian harmonies, as in **Example 3**. As mentioned, recurrences are unconstrained by the array, so the repeating arpeggiational pattern in **Example 4** is also fair game, as is the tertian chord progression realization in **Example 5**.

[2.4.1] Even though it has been remarked that Babbitt's music sometimes has a spontaneous jazzy quality[12], this relative degree of freedom within his system is often a misunderstood facet of his compositional practice. Because of its systematic rigor and lineage back to the Second Viennese School, it seems on its face to be incompatible with the more light-hearted and ephemeral popular songs and jazz that consumed his youth—so much so that experiencing faint whiffs of these when hearing Babbitt's classical compositions might be suspected of being merely fleeting fictions or mirage.

[2.4.2] For instance in the 1990s, Stanley Jordan (who studied with Babbitt in the late 1970s and early '80s) remarked:

> When I met Milton, I started to understand his music better. In particular, when I started to understand his sense of humor, I started to understand his music better, because there are things that happen in his music—and I don't know, maybe he should be here to confirm or deny what I'm about to say—moments where little things happen, little ditties and [whatnot] will happen where I'll say to myself: Wait a minute now, no self-respecting person in the modern, serious classical world, who's trying to impress his peers, would ever put a little ditty like that in his piece. At best, one would have to say, well, this is just a kind of local occurrence that happened as part of the unfolding of these larger structures I was working out and so forth. But you know, I think about it, I listen to it and say: No, Milton put that little ditty in there because he wanted it in there, and he wanted it to sound however it came off: cute, funny, shocking, or whatever; he wanted it to sound that way.[13] (Hilferty n.d.)

Though never absent, these quirky qualities in Babbitt's music were in some ways less pronounced earlier in his career, certainly in the 1940s but even in the '50s and '60s. Even when these qualities became more pronounced later on (especially since the '80s), they could be difficult to come to terms with, because, while other composers had since abandoned ship, Babbitt's music all the while had continued to be based on the 12-tone system, which he continued to develop and systematize, but which in the minds of many had always been associated with constraint and control. The mismatch between prior expectations and newly observed quirky qualities in Babbitt's composed surfaces could be hard to reconcile. The acknowledgment of his music's quirkier qualities could thus remain elusive, which could easily thwart a shift of perspective needed to arrive at Jordan's ultimate leap of faith: that their impression is indeed infused with intention.

[2.4.4] For instance, recently, composer, theorist, conductor, and keyboardist Jeffrey Kresky (in private correspondence) wrote in response to Mailman 2019:

> I knew Milton very well, but my connection to his pieces was actually very casual. But your basic idea—about that built-in possibility of flexibility at the surface—has resulted in a real shift for me: I had always thought that my responses to moments of "whimsicality" (as well as other affects) were essentially mis-hearings, or at least irrelevancies—that these moments were purely the surface manifestation of the underlying processes, merely resultant configurations that are incidental byproducts, with therefore unearned significance. It is delightful to know that perhaps I was just being whimsical (and so forth) *along with* Babbitt, rather than "against" him or unconnected to him. It is surprising, after having known him and his music for more than 50 years, to experience such a shift now—and for this I'm thankful.[14]

[2.4.5] Though partial ordering was always an inherent part of Babbitt's dodecaphony, his continued systematization, rather than creating more constraint or control, instead increasingly brought the potential flexibilities of dodecaphony to full bloom. This meant there was increased potential for him to infuse aspects of his entire personality and musicality, including his youthful musical activities and interests.

[2.4.6] We cannot prove intention, but we can demonstrate possibility. To illustrate how the hearing of spontaneity or "whimsicality"—a subtle chatter of, or with, jazz or pop ditties—is plausibly *not* irrelevant mishearing, consider that Babbitt has set up a situation that even allows him to quote popular musical theatre songs of his youth. For instance, the freedoms of this partial ordering (shown and discussed above) allow most of its pitches to forge the beginning of the melody of the 1934 popular American standard "My Old Flame" as shown in **Example 6**. Also, without much trouble, I can arrange the entire partial ordering to forge the melody of the 1932 Jerome Kern standard "I've Told Ev'ry Little Star," albeit with some slight adjustments (**Example 7**). Given Babbitt's obsession with American popular songs of the 1920s and '30s, I find it helpful to remember that most of his aggregate partitions can be ordered into a popular melody such as this. [(15)] Such hypothetical pan-stylistic permutation is possible because (1) the popular melodies of the era were chromatic, and (2) almost all partial orderings of an aggregate permit a surprisingly high degree of ordering flexibility, made infinitely greater through pitch recurrence.[(16)] Furthermore, Babbitt's works since the 1980s (such as *Whirled Series* and *Canonical Form*) are based not on arrays, but rather *superarrays*, which—like simultaneous playoffs of a championship or independent rounds of a tournament—are two or more arrays unfolding simultaneously, without directly impinging on one another. Thus, the rules of play that govern arrays do not apply at the level of superarrays. Specifically, in Babbitt's game, pitches from different arrays of the superarray can combine and interact without any ordering restriction, thus multiplying the flexibilities of the partial ordering. It's like playing two or more posetinomiums at once.

[2.5] Although it is quite possibly *not* a quote from a popular song, the following excerpt from Babbitt's *Canonical Form* sounds like it could be. (Listen to **Audio Example 1**). One can imagine Babbitt—as if solving a puzzle—devising an arrangement of his partially ordered pitches to create just this effect, an effect particularly his own (never heard in European serial or post-serial music) achieved not as a result of his precompositional structures, but rather as an added bonus available within the rules, a prize won through skill in playing the game.

[2.6] There is no question that Babbitt's precompositional structures are a crucial aspect of his art, yet they do not directly determine the details of the sounds one hears. Rather, the precompositional structures are crucial for setting up the logistical situations in which Babbitt likes to create. The creative choices he makes (how he exercises his prerogatives) once in these situations are what I explore in the remainder of this essay. Since, as I have suggested, there is astounding flexibility within these situations (partial orderings), examining the choices he makes should provide significant insights into his poetic inclinations and possibly his deeper musico-philosophical outlook.

III. Musicking *of* portmanteau *(*portmantonality*) in* A Gloss on 'Round Midnight, Canonical Form, *and* Whirled Series

[3.0.1] As suggested above, the prevalence and variety of tonal features in Babbitt's late-period works (which nonetheless remain dodecaphonic) deserve specific attention, especially taken in tandem with his decades-long predilection for puns. This confluence of phenomena is deserving of its own concept. Therefore, I define *portmantonality*: a condition where various features of tonality are conjured, or emergent qualities of tonality are vaguely suggested, by tone configurations that are afforded by (are possible through) the flexibilities (freedoms) inherent in another syntactical system that is simultaneously enforced.[(17)] The result is a blend of two syntactical systems somewhat analogous to a verbal blend of two words: a *portmanteau*. Since one of the two syntactical systems alluded to is tonality (the other one being 12-tone serialism) I exploit the homophonemes '*teau*' (as in portmanteau) and '*to*' (as in tonality) to form the neologism *portmantonality* (or

portmanteaunality), which is itself an instance of portmanteau as well as being a homophonic pun, the sort Babbitt often employs in titles of his compositions.

[3.0.2] The sections that follow discuss four groupings of aspects contributing to portmantonality, somewhat in order of increasing subtlety or complexity: Section A discusses tertian harmonies, octave euphonies, purposeful methods of chordal reduction and recomposition, and observations on referential voice-leading. Section B applies conceptual blending theory to explain the musical equivalent of verbal *portmanteau*. Section C discusses the fluid flux of *pitch permeation* as a material force of form functionality. Finally, Section D discusses deeper affinities between syntactic-semantic interactions in playful pop song lyrics and serial-tonal interactions in Babbitt's *Gloss*, *Canonical Form*, and *Whirled Series*, by relating these interactions to a practice called "ragging."

A. Emancipating the consonant triad: Tertian harmony and non-obligatory euphony

1. Triads and cadential gestures

[3.1.1.1] Perhaps the most striking thing Babbitt repeatedly does with his partial ordering prerogatives is to forge brief tonal passages, chords, progressions, melodies, and other euphonies. These have been largely ignored until relatively recently, when they've been discussed by Leong (2011), Bernstein (2015), and Maggart (2017).[18] Given how long this important phenomenon was ignored, it is important to illustrate that it is not just isolated happenstance, but rather reflects Babbitt's tendency of creative choice beyond his precompositional structures.

[3.1.1.2] Triads, other tertian harmonies, and other tonally alluding features pervade many moments in Babbitt's later works. For instance his Sixth Quartet (1993) features, at full-throated *forte*, a sustained full root-position E♭ major triad followed by a sustained root position B♭ major 7th chord, which most readily strikes the ear as some sort of plagal cadence (or a feigned one), a vaguely tonal gesture reminiscent of other music that ventures away from the prevailing authentic cadence-directed teleology of common practice tonality.[19] **Example 8** presents this passage (mm. 25–26) in the context of the preceding measure. A later passage (mm. 258–63 shown in **Example 9**) presents a root position C minor triad *fortissimo*, after which the texture clears away and the cello plays a broken G minor triad (accompanied and sustained into the next measure by the second violin). Immediately on the heels of this, the first violin and viola arpeggiate descending A minor and F♯ minor triads in parallel.

[3.1.1.3] Babbitt's Fifth Quartet ends with a quick B major arpeggio solo fanfare in the tenor register, preceded by a bright high-register slow progression of chords: C♯ minor, B♭ major 7th, F major, C minor, and F major, shown in **Example 10**. This final tetrachord (B major with its leading tone) is indeed a segment of the 12-tone row class on which the Fifth Quartet is based, the same one as in *Whirled Series*, *Canonical Form*, and *Around the Horn*, which are based on the same four-lyne all-partition array as the Fifth Quartet is (Mead 1994, Dubiel 1997).[20] The array is shown in **Example 11**.[21] Dubiel's (1997) analysis of *Around the Horn* makes the point that surface melodic gestures forged between lynes in *Around the Horn* are motivically equivalent to row segments occurring elsewhere in the piece's underlying array, and that these shouldn't necessarily be conceptually subordinated to the buried array segments, or possibly even to exposed ones such as the Fifth Quartet's concluding tetrachord.

[3.1.1.4] Dubiel points out that the discrete trichords of this row are two [037] types followed by two [015] types, plus an additional [037] trichord in the second half, as shown in **Example 12**. But there is much more. The secondary hexachord that is the middle six pitches of the row forms a diatonic hexachord [023579], shown here in A major (B Dorian). In fact, inclusion of the next pitch (A in order position 9) completes the entire 7-note A major scale, and with continuous segments that assert or suggest V7, IV7, and I in that key, which in retrograde is the grammatical cadential progression I–IV–V. And order positions 4 through 9 form the A-major Guidonian hexachord *ut re mi fa sol la* (**Example 13**). The inversion of the row enables a ii–V–I progression, the most standard progression in jazz and American popular song. Even the [015] discrete trichords in the second half of the row can be voiced as incomplete major 7th chords.

[3.1.1.5] The tetrachords formed by overlapping order positions (*ops* 0–3, 3–6, 6–9, and 8–11) can be voiced convincingly as mildly dissonant tertian harmonies heard in jazz and American popular song (**Example 14**). It would be difficult to construct a 12-tone row that is more tonally suggestive than this one is. The P_0 and R_0 forms of the row (shown in Example 13) strongly suggest the key of A major, the row's inversion renders ii–V–I, and four of the slightly overlapping tetrachords of the row suggest chromatic tonal jazz tertian harmonies. All this is to say that in *Whirled Series* (and *Around the Horn* and so forth, because they are all based on the same row and array) the many pitch configurations we hear as alluding to tonality, by and large, also motivically reference the underlying 12-tone row from which the array is built.

2. Tonal cadences in *Canonical Form*

[3.1.2.1] In *Canonical Form,* Babbitt chooses to align pitches from different array lynes, not only to forge consonant triads but also to suggest cadential tonal gestures and, in some cases, longer chromatic tonal progressions.

[3.1.2.2] The third page (mm. 19–24) of *Canonical Form* presents one of the most striking examples. As shown in **Example 15**, on the downbeat of m. 21 a perfect authentic cadence (I–V–I) in F♯ minor jumps out—even m. 20's melodic lead-in, A and G♯, contributes to it.[22] Next, in m. 22, six pitches (from two arrays) group to arpeggiate an A major-minor tetrachord. The next two measures enlist eight notes from all three arrays to emphasize B minor, rubbing elbows with three diatonically related pitches (G, C, and E). The passage, just prior to all this (mm. 19–20) configures six pitches to suggest A major, followed by a D major triad in the lowest register. Notice that the chords suggested (A major, D major, and B minor) are all diatonic to F♯ minor (although many other non-diatonic pitches occur during these passages). Thus, they follow the rule (*canon*) for inclusion in that tonal scale and, as major and minor triads, are archetypal (*canonic*) tonal sonorities. The tonal allusions relate to the work's title.[23]

3. A flurry of triads through inter-array alignment *Whirled Series*

[3.1.3.1] For a different perspective, consider a passage later in *Whirled Series*, at mm. 95–108, where Babbitt aligns pitches from different lynes to create a series of consonant triads heard as chords, sometimes partly arpeggiated, or displaced (**Example 16**). Again, these triads don't arise automatically from the array; they easily could have been avoided without disturbing the integrity of the serial structure. In this passage, the saxophone presents a single lyne, so the ordering of its pitches is completely determined. The partition spans of the piano middle register array at this point have tens of thousands, hundreds, and dozens of possible orderings from which Babbitt can choose.[24] From these choices, the way Babbitt forges the triads from the arrays is best illustrated through **Video Example 2**, which also illustrates how the passage sounds.[25] Especially given the number of alternatives (hundreds, thousands, and tens of thousands, or hundreds of possible orderings) there can be little doubt that the specific alignments of pitches that Babbitt actually chooses for the passage are intended to promote the formation of major and minor triads heard in the flowing surface.

4. Tonality as an intertextual allusion to Thelonious Monk's *'Round Midnight*

[3.1.4.1] To gain further insight into tonality and the use of triads in Babbitt's serial music, it is helpful to examine his final piano composition, *A Gloss on 'Round Midnight*.[26] It is apparently a 12-tone aggregate array composition meant to reference the famous tune by Thelonious Monk, yet on listening, I find there is barely anything that jumps out as reminiscent of Monk's tune (Allan Kozinn [2002] calls the piece a "vehement deconstruction"). This disparity is perhaps unsurprising, given the ordering constraints of 12-tone aggregate arrays, which Babbitt uses. One thing is very clear though: the E-flat minor tonality at the start of *'Round Midnight*'s main tune (the well-known motto after its bridge-like intro). As shown in **Example 17**, Babbitt plainly articulates the E-flat minor tonic harmony (all the black noteheads in the example are members of the E-flat minor triad). There cannot be any question that Babbitt is deliberately referencing a tonal chord here, because his piece is declared to be a gloss on another piece whose main melody starts with a tonic E-flat minor chord.

[3.1.4.2] The excerpt also gives insight into the kinds of flexibilities that Babbitt's embedded tonal practice entails. These mainly manifest as licenses in regard to normative chord voicing, slight ordering adjustments (consecutive pitches become simultaneities or vice versa), elision of a minimal number of pitches, and inclusion of a minimal number of additional pitches. Note that the E-flat minor chord is not voiced in the optimal way, but rather with its chordal 5th in the bass, and that the chordal 9th (F, which is also part of the melody) is stationed in the baritone register rather than in a higher register more typical of a chordal 9th. Babbitt's array apparently necessitates other liberties in regard to *'Round Midnight*'s chromatically descending bass line. Monk's consecutive bass pitches D♭ and C have to be placed simultaneously and each in a different upper register. Monk's D-natural, which preceded these, becomes elided (or delayed until m. 2). A chordal 11th (which in jazz harmony is often used as a diatonic filler tone when realizing minor 7th chords) has to be added, as an unobtrusive high A♭, harmonizing with C (also diatonic to E-flat Dorian minor) above it. None of these licenses really interferes with projection of the E-flat minor chord and key, because the pitch configuration is framed by the low {B♭, E♭, F} trichord in the left hand on the downbeat of m. 2 together with chordal D♭–G♭ in the right hand, and registrally all this is framed by the climactic high {E♭, G♭} dyad in m. 1. Moreover, there is such a prevalence of E♭, G♭, and B♭ in octave duplications and repetitions that E-flat minor clearly shines through.

[3.1.4.3] This situation demonstrates the flexibilities particular to two distinct creative practices being exploited so that they may converge or associate with each other. Obviously a more deterministic serial syntax would preclude or severely hamper the possibility of referencing a tonal style. Or, vice versa, if the tonal style being referenced were traditional strict vocal polyphonic art music, then even the unusual degree of flexibility of 12-tone serial arrays' (or superarrays') partial orderings would probably still be too restrictive to achieve such a convergence or association. Yet the confluence of flexibilities from both sides (jazz as a vernacular improvised genre and 12-tone serial arrays as an unusually pliant serial syntax) provides an opportunity: in terms of projecting voice leading, jazz keyboard playing often exploits registers rather liberally, and so we see Babbitt, having grown up musically with Dixieland and other early jazz styles, exploits this flexibility when alluding to tonal progressions by exploiting the limited but sufficient flexibilities of his 12-tone serial arrays.

5. Octave doubling in *Whirled Series*

[3.1.5.1] As I have suggested above (and previously in Mailman 2019), Babbitt "improvises" the surfaces with full awareness of the vast structural details of the array. One of the things he does, which Dubiel (1997) has written about, is arrange pitches so as to quote or accentuate certain segments of the array's 12-tone row, making these into motivic fragments, as it were. A superarray enables new kinds of coordination to occur, because there is no fixed order constraint between the constituent arrays of the superarray.

[3.1.5.2] *Whirled Series* is a superarray work based on three versions of an all-partition array (two assigned to the piano and the third to the sax). In one particularly quirky passage, which falls within the one already discussed, Babbitt "improvises" into the texture the piano's intermittent octave doubling of the saxophone's pitches, at mm. 99–105,[27] shown in **Example 18**.[28] The passage is intriguing, as the piano is doing a lot else besides this, and the octave doubling between the instruments is sometimes irregularly timed, thus resulting in a surface flow that is complex yet barely on the threshold of sounding tightly organized.

[3.1.5.3] Here Babbitt engages his trained wits to exploit an opportunity: at this particular point in the superarray, both the saxophone and piano middle register arrays present row form RP_e at basically the same time (**Example 19**).[29] **Video Example 3** illustrates this.

[3.1.5.4] The piano's middle-register array presents row RP_e at mm. 95–105. And the sax also presents RP_e from mm. 97–105. A subsegment of this, pitch-classes ⟨F, D♭, E♭ B♭, G, F♯, D, B⟩, is doubled amongst many other pitches in the piano. Compare, in Example 18, the octave-doubled pitch-class series isolated from its occurrence within the full texture (including other lynes). Here, in **Video Example 4**, are those doubled pitch-classes isolated but with their rhythm preserved. And

here, in **Video Example 5**, are the doublings amongst all the other pitches, from other lynes of the array.

[3.1.5.5] The sax and piano arrays having the same row form as each other during a particular span in the superarray would not automatically cause octave doublings—keep in mind that other row forms are woven in too—so the octave doublings depend on how Babbitt chooses to isolate and align the pitches from the two arrays.

[3.1.5.6] Such bald euphony is noteworthy since Schoenberg originally avoided octave doublings in his 12-tone music because he felt they would disrupt the chordal-contrapuntal continuity with distracting tonal allusions.[30] Such euphonies, in Babbitt's music, indeed stand out from their surroundings—it is clear that he was quite comfortable with whatever tonal allusions these create.

6. Longer tonal progression in *Whirled Series,* revealed through a pitch permeation filtering reduction

a. Flux of unequal prevalence

[3.1.6.1] A pervasive feature of much tonal music is the noticeably unequal prevalence of some pitches over other pitches within any span of time. Thus, the tonal suggestiveness or tonal flavorings in Babbitt's 1980's works go beyond triads, cadential gestures, diatonicism, and octave euphonies to include similar phenomena. Arising in their own way from Babbitt's post-array creative decisions (prerogatives within the structural game he set out) there are subtle tonal shadings a listener can sense but which are hard to pinpoint, at least in terms of traditional 12-tone theory, although they loosely relate to intuitions about chord progressions in certain improvised musics such as straight-ahead jazz. To get at these tonal shadings we must somehow reduce the passage to something vaguely resembling a chronology of pitch sets, which perhaps can be heard like a chord progression. Thus, we have to isolate pitches not based on their inclusion or position within an aggregate (or within the array's allocation of pitches to specific registers); rather, we have to isolate them based on choices Babbitt has made beyond what the array specifies, choices that could have been otherwise while still being consistent with the array.

b. Defining and filtering by pitch permeation

[3.1.6.2.1] Let us consider a systematic method of reduction that, by its very nature, addresses the realized surface, without direct consideration of the array from which it was composed. In other words, this is a method of reduction that necessarily captures some of Babbitt's choices made subsequent to the design of the array (though the reduction indeed captures facets that are indirectly influenced by the array, in that the array imposes constraints on Babbitt's choices in composing the surface).

[3.1.6.2.2] To do this we set up a reduction rule, which acts like a filter, or selector. The rule selects the pitch events of pitches that *permeate*. A pitch is defined as *permeating* if it has both *recurrence* and *infusion*. That is, a pitch permeates within a time span if and only if it recurs *and* it has *infusion* of at least one other pitch between its first and last occurrence.[31] This is demonstrated in **Example 20**, which, at its top, features the piano part of *Whirled Series,* at mm. 4–7. Dotted slurs at the bottom of Example 20 help visualize the excerpt's pitch *recurrences* and *infusions*. The table's far-left column shows that only four pitches (G5, D5, B4, and B♭3) recur. Of these, only three (G5, B4, and B♭3) have infusions. For instance, as indicated by a checkmark in the table's top row, between the initial occurrence of G5 (m. 4) and its recurrence (m. 5), D♯4 is infused. Between the initial occurrence of B4 (m. 5) and its final recurrence (m. 7), six other pitches (A3, B♭3, C4, F♯4, D♭5, and D5) are infused. Between the initial occurrence of B♭3 (m. 5) and its final recurrence (m. 7) there are five other pitches (A3, F♯4, B4, D♭5, and D5) infused. All this is tallied in the table. By definition, *recurrence* is a precondition for *infusion,* so a pitch having *infusion* implies or entails that it is *permeating*.

c. Pitch permeation vs. tonal prolongation

[3.1.6.3.1] To clarify this concept, it is helpful to compare it to an example of tonal prolongation. Although these concepts are distinct from each other, they nevertheless associate with each other, by conjuring similar intuitions based on possibilities they share. Indeed, this is why *pitch permeation* can be considered an example of or aspect of *portmantonality*. **Example 21** shows a tonal progression whose outer voices are analyzed first in terms of prolongation and then in terms of pitch permeation, to illustrate the difference between the concepts as well as how they may coincide. In Example 21 (a), blue noteheads are prolonged by red ones, which in this case are neighbor tones. As we know, tonal prolongation depends on hierarchical facets of tonal syntax. In Example 21 (b) green noteheads permeate; they are infused by the orange noteheads, because the orange noteheads are sandwiched between occurrences of the green noteheads.

[3.1.6.3.2] Whereas tonal prolongation is inherently hierarchical, pitch permeation is not. Rather, two or more pitches can infuse each other and thus mutually permeate. This is the case in m. 1 with B♭4 and C5, which infuse each other. Furthermore, pitch permeation is not syntax-dependent; rather it is an emergent feature of surface configurations, and thereby is only indirectly influenced by (and is not determined by) serial syntax. Notice that in m. 1 pitch permeation both coincides and conflicts with tonal prolongation (B♭4 and G3 are infused by C5 but do not prolong it); whereas in m. 2 pitch permeation and tonal prolongation only coincide. One might say that it is by virtue of tonal prolongation's hierarchical syntactical nature that tonality (as pitch centricity) is able to emerge. Yet syntax in general neither entails nor precludes hierarchy. Whereas the non-hierarchical potential of pitch permeation emerges from the non-hierarchical nature of serial syntax, the hierarchical potential of pitch permeation, by contrast, emerges from the inherent variety of an all-partition array. Though tonal prolongation and pitch permeation both in important ways partake in some sort of emergence, and both are influenced by some or other syntax, the former is inherently hierarchical whereas the latter merely can be, so they do not easily compare with one another.

[3.1.6.3.3] On the one hand, it seems pitch permeation is a looser criterion than tonal prolongation; on the other hand, there are many other possibilities for tonal prolongation besides flanking an intervening tone or chord: linear progression, arpeggiation, voice exchange, harmonization, displacement, and so on. In other words, neither tonal prolongation nor pitch permeation is inclusive of the other, but they do have a commonality—their possibilities merely intersect. It is on the basis of this shared possibility that an association between them is formed. They can participate in a conceptual blend.

d. Distinguishing surface features from those of the array

[3.1.6.4.1] The concept of *pitch permeation* is apt for *Whirled Series* in at least two ways, one of which, as already mentioned, is to provide a selection rule (reduction rule), filtering for certain pitch events, in a fashion that is tailored to the peculiar constraints, possibilities, and advantages of partially ordered pitch arrays, such as Babbitt employs.

[3.1.6.4.2] Beneath mm. 1–7 of *Whirled Series*, **Example 22** shows each of the permeating pitches connected with dotted slurs[32] (and **Video Example 6** provides a scrolling animation of this). You can verify these obey the selection rule as follows: Each dotted slur connects two note heads of the same pitch and furthermore, chronologically between the first and second note heads of the pair, at least one other pitch occurs (necessarily from another lyne within the same array). For instance, in the piano in the beginning, D recurs, and between its first and second occurrences, D♭ and B♭ occur (they are *infused*); therefore, the two Ds are connected by a dotted slur to indicate their *permeation*. The same is true of every one of the note heads connected by a dotted slur. Conversely, you can verify in the score that every pair of pitch events that, in this way, presents a recurring pitch with at least one other intervening pitch (within the piano or within the sax) is included thusly, with dotted slurs, in the diagram.

[3.1.6.4.3] The top of **Example 23** shows mm. 1–14 of *Whirled Series* above the chronology realization of the arrays (a continuation of the previous Example), again with permeating pitches connected with dotted slurs and the most permeating pitches on a separate system beneath.[33] (**Video Example 7** presents a scrolling animation.) **Example 24** duplicates the latter components

and underneath them provides a sonority reduction, which includes all and only the pitch events of those permeating pitches (dotted slurred notes above). (**Video Example 8** presents a scrolling animation.) Thus, it presents the results of the filter, the permeating pitch selector. (The few light grey shaded note heads are pitches that occur with or near permeating pitches and which support a tertian chordal reading.) Notice two crucial points:

1. *Recurrence* of a pitch is a facet of surface realization, not a facet of the array; it is not entailed by the array.

2. If a pitch is *infused* between the first and subsequent occurrences of another pitch, it is necessarily from a different lyne (otherwise the recurrence would break the ordering rule within a lyne). Since it's from another lyne, the ordering is indeterminate, and thus also is not a facet of the array; rather it is a facet of surface realization.

Therefore, the set of pitches that enjoy *recurrence* and *infusion* could have turned out differently, even within the constraints already imposed by the array: *recurrence* and *infusion* are not baked into, or implied by, the array itself, though they are made possible by it.

[3.1.6.4.4] Since the sonority reduction is based strictly on *permeation*, which depends strictly on *recurrence* and *infusion*, it necessarily isolates (selects) pitch events in a fashion that is undetermined by, and mostly independent of, the array. In other words, because of points (1) and (2) above, we are guaranteed that our reduction reveals facets of Babbitt's chosen surface realization, rather than the array itself. The tonal flavorings in the reduction arise not by accident or as an automatic by-product of the array, but rather as a matter of later-stage compositional choice, given the possibilities made available through the array.[(34)]

e. Deriving chords from pitch permeation

[3.1.6.5.1] In getting from the *relative ordering realization* at the top of Example 24 to the *sonority reduction* at its bottom, there is an important subtlety to clarify: the pitch-permeation selector (filter) is a completely systematic method, without any subjective element whatsoever. Yet, given the permeating pitches produced by this filter, there is still discretion in deciding how to group these into chords. Additionally, there are some non-permeating pitches in the reduction (less than a quarter of them) that are included because permeating pitches simultaneous with or around them suggest a tonal role for these tones (which are shown as grey noteheads). Although they do not permeate, E and D♯ are included because of octave doublings. Two pitches (A4 and B4) that permeate only very locally are also shown in grey noteheads because tonally they serve as colorations (a 6th and 7th to a C major triad). Some tones are also included in the reduction if they occur within the span and were permeated in a previous span. Lastly, although not included in the permeation filtering, cross-talk between the realizations of the piano array and sax array produces pitch permeation de facto, such that this influenced the inclusion of pitches in the reduction, especially in the presence of other support. (An example is the D4 which the piano repeats in mm. 6–7 amongst intervening saxophone pitches and which also recurs in the saxophone in m. 7 after several intervening pitches in the piano part.) Thus, although pitch permeation provides a totally systematic way of selecting (filtering for) certain pitches associated chronologically and does so in a way that captures features of realization beyond the original arrays, it does not on its own generate any chord progression. Some gentle massaging is still required to gather these selected pitches into chords, such as shown at the bottom of Example 24. Only at this juncture does the reduction also gently consider further subtleties such as octave doubling, tertian coloration, and inter-array cross-talk.

f. Tonal chords contributing to portmantonality

[3.1.6.6.1] With the reduction now on hand, we can begin to consider sonic features of the surface that arise from Babbitt's surface-compositional decisions—that is, the decisions that occur subsequent to the array design. The first measure features a lot of permeating pitches all at once: D♭, D, F, B♭ in the piano F♯ and F in the saxophone, thus giving the sound of a full pentachord being arpeggiated along with other non-recurring pitches. This harmony (set class [01458]), a subset of the hexatonic or E-type hexachord), is the first pentachord of the I$_1$ and RI$_e$ row forms,

which underlie some of the piano music heard at mm. 24–59 and mm. 60–95, and it is the last pentachord of row forms I_e and RI_1 and thus underlies some of the piano music at mm. 107–9 and mm. 9–10. This is thus an example, in chordal rather than melodic guise, of Dubiel's (1997) observation that surface configurations in a passage tend to reference row forms that underlie another passage. (Another interesting observation is that in m. 1 Babbitt appears to either have made a mistake in copying pitches from his array chart, or deliberately exceeded the partial ordering constraints of this aggregate partition, by adding an A natural before the final occurrence of A♯/B♭.[35] If we were to include this A along with the pentachord of permeating pitches, we have, presented right at the outset, the full type-E/hexatonic/[014589] hexachord of the row class.) Thus, while the permeating pitches are members of horizontal lynes of the array, they are also members of a chord, or a fuzzily formed harmonic field, that references the row from which the array is forged. The reader is invited to play as a chord and freely arpeggiate the pentachord to verify that it captures the chordal-harmonic essence of m. 1.

[3.1.6.6.2] With this sound in mind, I want to focus on the tonal or tertian harmonic flavor of the entire reduction, which corresponds to mm. 1–14, the first block of the array, and after which both the piano and saxophone present sudden registral shifts. A tonal-tertian chordal analysis is shown in **Example 25**. The somewhat wide registral spacing, or voicing, of the opening pentachord of permeating pitches suggests several tertian chordal hearings, among them a G♭/F♯ M7 ♭13 chord. After that, on the seam from m. 1 into m. 2, the permeating pitches D♭, E, and C faintly suggest an incomplete D♭ minor major-7th chord. Various A major-minor chords dominate the next passage in the reduction, mm. 2–5, which spans into the second aggregate partition span (mm. 3–5). Between the first aggregate partition span (mm. 1–3) and the second (mm. 3–5) there are two pitches that permeate in both, namely A4 and E5. (Actually, in the second partition span, E5 receives emphasis through octave doubling rather than through permeation.) It unmistakably suggests an A major-minor tonality or harmony. An augmented triad (E♭5, G5, B4, D♯4) and incomplete B♭-minor major 7th chord (A3, B♭3, D♭4) quickly follow.

[3.1.6.6.3] The reduction of mm. 6–13 presents a series of chords each of which is tonally close to the previous one: D^{Add6} (Bm7), Gmaj/min, Dmin, Cmaj/min, Fmin, B♭min (G♭maj7), D♭maj7, Fmin7. This finally culminates in a fleeting A min/maj 7th chord at the end of m. 13 (followed by a more superficial F♯ major triad on the downbeat of m. 14). Of course, most of these chords are also trichordal or tetrachordal segments—for instance [014] or [0347]—of the row class for the piece, so they have referential status in relation to the work itself, independent of tonal associations. To my ears—and supported by the systematic reduction based on *pitch permeation*—the strongest tonal impressions are the A major/minor harmony suffusing mm. 2–4 and the C major/minor harmony suffusing mm. 7–9. I also draw the reader's attention to the fact that the reduction of m. 10 (and last beat of m. 9) presents all and only the pitch classes of the diatonic F Phrygian pentachord, which, if supplemented by the D♭ in m. 10, creates the D♭ Guidonian hexachord, whose pitches also exhaustively occur in mm. 11–13. Additionally, the grand pause on the downbeat of m. 10, together with the sudden absence of G3 and C4, allows m. 10 to be heard as a sudden change of tonality from C minor/major to D♭ major / B♭ minor.

[3.1.6.6.4] Considering an ambiguity or flexibility of diatonically related modes (those with a key signature of five flats), the passage (which earlier suggested D♭ major / B♭ minor) ultimately settles on F♯/G♭ Lydian, as illustrated in **Example 26**. Three of the pitches (B♭, D♭, F♯) that permeate in mm. 11–13 exchange registers, in m. 14, to forge the "superficial" F♯ major triad, giving it deeper roots. The two other permeating pitches (C and G♯) are also diatonic to F♯/G♭ Lydian. And so are almost all of the pitches leading up to the F♯ major triad, just before an abrupt registral disjunction, which is tied together by a high-register tonic-affirming ascending C♯-F♯ gesture, echoing the preceding ascending A♯-C♯ dyad.

[3.1.6.6.5] The analytical vignettes above have been provided to help the reader appreciate and hear some of the tonal features of *Whirled Series*—that is, to give the reader an experiential sense of its *portmantonality*. There may still be, I suppose, some lingering doubt as to how much of this arises from the force—however gentle—of the analytical process, rather than from choices Babbitt has made in realizing his array as an audible surface. This is ultimately an insoluble issue with any

analysis of a human-created work, due to inherent ambiguities of intention. In this case, however, since it pertains to the relation between surface realization and background structure, we can address it substantially by comparing to a hypothetical recomposition of the same background structure.

g. A contrasting alternative realization of the same array

[3.1.6.7.1] Although the selection criterion (*pitch permeation*) for the reduction is systematic, it still might be argued that I have gently gathered those pitches in a fashion that is biased toward a tonal hearing. Or, it might still be argued that the tertian harmonies on the surface arise merely by accident due to some hidden implication of the fact that so much tertian harmony is suggested from the trichordal and tetrachordal segments of the row, in other words that, once given the row and array, the tertian harmonies on the surface are unavoidable.

[3.1.6.7.2] To assuage both concerns, I invite the reader to consider a recomposition of the passage, based on the same superarray, with the same allocation of lynes to saxophone and piano, and using the identical composite rhythm. In other words, all that differs are the facets that are *not* stipulated by the pre-compositional plan; my recomposition follows the same compositional design, except that, using the flexibilities allowed by its partial ordering, I have altered which pitches get repeated and how they align and distribute. This is shown in **Example 27** (a and b), which also provides a computerized audio rendition. I hope the reader finds that the recomposition sounds significantly different from the corresponding passage in *Whirled Series*. More specifically, it suggests tertian harmony a lot less, perhaps not at all; the tonal flavoring, which Babbitt so distinctively instills in *Whirled Series,* is decidedly absent, as I have strived to do in recomposing it, instead opting for a more "dissonating" chordal and melodic vocabulary.[(36)]

7. Voice-exchange and dissonant tonal voice-leading

[3.1.7.1] As described above, portmantonality is not just a matter of tertian harmony, but rather arises through the presence of a variety of features from tonal music. Measures 178–93 of *Whirled Series* feature another phenomenon familiar from tonal music. This passage, shown in **Example 28**, presents the 12-partitions of both the piano middle register and the saxophone arrays. These two constituent arrays move in parallel as they are closely related, specifically by pitch-class inversion: the 12-partition of one coincides with that of the other, a feature of the compositional design that Babbitt exploits. For the sax array and piano middle register array, Babbitt has chosen an index of inversion, T_7I, under which four of the consecutive dyads are invariant: ⟨A, B♭⟩, ⟨G♭, D♭⟩, ⟨A♭, B⟩, and ⟨C, G⟩. The result is a series of voice-exchanges, which occur often in 12-tone music. Yet in this case, the voice-exchanges tonally suggest first a G♭ major-minor triad (G♭#9) and then an A♭ minor/major 7th chord, or a C major-minor triad (C#9) with double chromatic neighbor tones (A♭ neighboring G and B neighboring C). The tonal prolongational technique of voice-exchange is forged through the resources of the underlying serial structure; there's no inherent incompatibility. Both the G♭#9 and C#9 chords are tetrachord type [0347], which is referential to the row, as it occurs as a discrete segment in two places (ops 2345 and 789t). What is also interesting here is how the forged tonal flavoring feeds back to reinforce or amplify a more nuanced feature of the serial structure. G♭#9 and C#9 are chords transpositionally related by a tritone, an interval absent from the work's type-E (hexatonic) hexachord, and thereby an interval always spanned by the two discrete hexachords of the row. The G♭#9 to C#9 motion in this passage illustrates this hexachordal relation through a prism of tertian harmonies embellished in a fashion reminiscent of tonal practice.

[3.1.7.2] Babbitt's *Gloss on 'Round Midnight* is another example of the composer apparently referencing tonal voice-leading by exploiting flexibilities within his 12-tone array structure. This time it is dissonant tonal voice-leading acting referentially. **Example 29** (a) shows mm. 3–4, the continuation, of Monk's *'Round Midnight*. The melody in mm. 1–3 is entirely diatonic to the key of E-flat minor, so the harmonized sequential chromatic descent introduced in m. 4 grabs attention. This involves a ii–V chord pair transposed down chromatically, using the 3rd of each V chord as a common tone that is the 7th of the following ii chord (resulting in a chromaticized chain of 7–6

suspensions). A hypothetical continuation of the sequence is shown in parentheses, and a voice-leading shell is shown below, in Example 29 (b).

[3.1.7.3] The pattern stands out not only for contrasting with what preceded but also for its evocation of one of Monk's distinctive dissonant chromatic techniques, heard in other Monk songs (as compared to earlier Tin-Pan-Alley oriented jazz songs). Example 29 (e) shows an excerpt from Monk's "Ask Me Now" employing the same voice-leading technique in a much longer sequence. Example 29 (f) shows the pattern in an elided fashion in Monk's "Skippy"; his left-hand comping style uses chromatically descending parallel minor 7ths to realize a descending 5th sequence with flat-five substitutions. This version of the pattern actually occurs just a few measures later within *'Round Midnight,* at mm. 7–8, shown in Example 29 (d).

[3.1.7.4] As I noted earlier, Babbitt's *Gloss* has no direct quotes of Monk's tune. Therefore, in listening to it, after the initial fleeting whiff of E-flat minor, one struggles to identify any affinity with that which it ostensibly glosses. Like other Babbitt compositions, it is also devoid of literal repetitions over the course of its 42 measures, except in one place: mm. 33–34, shown in Example 29 (c). This repeated figure, involving minor 7th simultaneities moving by semitone (G over A moving to and from A♭ over B♭) stands out from the non-repeating continuity. In any other Babbitt piece, it would come off as merely a quirk. Yet if the title *A Gloss on 'Round Midnight* primes a listener to try to correlate this piece with Thelonious Monk's music, as I believe it does, this moment stands out as an allusion to one of Monk's signature voice leading techniques, which in fact occurs within Monk's *'Round Midnight*. Babbitt's repeating of the double dyad gesture enables it to be heard in *descent* (A♭ over B♭ proceeding to G over A), as occurs in Monk's voice leading. Although Babbitt's allusions to tonal practice more often seem to play rather loosely with voice leading (for instance by employing octave displacements very liberally), this does not preclude his referencing tonal voice leading more directly in other cases, such as this.

B. Musicking portmanteau (pormantonality) and conceptual blending

[3.2.1] A *conceptual blend* is meaning emerging from the integration of two or more *input spaces* achieved by virtue of a subset of *generic* features that the two or more input spaces happen to share. As Fauconnier and Turner (2002, 41) describe it, "a generic mental space maps on to each of the inputs and contains what each of the inputs have in common." **Example 30** shows a template for a *conceptual integration network* (CIN), which is what diagrams this situation. Notice the two input spaces enjoy a correspondence by virtue of a subset of their features they share, which constitutes the generic space. These, however, trigger associations with other (not shared) features of each input space, which are thereby organically recruited into the blend. The entire process of integration occurs in three stages: *composition, completion,* and *elaboration*, by which the blend develops emergent structure that is not in the inputs.

[3.2.2] *Conceptual blending (integration)* is an appropriate way to appreciate the charms of *Whirled Series*. **Example 31** shows a CIN with two input spaces, listing some of the features of each. The bubble on the right (input space 2) lists seven features of tonal practice that are alluded to in *Whirled Series*. The generic space bubble at the top describes each of these in more neutral (generic) terms; through the possibility of conceiving each of these features in a more neutral (generic) way, they can be associated with specific possibilities of serial 12-tone all-partition superarray composition, which are listed on the left (input space 1). For instance, in conventional tonal practice a consonant triad (major or minor) serves a referential function as a tonic (a center of gravity, a most restful sonority) whereas in a 12-tone composition, trichords of type [037] can be referential for a different reason: they occur as contiguous order positions (discrete trichords) in the 12-tone row, which is referential. Likewise, in both input spaces, major and minor triads occur amongst dissonant sonorities although for different reasons, and they are often distinguished from dissonant sonorities by contextual means, also for different reasons in input space 1 as compared to input space 2. In both input spaces, every pitch event is related syntactically to the pitches in its surrounding context, but the syntax in input space 1 is completely different from that of input space 2. Features 5–7 in input spaces 1 and 2 relate analogously—that is, through a more generic description, by virtue of which they can be associated, as the reader can glean by scrutinizing the

diagram. Of course, there are many other unlisted features that are also recruited into the blend through association. For instance, unlisted in input space 1: we may know or sense that [014] and [015] trichords and [0148] and [0347] tetrachords are equally referential as compared to [037] trichords. Contrapositively, unlisted in input space 2: qualities of tension and relaxation, as well as build-up of suspense, are recruited through association into the listening experience. Numerous other unlisted qualities could be mentioned.[37]

[3.2.3] The CIN in Example 31 should not be taken as an assertion of *balance* between input spaces 1 and 2. On the contrary, *Whirled Series* correlates exactly with (is literally true of) input space 1, whereas it merely flirts with input space 2. The point here is twofold: (1) the associations in input space 2 are better recognized by being rendered in more neutral (generic) terms; these are the conduit through which the associations are made; and (2) each of the individual associations in input space 2 is made more plausible because of the other associations in that space (the other listed features of tonal practice). These are merely associations, yet input space 2 is not merely auxiliary; it is real added value. *Whirled Series* is not made weaker but rather is made stronger by this blend; its meaning is enhanced by it, with no compromise to its 12-tone serial integrity.

[3.2.4] Babbitt's gambit seems to be that none of these tonal allusions is incompatible with the intricate serial underpinnings of the piece. He is having his cake and eating it too. Or putting it differently: it is as if he is simultaneously playing bridge and poker with the same cards, or is moving his pieces (notes) by the rules of chess, but also intermittently finding and exploiting opportunities to score points in checkers by the same moves—after all, why not? Both are played on the same game board (the 12 pitch classes of the equal tempered scale). Such tonal flavorings occur throughout *Whirled Series*, all of whose pitches are also sourced from a 12-tone serial array.

C. Subtler portmantonality: formal functions

1. Formal function unattached to convention

[3.3.1.1] With the above in mind, I will discuss what I consider to be the most subtle and perhaps even controversial contribution to the blend in *Whirled Series*. It relates to the phenomenon that was discussed above as a procedure for making a reduction, namely *pitch permeation* (which is pitch *recurrence* with *infusion* of other intervening pitches). This feature in an additional way recruits an association from tonal practice that contributes even more deeply and subtly to the blend. To observe this, first consider an aspect of pitch distribution that often signals, or correlates with, certain large-scale formal functions in common practice tonal works. I am thinking of *closing material*, *retransitions*, and in some cases *opening material*.[38] I have in mind William Caplin's concept of *form functionality*[39]: the notion that "musical form directly engages our temporal experience of a work inasmuch as its constituent time-spans have the capacity to express their own location within musical time" (2009, 23).

[3.3.1.2] Of course, music such as Babbitt's generally lacks normative conventions of formal sections that can be likened to locations or to stock temporal phases such as *beginning, middle,* and *end*. Therefore, when Babbitt's music does express form functionality, it evades the burden of having to do so in crisp hierarchical ways. But these differences ought not prevent its constituent time-spans from having a capacity to express formal differentiation any more than a non-representational painting is prevented from expressing contours, depths, shadows, and motion. Novel situations provide opportunity to express (and experience) formal differentiation in nuanced, alluring, exotic ways.

[3.3.1.3] Form-bearing differentiation can emerge from the configuration of the note-to-note material. As Steven Vande Moortele explains of Adorno: "Although he does not deem the form-functional requirements of the whole irrelevant, Adorno proposes instead to deduce a unit's function from its internal organization, complementing the traditional top-down view with a bottom-up approach to musical form; one might speak in this respect of a unit's 'material' formal function"[40] (2015, 420). The expression of "formal functions" in Babbitt's music is analogously *unattached* to any specific formal conventions, remaining instead as unspecified (or underspecified)

formal differentiators, which sometimes (as in the closing rhetoric identified by Bernstein and Maggart) resonate with, or conjure associations with, conventional formal functions.[(41)]

2. Pitch permeation and *Formenlehre*

[3.3.2.1] In many compositions of the common practice period, the distribution of pitches at such junctures as closing, retransition, and sometimes opening, differs noticeably from that of adjacent passages, and this difference helps signal a formal function within the form of the entire movement. In the *Formenlehre* literature we witness this in terms of familiar higher-level concepts used to explain how tonality is deployed rhetorically, to persuade the listener of a certain conventional expectation. Some of these are fuzzy and qualitative. For instance, Hepokoski and Darcy ([2006](), 190), regarding closing material, acknowledge a characteristic of a "c-like theme" and a "hazy notion of 'c-rhetoric.'" Codetta material they describe as often employing tonic pedals, tonic-dominant oscillation, or a "rotary" 8–♭7–6–7–8 module, which inherently entails pitch permeation as it involves recurrence with infusion of four distinct pitches *and* circular perpetual prompting of this repetition. Another example is John Paul Ito's description of the "the beginning of the retransition [as] defined not by the beginning of a formal unit but by the beginning of the sense that the recapitulation is right around the corner. It's like smelling rain coming in the air. Two listeners may well legitimately hear the retransition beginning in different places" ([2019](), 3). Such a hazy, fuzzy, qualitative emergence is like the emergence of pitch permeation that might be experienced at various times in a Babbitt superarray composition. Hepokoski and Darcy's ([2006](), 191–93) example of retransition from Mozart's "Dissonance" Quartet, K. 465, features the tones of a G major chord and then G7 chord permeating throughout, of which one's awareness may be cumulative.

[3.3.2.2] Although some aspects of formal functions are not necessarily tied to discrete events, other aspects of common practice *Formenlehre*, however, are indeed described in terms of definite crisp events, such as *essential expositional closure* (EEC), *medial caesura* (MC), cadential progressions, and "dominant lock." Some of these are inherently tied to specific positions within conventional common practice forms, or to tonal functions, neither of which generally apply in the wider set of contexts where differences of pitch permeation can be observed, including in Babbitt's superarray pieces.

[3.3.2.3] Thus, although pitch permeation can play a role in formal differentiation in both classical sonata forms and in Babbitt superarray compositions, the purpose is utterly different in each case. Babbitt's task is never as specifically rhetorical in the way that, say, an EEC (essential expositional closure) is. An analogy might be blinking green or red lights considered outside the context where red indicates stop and green indicates go. We might imagine such lights on a Christmas tree or sculpture, which can, under the right circumstances, conjure notions of street traffic; but under most circumstances such red or green lights are detached from their traffic-signaling function. Just as green and red lights in various artistic or decorative contexts might remind us of traffic signals, the disposition of pitch material in a post-tonal musical surface might remind us of a semiosis of conventional form to which it isn't necessarily beholden: added meaning here arises through association or connotation, rather than denotation. In that case, a flux of harmonic pacing may also exert its effect on perception of form in an open-ended way, even without reference to that semiosis of conventional form, while it also may flirt with a listener's experience of such conventions, thus obliquely nodding in the direction of a dialogue with conventional forms, even while remaining independent of them.[(42)] Thus, prior to or outside of a listener's familiarity with standard formal signals (like pedals in closing modules or retransitions), differences of pitch distribution can nevertheless be experienced as a noticeable change, as a more general form-functional flux of harmonic pacing. Such thinking is still consistent with Caplin's definition of form functionality and moreover is directly implied by the bottom-up orientation of Adorno's *materiale Formenlehre*.[(43)]

3. Pitch permeation without *Formenlehre*

[3.3.3.1] To show this, I would like to provide an account that is independent of the conceptual apparatus of common practice tonality and form[(44)]—that is, a factual but deliberately naïve reading that reveals the relevant form-functional flux of harmonic pacing. Almost any sonata form

could be chosen to exemplify this. Consider for instance the development section of Mozart's Piano Sonata in C Major, K. 279, first movement, shown in **Example 32**. The bass line descends stepwise once per measure until the retransition at mm. 52–57 (the sixth and seventh systems), where it stabilizes on G. Other pitches besides G are heard during this passage; the action continues, while the insistence on G recurring creates noticeable contrast with what preceded. And this (being in this case on dominant harmony) signals formally the retransition to the recapitulation, at which point the recurrence of the G subsides and the faster harmonic pacing starts flowing again. In the last dozen measures of the movement, the chords and bass line change two or three times per measure until the final three measures, when the harmonic pacing again stops so that the pitches of the closing tonic C major can persist for a full three measures (with some neighbor tones intervening). In the Piano Sonata in G Major, K. 283, first movement, the end of the exposition presents closing material that again halts the flow of harmonic progression with an insistent left-hand gesture on D oscillating with C♯, shown in **Example 33**. After the double bar, the harmonic pacing flows again in the development section—that is, until the retransition nine measures in, at which point the dominant D incessantly recurs, amid other pitches in the upper register, until the recapitulation, when the pacing flows again. In some sonatas (such as the presto finale of K. 283 or the first movements of K. 280 and K. 330), bass pedals also occur in the opening phrase, which thereby contrast retroactively with the more flowing harmonic pacing of what follows.

[3.3.3.2] If we were to describe these situations in generic terms (that is, without regard to what we know is their role in the sonata form), we could say they have a recurring pitch with various other pitches infused in between. In other words, these are passages of increased *pitch permeation* (which is defined as *recurrence* of a pitch together with *infusion* of other pitches). Of course, this happens to some extent throughout, but it happens noticeably more during some passages as compared to others. That flux in the amount of *pitch permeation*, from one passage to another, contributes to our general sense of formal change as the piece flows by. It is on the basis of this general sense that the more specific and refined hearing of formal functions (such as retransition, closing, or possibly opening) can occur. Therefore, the mere general sensing of this flux of less versus more pitch permeation provides genuine insight into the formal sections and subsections of the sonata form, whether the listener is consciously aware or more naively senses it.

4. Gauging pitch permeation in *Whirled Series*

[3.3.4.1] Let us now apply this consideration to *Whirled Series.* Above, to develop the reduction, we simply noted where pitch permeation occurs (using this to select pitches for the reduction). We could also, however, quantify the extent to which pitch permeation occurs, for instance, in one partition span as compared to the next. Such quantifying addresses our sense of a hazy, fuzzy, quality emerging, "like smelling rain coming in the air" (as opposed to a crisp binary state). Since *pitch permeation*, as I define it, depends on both recurrence and infusion, it is most appropriate and simplest to quantify it as the product of these, with respect to each pitch within a span. This way of quantifying it is formally defined in [Appendix 1](), but in words it is simply this: for a particular pitch *p* in a span of music *S*, that pitch's *permeation* is computed as the number of times it recurs multiplied by the number of other pitches that occur between its first and last occurrence. In other words, it is the product of its recurrence and its infusion:

$$PitchPermeation(p, S) = Recurrence(p, S) \times Infusion(p, S)$$

[3.3.4.2] Computing the permeation of a pitch can be visualized as an area of a rectangle whose height corresponds to the number of recurrences of that pitch and whose width corresponds to the number of other pitches infused between the first and last occurrence of that pitch. This multiplicative product is best visualized as a rectangle, whose area corresponds to the amount of *pitch permeation* of a *pitch,* as shown in **Example 34**. In this example the pitch D occurs three times (*recurrence* = 2) and it is *infused* with five other pitches, so its permeation is $2 \times 5 = 10$.

[3.3.4.3] Furthermore, since more than one pitch can permeate (recur and be infused with other pitches), the overall permeation can be computed as the sum of permeation for all pitches in the span.

$$PitchPermeation(S) = \sum_{p \in P_s} PitchPermeation(p, S)$$

(This could be visualized as the total area of corresponding rectangles for all pitches in a span.)

[3.3.4.4] *Whirled Series* begins with fairly high pitch permeation. It dips slightly within the first four aggregate partitions, which unfold in mm. 1–14. **Example 35** and **Video Example 9** illustrate. A passage that demonstrates a more dramatic flux, from low pitch permeation up to heightened pitch permeation and back down, is at mm. 14–59. **Example 36** visualizes this by indicating the most permeating pitches in proportionally dark note heads and by hiding the pitches that do not permeate or that permeate only slightly. A quantitative graph is shown beneath. (**Video Examples 10 and 11** animate the notated permeating pitches, helping the listener to become more aware of them while listening, and experientially gain a better sense of how the particular surface pitch events relate to the more statistically based quantitative graph shown underneath.) Each instance of heightened pitch permeation can be imagined as a welling up of accumulating pools of water, whose flow is temporally held back by a dam or by a natural obstacle, membrane, or substance.

5. The particular nature of pitch permeation

[3.3.5.1] There are three intriguing aspects of pitch permeation to point out:

1. The more a pitch permeates a span, the more it drifts to the fringe of the listener's awareness; whereas other introduced pitches (those that *infuse*) attract relatively more attention due to their immediate novelty or "freshness." Therefore, the effect of permeating pitches is often retroactive, ambient, liminal. They affect a listener's sense of form subliminally, without necessarily coming to the center of focus, that is, without directly drawing attention to themselves. Pitch permeation does this by manipulating our shifting sense of pacing. When, in retrospect, one gradually senses the absence of a formerly permeating pitch, a previous sense of holding-back gives way to a sense of forward flow. Thus, the flux of pitch permeation regulates flux in pacing: holding back versus flowing forward.

2. Consecutive highly-permeating spans can contrast with each other by virtue of having *different* permeating pitches. This kind of contrast is not available (or is less available) to consecutive spans that lack (or have less) pitch permeation.[(45)] Thus, increased (higher) permeation activates yet another potential source of formal contrast.

3. (3) The role of pitch permeation in musical form cannot be reduced to a top-down (synoptic, hierarchical) or bottom-up (immediate, detail driven) mechanism. Both of the aspects just described (flux of less vs. more pitch permeation between consecutive spans and differing permeating pitches between high-permeating spans that are consecutive) are top-down in that they are statistical but are bottom-up in that they accrue gradually, not suddenly. In this way, pitch permeation is best understood as an *emergent* quality, which itself can fluctuate both quantitatively and qualitatively.[(46)] In that it is emergent, pitch permeation cannot act in a crisp or sudden way to affect the perception of musical form in the more typical ways we might imagine. Rather, it is more akin to the arioso-like indefinite ever-transitional flux between aria and recitative in pivotal scenes of Monteverdi's *Orfeo*, or in a different way, in Wagner's *Ring*. It is form emerging as if barometrically, through flux of content, rather than through crisp disjunction; it might also be reckoned as akin to fluctuations between prose and verse, for instance in Shakespeare (and other Elizabethan) plays. In Shakespeare plays (especially his comedies and romances) shifts from prose to verse, or vice versa, are used to project subtle shifts of mood (*Taming of the Shrew*), a shifting relationship between characters *(Much Ado About Nothing)*, a disguised character *(Merchant of Venice)*, psychological complexity *(Hamlet)*, or nobility (*The Tempest*) (see Ballard 2016). Generally it is not until detecting the presence or absence of rhyme that a listener senses the shift from prose to verse (or vice versa); it may take at least a sentence or two for the rhyme and rhythm of verse to emerge, or for its absence to be felt. Similarly, in a Babbitt superarray composition, the form-bearing effect of pitch permeation for the listener is not as crisp and clear-cut as his pre-compositional (pre-notational) designs might suggest, but rather is more fuzzy, hazy, and fluid, arising from the fluctuating disposition of its material.

6. Pitch permeation manifesting ("expressing") the serial array

[3.3.6.1] With these new perspectives in mind, consider mm. 157–98 of *Whirled Series*, a passage that demonstrates an even more dramatic flux of pitch permeation—again exemplifying the features just described. This passage realizes five partition spans of the array, with the second and third spans (mm. 160–78) having dramatically increased pitch permeation in both the saxophone and

piano parts. Again, **Example 37** visualizes this by indicating the most permeating pitches in proportionally dark note heads, and hiding the pitches that do not permeate or that permeate only slightly. This would be an appropriate time to listen to the passage or watch **Video Examples 12 (a) and (b)**.

[3.3.6.2] The propensity toward increased pitch permeation correlates with the shape of the array partition as follows: partitions that have small lyne part sizes tend to be realized (composed as notes) in such a way as to produce increased *pitch permeation*. For instance, looking at Example 37, notice that the saxophone partition span starting at m. 168 has a lyne with only one pitch class in it, G natural. During this passage this pitch recurs 6 times with 11 pitches intervening (its permeation computes to $6 \times 11 = 66$), thus it permeates greatly (indicated by the darkened note head). Likewise, the piano outer array has two lyne parts with only one pc each (D♭ and F), and these also in the composed (heard) surface permeate a lot; even C from the piano's middle array permeates. When a lyne part has one pc (or few pcs) Babbitt tends to reuse that pc; thus, that pitch will recur, with the other pitches, from other lynes, being infused amongst those recurrences. The relevant aspect of the shape of the partition spans depends on the lyne part sizes, specifically the sum of the reciprocals of their sizes, because this sum will be greater to the extent there are lyne part sizes that are smaller, for instance containing only one or two pcs (decreasing the denominator increases the value of the summed fraction). Thus, *Lyne Part Size Diversity* is computed, as shown in Appendix 2.

[3.3.6.3] **Example 38** is a graph showing that pitch permeation fluctuates up and down together in correspondence with the *LPS Diversity* of the partitions from which Babbitt composed these passages. Specifically, we can witness this graph's orange and purple contours (which are entirely different scales of magnitude keyed on left vs. right axes) tend to go up and down at the same time, with coordinated peaks and valleys. Therefore, the flux of pitch permeation, for instance at mm. 157–99 (Example 37), is not just an arbitrary feature. Rather, it correlates with (as shown in Example 38), and therefore signals, the shape of the underlying aggregate partition of the 12-tone all-partition array. Babbitt has gone through a lot of trouble to forge and use an array that is *all-partition*—that is, an array containing every possible shape—and thus the pitch permeation signalling the shape of the partition cuts right to the heart of the most important underlying structure of *Whirled Series.* It serves a function in signalling distinctions (different partition shapes) in the underlying formal structure (all-partition array). It has a formal function, in Caplin's sense explained above. That is, it exemplifies *form functionality*: since the overall composition moves through the all-partition array chronologically, it is by virtue of having noticeably lesser or greater pitch permeation that its "constituent time-spans," which are partition realizations, "have the capacity to express their own location within musical time."

[3.3.6.4] And this resonance between material-surface and abstract-structure is how *pitch permeation* relates to the blend I discussed above. As expressed at the end of input space 1 in **Example 31**'s CIN, flux of *pitch permeation* correlates with, and thus signals, the varying shapes of the aggregate partitions within the 12-tone serial all-partition array. In more general terms, this flux correlates with and thus signals deep facets of the underlying formal structure of the piece, and it relates associatively or connotatively to a facet of form-function signalling in common practice tonality, namely the *pitch permeation* (rhythmicized pedal tone or "rotary" modules) often heard in sonata form retransitions, closing material, and sometimes opening material, as listed at the end of the CIN's input space 2. On its own, such an affiliation might seem far-fetched, yet when clustered with the seven other items of the input spaces, it is made much more plausible, as contributing to a nuanced blended hearing of *Whirled Series*, a hearing of its *portmantonality*.

D. Hearing the language of playful portmantonality in *A Gloss on 'Round Midnight*, *Canonical Form*, and *Whirled Series*

1. Ragging as license

[3.4.1.1] The tonal gestures in some modernist works, notably Schoenberg's *Ode to Napoleon* and many works of Charles Ives, come across as purposefully contorted, often ironic and politically or performantively rhetorical, which is not how they seem in Babbitt's music, where they have a

curious manor all their own, arising instead playfully from his own experiences and enthusiasms. To be sure, the flirtations with tonality we have witnessed involve glaring syntactical distortions of conventional tonal practice, but they do not come off as strained or brazen. Rather, they suggest a kind of playfulness we witness in the lyrics of the 1920s Tin Pan Alley songs Babbitt so adored. As Furia (1991, 28) explains, the adjusting or distorting of syntax or stress to forge a rhyme is known as "ragging," for instance in this 1927 lyric "Side by Side" where past and present tense intermix and "when" is elided in "same as [. . .] we started"[(47)]:

> When they've all had their quarrels and par-
> ted,
> we'll be the same as we star-
> ted,

Or in the lyric from one of Babbitt's favorites (Oteri 2001) "You're the Cream in My Coffee" (1928), which plays with an opposition between basics and bonuses by distorting the stress of "necessity" and a double meaning of "lace":

> You're the cream in my coffee,
> You're the salt in my stew
> You will always be
> My necessity
> I'd be lost without you
> . . .
> You're the starch in my collar,
> You're the lace in my shoe

For a musical analog, notice that the string of octave doublings in mm. 99–106 of *Whirled Series*, discussed above, is not pristine, but rather is somewhat "ragged." [(48)]

2. Ragging in Babbitt's *Gloss* on Monk

[3.4.2.1] A more extreme example of the kinds of licenses or liberties that could be entailed by musical ragging is found in *A Gloss on 'Round Midnight*. Besides alluding to Monk's E-flat minor and dissonant tonal voice-leading, as discussed above, from the partial-ordering options available in his pitch-class and time point arrays, Babbitt also forges references to pitch sets, interval patterns, rhythmic profiles, melodic contours, and pc sets of Monk's tune, yet without clearly quoting the tune—as if to forge something like a cubist portrait of the tune, something at the liminal edge of recognizability.

[3.4.2.2] As shown in **Example 39**, Babbitt references the incipit of Monk's main melody ⟨B♭, E♭, F, B♭, G♭⟩ in several ways. Some involve literal pitch-class content (shown in green). (1) He begins his *Gloss* with the four pitch-classes, including beginning with its opening perfect 4th dyad {B♭, E♭}; (2) he presents the identical vertical ordering in terms of pitch intervals ⟨P4, M2, P4⟩; and (3) he repeats the opening trichord in the low bass register in m. 2.[(49)] Rather than a melodic series of pitches, Babbitt presents these as simultaneities in m. 1. Yet this opening trajectory of dyads and chords also alludes to the rising fanfare that begins Monk's motto, by tracing its path of upward skips (shown in blue). At this point the association deviates from the exact pitch classes, but associates via interval patterns (shown in orange): an ascending perfect 4th followed by a descending major 3rd ⟨C♯, F♯, D⟩, followed by a perfect 4th (G5 and C6) repeated, an interrupted descending minor triad ⟨F♯, D, B⟩, and (shown in lavender) a high-low-mid skipping melodic contour ⟨D4, E3, B3⟩. Additionally Babbitt's ⟨C♯, F♯, D⟩ transposition of Monk's ⟨F, B♭, G♭⟩ is pitch-class identical to the {D4, F♯4, C♯5} chord Monk played in his June 7, 1954 rendition (shown in light green). Thus, Babbitt's {C♯, F♯, D} trichord has a double meaning, simultaneously referencing two parts of Monk's tune.

[3.4.2.3] Moreover, all of Babbitt's pitches here have another meaning, as they derive from a 12-tone aggregate array structure. Notice again that adaptation of the serial-array elements to forge additionally the reference to Monk's tune entails significant distortions or licenses, as with the

examples of ragging in song lyrics. Such ragging entails a slight—or in this case extreme—bending of conception; that's a price one pays for a pun.

3. "Ragged" tonality in Babbitt's *Canonical Form*[50]

[3.4.3.1] Accompaniments of jazz and Tin Pan Alley songs are usually extemporized from lead sheets, giving them their own kind of "ragged" quality of variegated texture and syncopation, which fits hand-in-glove with their lyrical linguistic licenses, as in "Side by Side" or "You're the Cream in My Coffee" quoted above. Therefore, we ought not be shocked to find intermittent "ragged" tonal allusions as integrated bonuses to the consistent serial structures. For instance, to my ears, *Canonical Form's* mm. 189–94 suggest a somewhat coherent chromatic chord progression in a bluesy ("ragged") C major-minor, suddenly shifting down a semitone to B major at the end (a tonality twice hinted at parenthetically during the C major-minor progression).[51] **Example 40** presents the excerpt together with a two-stage reduction and audio rendering of both (presented in audio-synchronized scrolling format in **Video Example 13**). (To hear the tonality, or *portmantonality*, in the excerpt, I recommend listening first to (a), the original excerpt, and then viewing the graph while listening in series to three chordal, but somewhat rhythmically faithful, audio renderings of the passage—(b), (c), and (d)—and then listening to the original again. For the three chordal renderings: (b) is in a comfortable middle register, (c) is in a high register, and (d) preserves the octave placement of the original.[52]

[3.4.3.2] Obviously this is not a progression that would have been freely composed; on the contrary, this is a blend: within the partial ordering constraints of this portion of the 12-tone all-partition superarray, the "ragged" tonal allusion is forged. Correspondingly, my approach to representing and cultivating this tonal reading has been flexible and constructive. For instance, it is not, in any direct or systematic—let alone algorithmic—way, based on pitch permeation. Rather the tonal reading was prompted organically from familiarity through listening (over several decades); then it was further cultivated as follows: The C major authentic cadential pattern in m. 93 provided the starting point. Then, I speculated that the context leading up to this subtly afforded such a hearing, and that this might be due to a compatibility it bears with some Schenkerian middleground voice-leading pattern; so, by weighing various possibilities that include virtually every note, I ultimately traced a conventional tonal voice-leading pattern (an *Ursatz* or part of one) to approach the cadential event, while prioritizing consonant tertian harmonies and allowing great liberty regarding register.[53] This analysis, as a kind of bootstrapping or productive feedback loop, both resulted from and enhanced my tonal hearing of the passage.[54] Nothing about Babbitt's theorizing or other verbal pronouncements militates against such a tonal hearing. On the contrary, to be completely unable to hear this tonal progression, or to resist doing so, would be, in some sense, analogous to remaining oblivious to the baseball connotation of the title *Whirled Series*, or to the second meaning in any other pun or wordplay.

4. "Ragged" tonality in *Whirled Series*

[3.4.4.1] **Example 41** presents the score of mm. 22–29 of *Whirled Series* beneath a tonal reading, represented as a Schenkerian-style voice-leading graph. The excerpt ends (mm. 27–29) with a quick multi-registral F major arpeggio (m. 27), voiced with the chordal 3rd (A natural) at the top, followed by a grand pause and quick flourish that whimsically suggests a C-major-into-F-major harmonic motion (mm. 28–29). In that context, it is not too difficult to hear the octave-scrambled G♯–G–F melodic succession in the melodic flourish of mm. 28–29, to which the piano's high A (harmonized by F) at the end of m. 27 serves as a perfect prelude (again octave displaced). Backing up further, then, the B♭ and D over F near the start of m. 27, leading directly into A4 over F3 in the middle of the measure, can be heard as a neighboring $\begin{smallmatrix} 6-5 \\ 4-3 \end{smallmatrix}$ motion (over tonic pedal F), a motion that is manifested (albeit with octave displacement) through the entrance of middle C in the second half of m. 27. With this in mind the insistent D♭ in mm. 26–27 is tonally a C♯ lower neighbor to the insistent D in the sax part (fleetingly doubled by the piano). Back-tracking yet further we notice that the middle of m. 26 arpeggiates a C7 chord (V7 in F major). All this, just described, is enough to attribute a tonality of F major to mm. 26–29, with hardly any hindrances to sort out—even the

Ursatz presents itself, as a supported $\hat{3}$–$\hat{2}$–$\hat{1}$ *Urlinie.* The next observation, which further supports all this, is that the lowest pitches in m. 23, m. 24, and m. 25 are C and F.

[3.4.4.2] At this point, I suggest readers listen to or play the reduction, if they have not yet done so. The final audio clip is a somewhat rhythmically faithful chordal rendering that correlates closely with the graph. I suggest listening and watching in two ways: (1) watch the graph while listening to the rendition of the score, and watch the score while listening to the "rhythmicized" chordal reduction. **Video Examples 14 and 15** present scrolling animations synchronized with the rhythmicized chordal reduction and with two renderings (electronic and acoustic) of the original excerpt.

[3.4.4.3] In terms of pitch-language, the tonal chordal reduction suggests an early 20th-century Reger-esque chromaticism, with extended dissonance (postponed resolution) and some adventurous chord juxtapositions (Neo-Riemannian transformations), all handled with smooth voice leading. Although some of Babbitt's music has sometimes been described as static "vertical time" (Bernstein 2017), the features I just pointed out instead create a sense of direction toward a goal, which is the tonic F major, first with the arrival of the tonic *Kopfton* ($\hat{3}$) in m. 27 and then finally with the descent in m. 29. My way of developing the graph for mm. 22–25 was to prioritize (1) tertian chords that suggest themselves (C major, C7, E major, D♭ major, G♯ minor, and G♯°7, in mm. 22-24); (2) the arrival on bass F in m. 24; and (3) the harmonized chromatic descent G–G♭–F in m. 25 as well as the top-voice chromatic stepwise connection from high B♭ in m. 22 down to high G in m. 26 (through A and A♭), both members of a dominant C7 chord. Allowing for octave displacement makes it feasible to identify the other necessary stepwise voice-leading between chords. Keep in mind that all these pitch events are *also* fully correlated with the 12-tone serial all-partition array on which the entire composition is based. I find it intriguing to listen to this excerpt, hearing such an evocatively teleological tonal progression as if elegantly carved out of the pre-existing marble material that is the intricately structured 12-tone serial all-partition array (manifested as both pitch-classes and time-points).

5. Interactions between "ragged" tonality and pitch permeation

[3.4.5.1] Above, in discussing mm. 1–14, we observed (with Example 26) that the seemingly "superficial" F♯ major triad on the downbeat of m. 14 actually has "deeper roots," in that its three pitch-classes permeate mm. 11–13 (though in different registers) and the other two permeating pitches (G♯ and C) are also diatonically compatible with that F♯ triad (conceived as a Lydian tonic). Or, in the other direction, the permeating pitches of mm. 11–13 subtly forecast m. 14's surface F♯ triad. Here triadicism (or even tonality-modality) and pitch-permeation directly relate to each other. Thus, besides the conceptual blend (integration) of eight serial-tonal mappings (Example 31), which mutually strengthen each other through their engagement in the same work, there is also the possibility of more direct engagement among these features. More broadly then, tonality and serialism are sometimes deeply linked by Babbitt's surface-compositional decisions. The surface gestures Babbitt chooses to create connect consonant triadic configurations to pitch permeation (which is a statistical manifestation of serial array structure possibilities).

[3.4.5.2] Besides mm. 11–14, we can now observe two additional examples of such direct links. The first relates to the passage for which the teleological F major tonal reading was presented above (Example 41) and the other relates to the tonality-modality of G♭/F♯ Lydian just discussed (Example 26). Looking at the distribution of pitch permeation shown in Example 36, notice that the four partition spans (mm. 18–21, mm. 21–24, mm. 24–27, and 27–36) that include and surround the F major passage (mm. 21–29) each feature F as a most permeating pitch (F permeates in each of these spans and no other pitch permeates more). In two of these spans (mm. 21–24 and mm. 36–46), F is the only permeating pitch; it permeates each time from a different register, F6, F2, F3, and F5. In fact, we could say that it progresses to an increasingly prominent position, registrally and in terms of permeational intensity, starting from moderate permeation in peripheral high and low registers (F6 and F2 in mm. 18–21 and mm. 21–24) and then, in mm. 24–27 and mm. 27–36, to increasing permeational intensity in more prominent registers (F3 and F5 in mm. 24–27 and mm. 27–36). In

these ways, the passage (mm. 21–29) that withstands the Schenkeresque tonal reading is more deeply ("structurally") linked to its surrounding context, through pitch permeation.

[3.4.5.3] The other example follows on the heels of this, but relates now to a G♭/F♯ Lydian tonality/modality, yet engages permeating pitches from the F-natural oriented passages just discussed. For this observation, refer to **Example 42**. After a passage (mm. 36–46) in which G♭ and B♭ are the predominantly permeating pitches (see Example 36) and ending with a D♯ minor triad and F♯ major triad, a grand pause (that is also an aggregate boundary) precedes m. 47, which presents a modal cadential gesture that feigns a I–V6 motion in the key of F♯/G♭. (The longer three-chord progression can also be described as Neo-Riemannian operators *R (Relative)* and *L* (*Leittonwechsel* / leading-tone exchange)). In fact, all the most permeating pitches (see Example 36) in the spans leading up to this (F and D♭ in mm. 21–36 and B♭, G♭, and C in mm. 36–46) are diatonic to a G♭/F♯ Lydian tonality/modality, and thus the G♭/F♯ tonal/modal chordal gestures in mm. 44–47 can be heard as responding to, or bringing into tighter focus, the larger pitch-permeational context that leads up to them.

[3.4.5.4] Given that the relative tendency for pitch permeation is correlated with the shape of each partition in the all-partition array, it is possible to imagine Babbitt, in preparation for composing the note-to-note surface, scanning over the array to strategically locate appropriate contexts for tonal gestures based on possible pitch permeational distributions and allowing the particular permeating pitches to guide the choice of which tonalities to reference. In any event, as listeners, performers, or analysts, it is certainly helpful for us to know that the deeper form-bearing (form functional) role of pitch permeation can relate to more local ("superficial") tonal gestures in his 12-tone serial music. The tight links between form and content, relating local and long-range pitch configurations, ought to remind us of Schenkerian theory of tonality. This seems especially appropriate given that Babbitt's career coincided both chronologically and geographically with the growth of Schenkerianism in America, which Babbitt embraced. Beyond this, it was certainly a virtuoso feat that Babbitt was able to parallel the systematic intricacy of Schenkerian tonality, while also making surface tonal gestures that are deeply woven in, yet without any compromise to 12-tone serial structure, and while also riffing on jazz and features of American popular Tin Pan Alley songs to boot.

E. Conclusion

[3.5.1] *Whirled Series, Canonical Form,* and others are all-partition superarray serial works that conjure multiple quirky associations with tonal music. However quirky, these are not trivial nods, collages, or pastiches, but rather arise from the composer's foregrounding various resonances to tonal practice that can be forged from within his intricate but flexible 12-tone serial system.

IV. *Poetics of* double entendre

[4.0.1] I have provided an account of a facet of Babbitt's oeuvre that I find intriguing because, although not contradicted by his own theories, neither is it ever directly stated by him. Yet that does not detract from its appropriateness. Rather I take it as implicit that one of the prerogatives of creative actions is that they push the boundaries of categories and expectations. As Michael Spitzer (2018, 33) explains, quoting Per Aage Brandt (2006) discussing representational painting: "art blends the two spaces of 'pragmatic reality' and 'aesthetic form', or 'reference space' and 'presentation space'. . . . In the blend, these two spaces are held in unresolved tension, a tension whose very intensity creates emotion in the viewer of the painting. 'Beauty resides in the tension between two mental spaces' ([Brandt] p. 182). . . . Even though art is rooted in pragmatic, action-oriented, space, it is ultimately oriented towards transcending this space." Spitzer also writes of Ricoeur- and Goodman-inspired grammatical and hermeneutical "density" as blocking assimilation of certain oddities in a late Beethoven quartet, thus stimulating an intriguing "tensive" quality:

> As with grammatical density, hermeneutic density is worked out in the interaction
> between the sense (concept) and reference (image) of the poetic schema. Earlier, I

argued that grammatical sense and reference are blended together and are separable only when these categories are intellectualized, typically in music theory. I claim now that discourse problematizes the relationship between sense and reference, to the point where the concept and image cannot be grasped in a unitary experience. Instead, concept and image "flicker," like the dual aspects of "seeing as" effects. Discursive "hearing as," which we can also call "stereoscopic listening" and "split reference," bestows upon musical experience a tensive quality that is not present in grammar. We can identify precisely, therefore, just how the stuff of discourse seems to come alive. To borrow [Nelson] Goodman's phrase, the tensive can be selected as the "cardinal symptom" of the musical aesthetic. I define this symptom technically as *blocked assimilation*. Impertinent predication can no longer be assimilated into an overarching interpretational context, as was the case with grammar. With this path blocked, the listener's only resort is to relate to the music in a mode that is open, dynamic, and self-critical. By denying closure, the work questions our existing assumptions and clears new spaces for experience. This is the impact musical metaphor has on our lives. (Spitzer 2004, 111)

If these are apt characterizations for painters or for Beethoven's late style, then why not for Babbitt's flirting with tonality (as an "aesthetic" or "presentational" area) from, or through, his 12-tone serial compositional system (his "pragmatic reality" or "reference space")? After all, Babbitt's would not be the only music that strives to transcend a category or expectation, to create such a "tensive" quality.

A. Precedents and lessons of multivalence

[4.1.1] I have described such transcendence of categories in terms of conceptual blending theory, but there are plenty of analogous musical precedents that were already familiar before this theory arose. Berg's *Wozzeck* stands as an important clear example. Each of its three acts is not only a series of dramatic scenes but also a collection of instrumental genres: Act II, for example, is a five-movement symphony consisting of a sonata form, a fantasia and fugue, a largo, a scherzo, and a rondo. The hybrid multivalent character of these scenes is one of the distinctive features of *Wozzeck.* To essentialize any of them as one or the other (either just a dramatic scene or just an instrumental work) would detract from the intriguing aesthetic value of Berg's creation. None of these is either/or. Each is both/and; each is a *blend*.

[4.1.2] A wide-eyed look at music theory suggests that being aware of the power of such conceptual blends (versus insisting on reductive essentialism) is a crucial part of musical wisdom. **Example 43** shows several instances varying from routine to arcane. Regarding the tonal role of a chord, Gottfried Weber's concept of *Mehrdeutigkeit* is indispensable for understanding modulation from one tonality to another, by acknowledging how one chord can simultaneously play different roles in two different keys (Saslaw 1992). In the century prior, Rameau's *double emploi* enables a plausible explanation of chord progression by suggesting that, with certain chords there are two plausible analyses of what the root is. One of the magical qualities of a major (or minor) triad is how easily it can partake in multiple systems simultaneously; it is "overdetermined," as Richard Cohn (2011) calls it, by parsimonious voice-leading, which affords multiple smooth transitions in and out of the chord, independent of its role in any particular tonality.[55] Such magic is exploited by Wagner in his *Tarnhelm* leitmotif, which on the one hand is a G♯ minor triad oscillating with semitone neighbor notes and on the other hand is a G♯ minor triad oscillating with an E minor triad. David Lewin (1986), Babbitt's former student, demonstrates the plausibility of even more extravagant multiplicities of chord perception in Schubert's "Morgengruß" (including his discussion of *dubbit,* an ambiguous composite of rabbit and duck from early 20th-century psychological theory), and then develops the elaborate mathematical technology of *product networks* (1987, 1995), which, for parallel organum, as well as for the opening measure of Schoenberg's String Trio, show the equal (dehierarchized) validity of vertical (harmonic) and linear (melodic) generation of the pitches concerned.[56] Carl Schachter (1985, 1999) argues for acknowledging an alternate hearing of a tonal passage whose Schenkerian analysis he has just demonstrated firmly. A reasonable argument could be made that the ability to entertain—or more so: embrace!—multiple meanings (multiple analyses, multiple hearings, multiple generative systems) for the same pitch event is a pervasive,

perhaps even central, facet of deep musical understanding, one around which it is worth weaving one's composerly poetics. We can even imagine Babbitt slyly advocating for this wisdom of anti-essentialism through his compositional activities.

[4.1.3] To pursue this idea of a poetics of multiple meaning, we certainly have to reach beyond the notes in Babbitt's scores, but I think *not* to his substantial prose writings, as would be usual and expected when interrogating a composer's poetics. Rather we have to follow Alison Maggart's (2017) lead in taking the playfulness of Babbitt's titles more seriously.[57] She makes a compelling case for tapping into additional meaning in Babbitt's music by considering facets of his identity, including his predilection for wordplay in the form of puns, which he uses for many of his titles.

[4.1.4] Maggart's fascinating exploration has inspired me to look more carefully at this aspect of Babbitt's creativity. My analyses, I believe, lend support to, elaborate on, and extend her thesis. In this section and later sections in Part IV, I make a few additional observations.

[4.1.5] Although Babbitt is perhaps the only classical composer to emphasize puns in his titles, he is certainly not the only notable musician to do so. As we know, among most notable classical avant-garde composers of the 20th century, Babbitt is one of the only ones with a close personal connection to jazz and popular showtunes. Just as there was a tradition of "ragging" wordplay among Tin Pan Alley composers, also, and perhaps inspired by this, among jazz musicians of the mid-20th century, there was a tradition of witty wordplay in song titles, as somewhat "inside" jokes, that is, being self-referential to the genre. For instance, in 1948 Thelonious Monk developed a *contrafact*[58]—that is, a jazz composition based on the same chord progression as the 1929 Tin Pan Alley song "Just You, Just Me" (from the film *Marianne*). Monk originally titled the new version "Justice" (phonetically the same as "just us," which is semantically "you" and "me") but subsequently renamed it "Evidence" (which relates to "justice" in legal terms), thus creating a *recursive pun*. As Kevin Sun (2013) explains, the tradition continued as "Charlie Parker's 'Confirmation' was followed by Sonny Rollins's 'I Know,' Miles Davis's 'Tune Up' preceded John Coltrane's 'Countdown,' 'How High the Moon' was reimagined as Coltrane's 'Satellite,' and so forth." Bill Evans's 1959 jazz tune "Peri's scope" exemplifies a phonetic style of pun common in Babbitt titles (*Whirled Series, Phonemena, My Complements to Roger, It Takes Twelve to Tango, Fourplay*). [59]

[4.1.6] One of the most famous of all musical puns is another phonetic pun, the one taken as the name of the "Fab four," that is, the Beatles. The name *Beetles* was originally suggested as an homage to Buddy Holly's band, the Crickets. John Lennon changed the spelling to *Beatles* to reference the stylistic quality of their music: *beat music*, a late 1950s, early 1960s genre of British post-rock'n'roll.[60] In Maggart's classification of Babbitt's titles, it is interesting that the only pun title before 1969 is *All Set* (1957).[61] *Babbitt's* habitual use of punny titles covers the period 1977–94. As the Beatles did in choosing their moniker in 1960, Babbitt uses puns to verbally draw attention to non-verbal facets of his music.

[4.1.7] This is especially intriguing because puns are a kind of conceptual blend, which I discussed above in regard to Babbitt's numerous witty references to facets of tonal music, or in a sense to tonality itself. As Carita Lundmark (2003) explains it: "puns are usually described as two meanings being incongruously combined in one and the same utterance." In this way, Babbitt's titling of his compositions serves as a parallel to the conceptual blends he achieves with pitches, pitches whose configurations have syntactic meaning through their derivation from serial array structure, as well as, incongruously, having "tonal" meaning through their euphonic sound.

B. *Whirled Series*

1. Maggart's baseball thesis

[4.2.1.1] The title *Whirled Series* is intriguing for referencing what we know to be one Babbitt's favorite pastimes: following baseball. I point out elsewhere (Mailman 2019) that the playful unpredictable quality of Babbitt's superarray compositions (played out within fixed rules) affiliates with similar aspects of baseball. Yet Maggart provides an extensive insightful argument that

Babbitt's titles provide specific hermeneutical bait that is profitably woven into the overall aesthetics of each work, especially the ones whose titles are puns.

[4.2.1.2] In particular, Maggart (2017) shows the pun in the title *Whirled Series* can be read as informative in regard to specific technical features of the musical compositional itself, features that it shares with baseball. For instance, citing various authorities on baseball as well as Boretz's (2006) interpretation of Babbitt's musical temporality, Maggart argues that repetitive rotations of ordered trichords, which dramatically dominate the conclusion of *Whirled Series*, affiliate with baseball's counterclockwise run around the bases, and the cyclicality of time (a self-defined time-cycle) is a feature shared by baseball and Babbitt's time-point system (280–95).

2. Pursuing Maggart's thesis further

a. Array blocks and baseball innings

[4.2.2.1.1] Maggart also cautions that Babbitt somewhat dismissed the title's associations to baseball, although he elsewhere left the possibility open. Yet I propose a perspective that musters even more support for Maggart's thesis. If we look to Babbitt's more general predilections and inclinations, we do not need a specific smoking gun in order probe the meaning of his titles. In planning out his compositions, Babbitt's predilection for designing crisp registral or instrumental blocks involving binary swapping is somewhat unusual and noteworthy. (For instance, his *Composition for Four Instruments* starts with a section for solo clarinet followed by a section for the complementary set of instruments: flute, violin, and cello, and continues with pairs of sections involving this kind of complementary binary swapping, as discussed in Dubiel 1992 and Lewin 1995.)

[4.2.2.1.2] As compared to other spectator sports, baseball much more crisply divides into alternating complementary sections of play, called *innings*, which hierarchically divide further into three or more *at bats*, which can further divide into *pitches*; this feature strongly characterizes the entire feel and flow of the game, distinguishing it from most other sports games, which tend to be more continuous; in America at least, baseball is the only popular spectator sport in which there is an alternation of one team entirely vacating the field while the other team entirely takes the field; it is the most obvious instance of complementary binary swapping in all of sports.

[4.2.2.1.2] Generally Babbitt divides his all-partition arrays into blocks (which correspond fairly closely to row endings). In *Whirled Series* he assigns two arrays to the piano, divides each array into upper and lower halves, and then performs complementary binary switching on the resulting four registral bands. The thick vertical lines in **Example 44** correspond to the end of each block; dotted lines correspond to aggregate boundaries; shaded areas correspond to active pitch registers. It is not difficult to liken each block to a baseball inning, with aggregates corresponding to plays, and registral bands corresponding to players in the field. As in baseball innings, which divide into two halves, in which the fielding teams swap places, so too each block divides into two halves, in which the active registers swap places. For instance, the first half of the first block (*inning*) presents the two inner registers of the piano, which then swap with the outer registers for the second half of the block (*inning*). The second block presents the three upper registers in the first half, then swapping for the lowest register for the second half, and so forth. (The saxophone presents its array similarly except that its designated ranges overlap; its first block—mm. 1–14 vs. mm. 14–24—however, does indeed contrast nonoverlapping upper and then lower registers and is the only block that does so.) Of course all of this is a similar gambit to the complementary swapping of instruments in Babbitt's *Composition for Four Instruments* (and other works). Yet in *Whirled Series* it is perhaps even more conspicuous because, in order to achieve this, Babbitt actually horizontally slices each array in half, temporally dislocating upper and lower halves from each other.[(62)] Either way, the baseball-referencing title baits us to explore and attend to this distinctive feature of this and other Babbitt compositions. It is a poietic enticement.

b. The pun as dual reference

[4.2.2.2] Since it is so unusual to use puns to title classical musical compositions, this is worth looking at more closely. Of course, the beauty of a pun is that since it involves a *double* meaning, it has two verbal-semantic ways of pointing us toward musical features. A title, as a kind of *paratext*, can prompt us to attend to (observe, discover, privilege) certain facets of a work, for instance, as diagrammed in **Example 45**, title X might point us toward facets h, i, j, k, whereas title Y might point us toward other facets l, m, n, o. For instance, a title X relating to baseball may prompt us to attend to baseball-related facets of the work, whereas a title Y relating to a twirling motion turns our attention to those other facets. But a double entendre title Z that evokes both X and Y meanings turns our attention simultaneously to both sets of features, not only h, i, j, and k, but also to l, m, n, and o.

c. Multiple whirls

[4.2.2.3] Thus, the title *Whirled Series* can suggest musical features related to baseball, as well as features unrelated to baseball but related to *whirling*. Maggart 2017 expansively develops a hint about *whirling* articulated by Mead (1994), who notices that the threefold occurrence of both [037] and [015] trichord types within *Whirled Series's* 12-tone row presents three different order configurations (thus expressing different note-to-note intervals). So, as they recur within the series, these trichords are *whirled*. As Maggart shows, Babbitt (1987) himself referred to Stravinsky's hexachord rotations as inducing a "whirled series." Maggart ingeniously applies this to the dramatic finale of *Whirled Series,* which feels climactic and conclusive largely because of its intensified *pitch permeation* (Mailman 2010), although "without a propulsive teleology" (Maggart 2017, 281).[63] As Maggart shows, in the finale, the same kind of *whirling* of trichords that occurs within the underlying series is made to occur among pitch-permeating trichords formed between lynes. For instance, one hears from the saxophone C–G–E, then C–E–G, then E–C–G, and G–E–C. (During this passage, the piano's middle register, which presents an inversion of the saxophone array, permeates the pitches of a B minor triad.) Thus, the intensified pitch-permeation and the C major arpeggio rotation/retrograding (whirling) are manifested through each other.

d. Cyclic time and cyclic space

[4.2.2.4.1] Maggart actually connects whirling with baseball by noting the role of trichordal whirling in creating a timeless feeling in the finale, and posing this as a referent to baseball as a timeless tradition in American culture, as well as to the counter-clockwise running of the bases. Upon further consideration, however, I find at least two more connections to baseball that Babbitt's temporal cyclicality brings up. Other prominent spectator team-sports run by a clock (football, soccer, hockey, basketball) but not baseball, which instead runs nine untimed innings, and "extra innings" if needed to break a tie, thus additional discrete cycles contingently added on. There is an analogy to Babbitt's time-point system, which enables the composer's prerogative to repeat one or more time-points from one measure to the next. It thus underwrites the possibility of indefinite cycles of repetition, by elongating the number of measures corresponding to a time-point aggregate. There is an analogy with *outs* in baseball, as each half-inning has as many *at bats* as needed until three *outs* are achieved; thus, although each half-inning has a minimum length (three *at bats*), hypothetically it could go on and on for many more *at bat* cycles. This is analogous to articulation of a time-point aggregate, which has a minimum length but hypothetically, through appended time-point cycles, can go on indefinitely. It is possible to envision Babbitt's invention of the time-point system as being inspired (perhaps subconsciously) by this cyclical open-ended aspect of baseball's temporality, manifested at three different time-scales: within each *at bat*, within each *half-inning*, and within each entire *game*.

[4.2.2.4.2] As an example of the latter in Babbitt's music, consider this: In time-point array compositions, there is also, conversely, the possibility of, at the end, needing to repeat pitches in the pitch array, in order to fully exhaust the time-points still left in the time-point array. More generally, there are interesting phenomena of this sort (relating to coordinating the exhaustion of pitch-classes and time-points) discussed by Scotto (1988) and Bernstein (2015), which might be analogized to baseball "extra innings," which by definition are the most suspenseful part of any game in which they occur. Since, as Maggart (2017) observes, the finale of *Whirled Series* is particularly exciting by virtue of the "whirling" repetitions, the analogy to baseball "extra innings"

is well worth entertaining. The idea of "running the bases" prompting "extra innings" and vice versa, thus mutually-perpetuating the game, resonates with the phenomenon of intensified pitch-permeation and the C major arpeggio rotation/retrograding manifesting each other.

[4.2.2.4.3] As Maggart suggests, the *running of the bases* is a sort of *whirling* motion. There is more to say about this. The fact that baseball is played on a cyclical space (the diamond around which successful batters run) seems like an apropos predilection for Babbitt, the one musician who after centuries of it being relevant finally coined the term *pitch-class*, which nominally reifies the canonical finite cyclic space of chromatic (or diatonic) tones. Another related idea, which connects baseball's cyclical running of the bases to Stravinsky's (as well as Berg's, Krenek's, and Crawford Seeger's) pitch-class order rotations, is a feature that occurs necessarily within the four-lyne all-partition array of *Whirled Series,* and thus is uniquely entwined with this 12-tone row, which is the basis of all of Babbitt four-lyne all-partition array works. This idea concerns the single lyne that occurs at the 12 partition (the "voice-exchange" passage discussed above). It is a substantial logistical puzzle to use exclusively complete 12-tone rows of the same class to forge an array of all possible partitions of the aggregate of 12 tones, while not repeating any of the rows. In Babbitt's four-lyne array, the solving of this puzzle presents an interesting quirk at the 12 partition. This partition presents the entire RI$_7$ row form in a single lyne, except that exactly one pitch class (D natural), the first one of the row, occurs at the end, being borrowed as it were from the next row presentation while the ostensibly first order position presentation of this pitch class is excluded from this aggregate and is instead presented 18 measures earlier. Thus, as depicted in **Example 46**, within the 12 partition (a single-lyne aggregate), the first pitch class of the row is whirled around to the back.[(64)] It certainly seems symbolic since this is the minimum reordering needed to suggest row order rotation, which Babbitt preferred to call "whirling."[(65)] And the passage in the piece stands out texturally, being the most clear and direct linear presentation of the row. Thus, within the piece, the order-position whirling is reflexively self-promoted, in a climax of generative transparency.

e. Canonic actions encoded and referenced

[4.2.2.5.1] Yet there is more around and about the baseball theme. Another type of whirling motion is the tradition of keeping the infielders' arms warmed up and loose by throwing the ball around the infield circuit. For instance, after a strikeout or other out with no men on base, the catcher may throw to the third baseman, who throws to the second baseman who throws to the first baseman who throws it back to the catcher, a pattern which is called "around-the-horn" and which is the title of Babbitt's solo horn composition of 1993, made from the same array as *Whirled Series*, and written about by Dubiel (1997). Dubiel has mentioned to me that "Milton [Babbitt] once said that the references of *Around the Horn* included an expression for a triple play, which a scorecard would indicate 5-4-3," and that he recently started to wonder if 5-4-3 might refer to an "*unordered* set of intervals, most compactly made available in sets of type [037]."[(66)] As **Example 47** diagrams, the 5-4-3 numbering refers to a conventional numbering for infielding positions: 5 (third base), 4 (second base), and 3 (first base), the three places where baserunners are tagged out in this particular triple play, which thus replicates the around-the-horn throwing warmup.

[4.2.2.5.2] I find Dubiel's suggestion intriguing for several reasons. It relates to Mead's point that all three interval classes of [037] are highlighted in the row because it presents three ordering permutations of this trichord, which Maggart develops into the *whirling*-trichords interpretation of *Whirled Series'* finale, as explained above. (Babbitt's *Around the Horn* [1993] presents such permutations on the surface as well, as shown in **Example 48**. Measures 1–22 emphasize permutations that highlight ics 3 and 5; the permutations in mm. 31–38 highlight ics 3 and 4; the C–F–A segment in m. 51 highlights ics 5 and 4, and so on.)

[4.2.2.5.3] I find a strong resonance between Maggart's remark about baseball as a timeless tradition in American culture and the canonical status of major and minor triads in Western music (classical and vernacular), which connects to the idea of *triple play*, for what else in music is a "triple play" other than the playing of three pitches at once: a *chord*? And of all the chords in music, by far the most prevalent, canonical, and traditional are the consonant triads (major and minor),

which are precisely the only chords made of exclusively the ics 5, 4, and 3. Providing an uncanny parallel to this: Of the triple plays that have ever occurred in major league baseball, by far the most common type is 5-4-3 (92 out of a total of 343 ever recorded—by comparison, 6-4-3, the next most common triple play, has only occurred 56 times).[67] This means that the 5-4-3 triple play is by far the most "canonical" in baseball, as is the consonant triad in music. In *Whirled Series*, one of the passages where Babbitt chooses to emphasize major and minor triads the most is mm. 94–110 (discussed above in connection with Example 16) which starts with partition 543 (the passage featuring the prominent E major, E♭ minor, F♯ minor, and A major triads). Thus, Babbitt apparently correlates the partitioning of the octave by ics 5, 4, and 3 to the partitioning of the aggregate into lyne part sizes 5, 4, and 3, as visualized in **Example 49**.

[4.2.2.5.4] The numbers 5, 4, and 3 in baseball are almost but not quite arbitrary designations for the infielding positions. These positions in some sense are privileged, outside the pitcher-catcher axis (positions 1 and 2) and of course much closer to the baserunning action than the outfielders (positions 7, 8, and 9). The three base positions 5, 4, and 3 are thus optimal for tagging players out. The 543 partitioning of the octave is in its own way optimal, using intermediately sized intervals to partition the octave *maximally evenly*, that is, just shy of complete evenness (444) which is paltry in terms of having only one interval class. In regard to partitioning the aggregate into lyne parts, the 543 partition has almost the greatest ordering flexibility of all three-lyne-part partitions (27,720 possible orderings). Thus, again, the intermediate-sized numbers 5, 4, 3 beget a kind of optimization.[68]

[4.2.2.5.5] Yet how might such rarified numerical considerations enter into thoughts about baseball, or vice versa? It is intriguing, but perhaps not totally surprising to notice the famous baseball fanfare "Charge," shown in Example 49 (c), is the one configuration of the major triad that articulates literally the intervals 5, 4, and 3, in that order. For instance, if, while composing with consonant triads and aggregate partitions, one heard the "charge" fanfare on television, such numerical associations as I described could easily come to mind. That is, one might notice that the full octave triadic interval circuit of the "charge" fanfare presents the triad's three interval classes in the same canonical ordering as is used for naming partitions and the scoring for the most common triple play, which involves the clockwise throw pattern, and this involves positions that are, for good reasons, often at the center of action in baseball and in music. As it happens, the "charge" fanfare was first heard in the NBC broadcasts of games 3, 4, and 5 of the 1959 World Series, which lasted six games.

C. Hyperblends

[4.3.1] The words of the title *Whirled Series* prompt us to read it as a conceptual blend. Based on this then, the multiple meanings of the title prompt us to hear—or be comfortable entertaining or switching between—multiple meanings (multiple contextualizations, multiple generative sources) for the sounds or configurations of events in this composition. That is, what applies to the words of the title applies as well to the pitches, chords, and melodic figures we hear in the music's surface.

[4.3.2] Since composing of the title is a creative act in itself and can so strongly influence our interpretation of the music, this, in turn, prompts us to interpret the artistic work *Whirled Series* as a blend of blends, that is, as a blend of multivalent title and multivalent music, both blended together to stand as one artistic statement. Meaning emerges from their blend.

[4.3.3] By employing titles that can so strongly influence our interpretation of the work, Babbitt is doing what certain surrealist painters had done, for instance Georgio de Chirico and René Magritte. An obvious example is Magritte's *Clairvoyance* (1936), **Image 1**. The title drastically alters our reading of the painting. Other examples are more subtle: Magritte's title *Violation (Attendat)* (1937) (**Image 2**) draws our attention to its violations of the syntax of signs and of the optical "grammar" of illumination from the sky suggested by misplacement of shadows. De Chirico's title *The Enigma of a Day* (1914) (**Image 3**) even more subtly subverts the Renaissance science of perspective, through vanishing points (of the right vs. left structures) at different heights in the distance (Rubin 1982, 58). As Magritte himself explains:

> The titles of pictures are not explanations and pictures are not illustrations of titles.
> The relationship between title and picture is poetic, that is, it only catches some of the
> object's characteristics of which we are usually unconscious, but which we sometimes
> intuit, when extraordinary events take place which logic has not yet managed to
> elucidate. (Magritte 2016, 112)

Thus, for Babbitt, his double entendre titles act as enigmatic keys that playfully unlock meaning in
the music, meaning that would be absent if a generic title were given. The titles are conceptual
blends that then prompt conceptual blends in and of the music, which together prompt the title
and the music to blend with each other to form a hyperblend (blend of blends).

[4.3.4] The parallel multiple meanings of other Babbitt titles if anything add weight or resonance to
the parallel (verbal and musical) double entendres of *Whirled Series.* It is a blend of blends, a
hyperblend. To see how, consider this: like some of Babbitt's other titles (*My Complements to Roger,
Phonemena, Dual, Fourplay*), his title *Whirled Series* involves a *homophone* (a word whose sound is
shared with a completely different word)—*complement* versus *compliment*, *phoneme* versus
phenom(ena), *dual* versus *duel*, *four* versus *fore*, and *whirled* versus *world*.[69] In each case the same
sound has two semantic referents, each accessed through a different spelling and other adjacent
words, as diagrammed in **Example 50** (a). As discussed earlier in this essay, in *Whirled Series* (and
other Babbitt superarray works) the analogous is true of some musical events: A particular pitch,
chord, or melodic figure can enjoy two (or more) contextual musical meanings, through different
musical systems, as diagrammed in Example 50 (b). Specifically, many of the pitches, chords, and
melodic figures of *Whirled Series* can be taken as a conceptual blend of 12-tone serialism and
tonality (*portmantonality*). The analogy is brought out through the pairing of the title with the
music.

[4.3.5] This pairing of verbal multivalence with musical multivalence prompts the hyperblend,
enabled as it were by the mirrored (analogous) multivalence which constitutes the generic space of
the CIN, shown in **Example 51**. One input space is the *double-entendre* title, which itself consists of
two input spaces, for the two meanings of the homophone *whurld*, one (*world series*) pertaining to
baseball and the other (*whirled, whirling*) pertaining to a swirling motion of tones. Then there is the
musical blend diagrammed on the right with two input spaces: the 12-tone serial derived meaning
of the tones on the one hand and the impression of tonal meaning on the other (*portmantonality*). As
explained above, these two input spaces are each multifaceted and multiply interconnected. For
instance, baseball involves whirling motions in space (around the bases) and time (the indefinitely
recurring cycles that structure the game); the latter points to a parallel indefinitely recurring
whirling of time in Babbitt's time-point system. Within the music of *Whirled Series* the fluctuations
of *pitch permeation* (which synthetically associate with the sound of tonal prolongation) also reveal
the inherent structural varieties (and varieties of indeterminacy) inherent to 12-tone all-partition
arrays. Order permutation *whirling* of major and minor triads both articulates and is articulated by
bulging waves of *pitch permeation*. Triads are row segments and vice versa, and tonally euphonious
octave doublings sometimes articulate these row forms.

D. Portmantonality as constructive evasion

[4.4.1] As I have tried to demonstrate through a number of music-analytical approaches and
through conceptual blend modelling, I do agree with Maggart's suggestion that the multivalency of
Babbitt's titles and music can be taken as historically aware self-conscious philosophic-poetic
assertions. The diverse assortment of tonal features in some of his late-period compositions, which
I have shown, underscores the "authority of Babbitt's idiom," as Maggart explains:

> not . . . by subverting a past musical idiom, but rather by making manifest the power
> of the serial idiom to encompass any and all musical styles. It thereby also forces a
> radical revision in how one perceives music of the past: is it possible to hear music of
> the past as having emerged from an as-of-yet-unperceived substructure of serial
> relations? Such a feat is a feature of the artworks by those Harold Bloom deems
> "strong poets:" poets who can "achieve a style that captures and oddly retains priority
> of their precursors, so that the tyranny of time almost is overturned, and one can

believe, for startled moments, that they are being *imitated by their ancestors*." In contrast to conventional understanding, Babbitt's style can thus be viewed not as the pinnacle of complexity, but rather as a style that seeks transparency, that sheds the semantic in order to reveal the syntactic poetic sublime at the basis of all music. (2017, 181)

For instance, the appropriately generous interpretation of Babbitt's ([1960] 2003, 67) claim that "twelve-tone system cedes nothing to any musical system of the past or present" is that by expanding the scope and flexibility of the 12-tone system as he did (through the flexibilities of all-partition arrays, superarrays, time-points, and so forth), ultimately he could forge many important features of tonal music from *within* his system, so that the sonic details one hears actually partake of both (serial and tonal) systems simultaneously. Thus, he cleverly plays his own system like an instrument. I can imagine Babbitt witnessing the polemics of Neo-romantics and minimalists against serialism in the 1970s and '80s and chuckling to himself at the irony that he can render euphonious octaves, triads, and flirtations with tonality—and as much repetition as he wants—within his 12-tone all-partition based compositions. I suppose it is possible that he wished to avoid being pigeonholed or grouped with the aggressive futurism that characterizes ultra-modernists such as Varèse, whose music is more piercingly dissonant and steadfastly anti-tonal. Babbitt wanted his own compositions to engage with music of the past and to be a part of forging the musical future, but he wished his music not to be reduced (in history or by historians) to any particular historical moment or movement. After, earlier in his career, being (mostly unfairly) associated with a heavy-handed rhetoric, Babbitt then reacts with an insightful gentle touch rather than with the monumental force one comes to expect from daring 20th century composers. Asserting his playful titles and witty music together is perhaps his non-coercive way of nudging the reception of his music in the right direction yet without compromising his ideals.

V. Conclusion: Exemplifying an inclusive expansive creative mindset

A. Reflecting on an expanded approach to Babbitt's music

[5.1.1] It should be clear from the foregoing that Babbitt the theorist, writer, and speaker did not and does not determine the analysis and interpretation of the music of Babbitt the composer, not just because of the inevitable blind spots we all have, but also because he wouldn't expect it to be otherwise.

[5.1.2] There was a lot Babbitt did not know, and he was aware of it, which is why in interviews he often defers to his interviewer or questioner, dares not speak about fields (painting, architecture, etc.) outside his expertise, and moreover is wryly self-deprecating, often to hilarious effect. Yet also, despite being a virtuoso talker, and trailblazing theorist, Babbitt, like all great composers—even those such as Rameau and Schoenberg who were also theorists—knew a lot intuitively that he never could articulate verbally. In other words, there are valuable lessons we can draw from Babbitt's music and poetics (taken together) that he never implied directly in his prose writing or talking. Some of these, I suspect, were insights that he gained *after* he ceased being active as a theorist. For instance, *portmantonality* is not noticeably a feature of his music before 1980. Also, some of what I have pointed out regarding connections between his music and his titles relies on the expanded areas of music theory (such as metaphor theory) that blossomed well after Babbitt stopped holding sway as an active theorist. In some sense, it is by freeing ourselves from the narrower grip of Babbitt's verbally articulated thought that we gain the opportunity to learn the most from the inspiring wisdom embedded in his compositional-poetic creativity.[(70)]

[5.1.3] Such a development was forecasted by Fred Maus, in liner notes to a CD of Babbitt's late-period piano music:

> No doubt the apparent integration of Babbitt's theoretical and compositional work helped him to become as famous as he is. But now, admiration for his music can motivate an opposite impulse, a desire to distinguish the various strands of his achievements and evaluate them separately. When Babbitt's ideas have come to seem so problematic, it may be easier than before to approach his music in terms different from his own. (1997, 6)

This indeed is what I have tried to do in this article. After the introduction, which surveyed the context of Babbitt scholarship and staked out the topics to be covered, Part II delved into the freedom and agency entailed by the 12-tone structures Babbitt employed in composition, that is, the *indeterminacy* of these structures, which is not a perspective or even a topic that Babbitt directly addressed in his prose utterances. This emphasis departs from Babbitt's own priorities as a theorist. Part II also demonstrated types of 12-tone aggregate deployment (as linear scales, tertian chords, and popular song quotes) that he never demonstrated in his own writings, but whose truth of possibility he could not deny. Part III explored several other areas that Babbitt's theorizing never touched: (a) the formation of tonal chords and cadences within dodecaphonic music; (b) the acknowledgment, formal definition, and quantification of an emergent form-functional quality (*pitch permeation*); (c) chordal reduction of 12-tone-array based music; (d) the strategic comparison-motivated recomposition of 12-tone-array based music; (e) Schenkerian graphing of tonal passages of, and recognition of tonal voice exchange and voice leading within, dodecaphonic music; (f) application of cognitive metaphor and conceptual integration networks to music; (g) the acknowledgment of "ragging"; and (h) the overall concept of *portmantonality,* which uses conceptual integration network (CIN) modeling to tie the previous elements together. Some of the analytical approaches applied above are either ones I developed myself, quite independent from, or in some ways almost in defiance of, Babbitt's own theories. Other approaches I applied are ones that developed or entered into the field of music theory well after the time Babbitt exerted any significant direct influence on it. Part IV dealt with the idea of poetics, that is, an aesthetic-philosophical impetus or steering motivation for creative output. In terms of verbal discourse about music, such a consideration would certainly be the most remote from anything Babbitt engaged in. The point here is that Babbitt's compositions (their sounds and titles taken together) suggest how music and language reflect each other in the respect that their meanings, rather than being fixed, determined, or determinable, are instead highly context dependent, flexible, adaptable.

[5.1.4] Though he never verbally touted flexibility or adaptability, I believe these traits can be read into some of his own overlooked activities and those of the composers and other creative artists he influenced. The remainder of this conclusion therefore considers Babbitt's interaction with music different from his own, then, at length, the diverse creative activities of some of his protégés, before finally probing the possible underlying connections between Babbitt's own *portmantonality* (or more generally his poetics of double entendre) and the flexibility or adaptability that empowers those who can learn from his compositions and teaching.

B. Adaptability of thought in Babbitt's views of other music

[5.2.1] Although Babbitt was singular in his steadfast dedication to dodecaphony in his own compositions, his flexibility of thought is nevertheless suggested in some of the ways he related to music different from his own. He, born in 1916, was, in a 2001 interview, one of the first eminent classical composers to recognize rap, hip-hop, and sampling as "serious music."[71] A half a century earlier, his liner notes for Miriam Gideon's *Fantasy on a Javanese Motive* on a 1950 LP record of cello and piano music (by Henry Cowell, Ben Weber, and others) demonstrate intriguing insight into a creative initiative completely foreign from his own, namely a relatively early example of intercultural music by an American composer. He describes several subtle features one can actually hear:

> The construction of an accentually complex rhythmic totality, not by the interrelationship of essentially simple rhythmic elements, but by the endowing of a single rhythmical component with a complex accentual structure, interacting with metrical asymmetry and accentual intervallic dissonance. The use of the piano ostinato to secure an apparent staticity, not only through slight, but effective alteration, but through the cello's melodic line, which imparts changing harmonic implications to the harmonically ambiguous ostinato figure. (1950)

Babbitt also of course makes intriguing comparisons between Ben Weber's and George Perle's works, both in his twelve-tone wheelhouse.

C. The Diverse Creativity that Babbitt inspired

[5.3.0.1] From his prose writings, it would be easy to gain the misapprehension that Babbitt was somehow a purist such that we ought to compartmentalize his 12-tone serial music. Yet the eclecticism of his students, especially their involvement with musical theatre (opera, Broadway, and film), his self-effacing humor, his interest in jazz, and his exploratory spirit suggest that such compartmentalization is exaggerated and unnecessarily limiting. Unlike many other composition teachers, Babbitt was not one to teach his own style, or cultivate disciples. In light of what I have suggested above about the importance of multiple meanings (tonal, serial, and verbal) in his work, it is plausible that such flexibility of thought contributed to his ability to mentor, foster, nourish such a diversity of creative people, contributing to their ability to fulfill the artistic ambitions of their own identities, quite beyond and independent from Babbitt's own artistic predilections.

1. Diverse compositional creativity

[5.3.1.1] A great example is Babbitt's pupil Stephen Sondheim, one of the most renowned composers of Broadway musicals, who was granted the presidential medal of freedom by Barack Obama in 2015.[72] Although Babbitt in his youth was immersed in composing and arranging pop songs, and later (in the 1940s) briefly dabbled in the genre, the more Tin-Pan-Alley-leaning style of his own theatrical songs doesn't seem to have constrained Sondheim from blossoming into the striking originality for which he's become famous.[73] "Babbitt changed my life. . . . He taught me what music was all about" (Hilferty and Karpman 2011). "The revelation in studying with Babbitt was learning that the way to the heart was through the head" (Swed 2011). Sondheim explains that he wanted to study theory and composition (not musicology) but towards the goal of writing musical theatre, and that, at that time, Milton Babbitt was, perhaps uniquely, the teacher who could "spend the first hour analyzing Rogers and Hart, or Gershwin, or his favorites De Sylva, Brown, and Henderson (the people who wrote 'The Birth of the Blues') . . . and then we would go on to [Mozart's] *Jupiter* Symphony, and, [apply] the *same principles exactly*." Babbitt is conceiving of, and teaching, music compositional principles pan-stylistically—that is, in such a way that crosses between distinct styles and between popular and classical music. In particular, Sondheim enthuses over Babbitt's analysis of Kern's "All the Things You Are," whose descending fifths chord progression breaks with a tritone "that defines the key it's coming from and the key you're going to," an analysis that Sondheim "recreated" when he taught at Oxford University in 1990 (Sondheim and Bermel 2012). Sondheim explains that "most of [his famous Broadway musical] *Sweeney Todd* is based on two motifs, and working that stuff out is a direct result of Milton's teaching" (Hilferty and Karpman 2011, 21:20–21:32).

[5.3.1.2] Another example is Charles Wuorinen.[74] Wuorinen's mature style, exemplified in his 2012 opera *Brokeback Mountain* (libretto by the original author Annie Proulx), evokes very little of the sound of Babbitt's music; nevertheless Wuorinen has repeatedly insisted that Babbitt (along with Stravinsky and Wolpe) was his most important influence. (Wuorinen has both written about and used Babbitt's *time-point system*, although he uses it in quite a different way from Babbitt.) A related example is former Babbitt pupil Tobias Picker. Though heralded primarily for his sweeping neoromantic opera style, such as his 1996 *Emmeline* (which again bears little superficial resemblance to Babbitt's style) Picker might also be known for his neurocognitive disability having been studied by the renowned neurologist Oliver Sacks (2007, 99).[75] Picker's upcoming *Awakenings,* with a libretto by Picker's partner Aryeh Lev Stollman, based on Sack's book of the same title, chronicles Sacks's treatment of patients disabled by an encephalitis lethargica epidemic.

[5.3.1.3] Another Babbitt student, the Grammy award-winning and four-time Emmy award-winning Laura Karpman,[76] has lent her versatile expertise to several intriguing projects of urgent social significance. Paramount is Karpman's *Ask Your Mama* (2009),[77] an innovative multimedia setting of Langston Hughes, involving the legendary Jessye Norman, Questlove and the Roots, and a full symphony orchestra and choir. What attracted Karpman to Hughes's little-known 1961 epic poem "was not only that it was written by Langston Hughes, who [she] think[s] is one of the most brilliant poets who ever lived," but also because it presented a specific puzzle, which is that "in the right-hand margins of the poem, Langston says [describes] exactly how the music should sound," but did not provide a score. Hughes's descriptions call for "gospel cha-cha," "old-time traditional 12-bar blues," Latin music, and German lieder. "All of this is indicated in the margins of the poem.

And all of this Laura has been able to bring to this piece," said Jessye Norman. Such a challenge might have seemed daunting to any composer, but not so for the former student of the man who composed vocal works such as the tragic *Philomel,* the scat-infused *Phonemena,* as well as Broadway-style musical theatre songs. Karpman's score has musicians using keyboards to trigger samples on laptops—for instance, a sample of Cab Calloway doing *St. James Infirmary Blues.* Karpman also found and digitized an old recording of Hughes reading his poem. Throughout *Ask Your Mama,* Karpman interweaves these samples of Hughes's vocalization into her musical score along with the live singing (sometimes one directly echoing the other), a technique reminiscent of what Babbitt does with recordings of Bethany Beardslee's voice throughout his *Philomel.* [78] Karpman's score also includes bebop and hip-hop, African-American spirituals, various other vernacular styles, along with quotes of Schubert and allusions to the symphonic styles of Ravel and Prokofiev, the theatrical music of Leonard Bernstein, and the commercial film/television music of Lalo Shifrin. Karpman's more recent projects include *Project Spark,* a video game that, contrarily, promotes creative worldmaking, and the Steven Spielberg six-part documentary series *Why We Hate* (2019), about tribalism and humans overcoming ("unlearning") their natural antipathies.

2. Creativity beyond music composition

[5.3.2.1] Evidence of Babbitt's influence reaching yet farther out can be found in the work of writer-filmmaker Robert Hilferty, who had once studied music composition with Babbitt. Throughout his 2011 documentary film *Babbitt: Portrait of a Serial Composer* (a version of which was completed and produced by Laura Karpman), Hilferty's virtuoso repurposing of pre-existing film clips from musical comedies and dramas of the black-and-white era of cinema is often witty, sometimes hilarious, but always projects a double meaning: the meaning suggested by the clip's original context (mostly inferable even as excerpted) *and* the meaning (now somehow related to Babbitt) that emerges through its contextual connection to Hilferty's often ironical affected voice-over narration or the clips that precede or follow it in the documentary.[79] In his voiceover line "I began to accept the fact that I had deviant ear, a queer ear, an ear for eerie music" Hilferty even finds a way to channel an expression of his own gay identity into an expression of his admiration for Babbitt's habitual wordplay.[80]

[5.3.2.2] With a different tone, one of the documentary's most memorable sequences (filmed in front of Tower Records on Manhattan's Upper West Side) expresses a synthesis of Hilferty and Babbitt. Hilferty became known two decades earlier for his 1990 documentary *Stop the Church*, which featured hand-held video footage he shot from inside St. Patrick's Cathedral during ACT UP's December 1989 surprise sit-in demonstration protesting the Roman Catholic Church's apparently apathetic stance toward the AIDS epidemic.[81] Thus, in making his Babbitt documentary, Hilferty applies again his own guerilla style filming, this time to bring into focus an underappreciated facet of Babbitt's personality that seems to have blossomed in the 1980s and '90s: his sometimes lighthearted self-effacing verbal style. For instance, in a 1984 public interview, Babbitt recounts how one of his older colleagues in the 1930s encouragingly and sincerely wished him "good luck" in pursuing his "Schoenbergian tendencies," to which Babbitt remarks "he was wrong: [I] didn't have it"[82] In answer to Hilferty's query about being methodical in composing, Babbitt gently counters: "No, no. I'm a very sloppy guy; you've seen how I live" (Hilferty 2011, 21:35–40). In a 1984 public interview Babbitt says "and we are going to have questions; in fact we expect to be interrupted anytime I catch my breath [catches breath, the audience breaks out into laughter], but uh . . ." (Amirkhanian and Babbitt 1984). When introducing his *Vision and Prayer* at the 1987 Bang On A Can ("downtown") music festival, held on East 4th St in Manhattan, he joked "sorry I got here late, but I got lost—I've never been this far downtown before" (Robin 2016). In the 1984 interview, in answering whether he knew Hindemith, Babbitt hesitates, interrupting himself before he continues: "Paul Hindemith I found a very difficult man. Uh, I'm going to be totally candid, and, if this is going to be taped, then, well, you know—after all how much longer do I have to live," which again prompts laughter from the audience. Babbitt apparently had become quite comfortable drawing laughs by poking fun at himself.

[5.3.2.3] Thus, by proxy, almost as an extension of Babbitt's own light-hearted self-effacement, Hilferty makes light of Babbitt's obscurity within popular culture by applying his own guerrilla

style filmmaking to do something preposterous: confronting random strangers as they exit Tower Records to ask if they have heard of the music of Milton Babbitt. The candid responses caught on film—such as "No . . . I probably don't listen to enough radio," "Does he have an agent?" and "Is he signed? Is he even a signed artist?"— are of course amusing in their spontaneity, as each respondent apparently tries to determine why he or she is being asked out of blue what seems like an extraordinarily odd question.

[5.3.2.4] This Tower Records sequence within Hilferty's film has a double meaning, or serves a dual purpose: first of all it is entertaining and comical. Yet secondly, for those who know Babbitt's infamous essay "Composer as Specialist" (Babbitt 2003), this sequence also suggests that whereas some others might regard the relative obscurity of Babbitt's music as epically problematic, the filmmaker clearly does not; but on the contrary, revealing for all to witness the relative obscurity of his filmic subject, he embraces the situation as merely an acceptable fact, and shows how amusingly, and unthreateningly that fact plays out in real-life situations outside academia.

[5.3.2.5] In their responses, it is evident that the various interviewees confronted outside Tower Records each makes different misplaced assumptions about why they are being asked about music of someone they have never heard of, which brings into focus different aspects of musical popularity that Babbitt's music, by its very nature, seems to utterly evade on purpose and with purpose. Not only is Hilferty's Tower Records sequence a filmic (cinematic) echo of the older Babbitt's wry self-effacement, but it is also an audio-visual documentation of the ramifications Babbitt's decades-earlier composer-as-specialist thesis. It emits a humorous ironic tone not far from Babbitt's own. Like Babbitt himself, it is self-effacingly humorous and seriously thought-provoking at the same time.

[5.3.2.6] My final example of the versatility of Babbitt's influence is Stanley Jordan (who was quoted above), one of the most innovative guitarists and jazz improvisers of all time. A Grammy nominated artist who collaborated with Dizzy Gillespie and Benny Carter, Jordan became known in the 1980s for developing an unusual playing technique whereby he comps chords on one part of the fretboard by tapping with his left-hand fingers, while improvising melody by tapping on another part of the fretboard with his right-hand fingers. As Judith Wyatt (1985) explains, "Jordan taps the strings of his electric guitar with both hands, thus avoiding the limitations of the traditionally anchored right-hand-strum, left-hand-chords set-up." Jordan had developed this before studying at Princeton where he "shared his investigations into jazz with Babbitt." Nevertheless, as compared to traditional guitar playing, in which only a single hand prescribes pitches on the fretboard, Jordan's innovation jibes with what has been shown above regarding Babbitt's music, as Jordan's technique brings a double meaning to the guitar fretboard, in that it serves as a pitch resource for two hands simultaneously, thus doubling the usual tactile-sonic referentiality of the instrument.

[5.3.2.7] Jordan explains that, for him, Babbitt "created a map . . . a sort of music of the future," which paralleled what he wanted for improvisation: "to create an inventory of what's musically possible, and that way I [Jordan] could organize my learning around that, [so] when I got to play, I can draw from that freely according to the needs of the moment" (Hilferty n.d., unpublished transcript of an interview with Stanley Jordan). Jordan also states: "Many of Babbitt's ideas have relevance to jazz, to which I can attest from having spent many years exploring that connection" (Jordan 2019). Jordan had already developed his own *Jordan Chromatic System* before having met Babbitt, but Babbitt "with his knowledge of jazz . . . could clearly see what I was trying to accomplish and why my approach took some unique turns. . . . [H]e cautioned . . . that because this was my [Jordan's] own system . . . I should not be afraid to do things in my own way."[(83)]

[5.3.2.8] Upon Babbitt's passing in 2011, Jordan went a step beyond his already innovative guitar playing, by illustrating a relatively unknown resource in jazz improvisation: Babbitt's type-E all-combinatorial hexachord [014589], also known as the hexatonic scale, or, as Jordan calls it, the *augmented scale*. Jordan illustrates this in his improvised work *One for Milton* on his album *Friends*. Jordan's *One for Milton* is a completely improvised trio consisting of Jordan, along with drummer Kenwood Dennard and another guitarist Russell Malone. [(84)] As Jordan (2019) explains, "I chose Russell for this format in part because of his skill and affinity with improvising symmetrical

melodic structures. The most extensive use of the augmented scale occurs within the first 20 seconds or so of the track. Russell Malone and I made use of its inherent symmetry as well as its tonal 'slipperiness'—or resistance to being easily heard referentially from a root pitch class."

[5.3.2.9] **Example 52** shows my own transcription of *One for Milton's* most relevant parts. As Jordan's own remarks suggest, symmetrical scales, such as hexatonic and octatonic (also used in *One for Milton*), can be exploited for their "tonal slipperiness": a pitch configuration (for instance, a triadic one) can evoke tonalities while simultaneously possessing tonality-independent forces of coherence, which keep it from collapsing completely into the forces of tonal attraction.[85] Such "double meaning" triads are well-known in the octatonic music of Stravinsky and Messiaen and the use of the octatonic (or "diminished") scale to improvise over dominant V7 chords in jazz is common practice. What is different here is, first of all, emphasis on the hexatonic ("augmented") scale, rather than the octatonic scale, and avoidance of consonant triads. Nevertheless, Jordan and Malone's improvisation begins by vaguely suggesting a G♭ major 7th harmony of ambiguous major-minor quality, which is in some ways reminiscent of some of the tonal ambiguities heard in *Whirled Series*. Like *Whirled Series*, Jordan's *One for Milton* exploits the flexibilities of the type-E all-combinatorial hexachord, and related sonorities, to engage a listener's feeling for various tonal attractions, while buoyantly floating free from being pulled completely into the orbit of any one of them. Although engaging a listener's tonal sense in this ambiguous way does not define *portmantonality* intrinsically, it nevertheless seems to be an inevitably lurking facet of it, as the 12-tone aggregate basis of its serial grammar will always eventually prompt multiple competing vectors of tonal attraction. This also exemplifies how *portmantonality* is not retrogressive in the least, but rather is progressive and adventurous, as it doesn't merely collapse into any previously existing kind of tonality, but rather finds new possibility, and thereby constitutes a new kind of tonality.

[5.3.2.10] There is yet an additional sense of double meaning I find in Jordan's *One for Milton*. And it is a testament to the value of the so-called "formalized" thinking that Babbitt has played such a pivotal role in promoting in the field of music theory, or in music discourse in general. Example 52 annotates my transcription, not only with hexachord labels, but also with examples of repertoire that selected pitch configurations evoke: Liszt's *Faust Symphony* and Schoenberg's Op. 16, no. 1, for instance. Despite the similarity of pitch configurations, the occurrence of these in Jordan's improvisation sounds almost nothing like Liszt or Schoenberg. The affect is utterly different; rather than gloomy, expressionist, or ironic, Jordan's improvisation brings an electrifying bright spontaneous energy to the same pitch configurations. Although it might be tempting to associate certain pitch configurations with specific styles and affects[86], Jordan's deployment of the type-E all-combinatorial hexachord (the hexatonic or augmented scale) reveals a second affective meaning not forecasted by Liszt's, Schoenberg's, or Babbitt's use of the same. So here we find again that, in Babbitt's formalistic approach, Jordan could find resonance with his own quite distinct creative ambitions. That is, because of abstract formalization, Jordan is able to adapt some of Babbitt's thinking to extend and perfect his own individualistic expression.[87]

D. Interpreting adaptability, flexibility, and inspiration

1. Flexibility and Instrumentality of formalism

[5.4.1.1] One underlying theme lurking here is perhaps formalism (or mathematical formalism), because Babbitt the theorist is known for having formalized important aspects of the 12-tone system. Yet its connection to creative adaptability or flexibility is unobvious. There has been a tendency, especially of late, to indict so-called "formalism" in music discourse as depleting meaning from music. And if Babbitt is taken to represent such formalism, his musical compositions might be taken as the ultimate creative assertion of such meaninglessness.[88] I believe the analyses and contexts of Babbitt presented above suggest exactly the opposite. Actually, as I have already shown (Mailman 2016, 2018), and, prior to that, the writings of Babbitt's own protégé David Lewin (1986, 1987, 1995) have also already shown, on the contrary, formalisms, once mastered, can serve as tools or instruments of interpretive (or creative) expression; they can be instrumental to the proliferation of meaning—that is, the creation of multiple meanings, which prompt us to keep

aspiring to think openly and flexibly about music, about music theory, and other matters of significance (or amusement). On this view, what "shedding the semantic"[89] really does is open the possibility of multiple semantic directions, or avenues, corresponding to diverse artistic and personal identities, which each seek to develop meaning on their own. This is what we witness in the diverse artistic identities of Babbitt's protégés.

[5.4.1.2] Yet, although formalism can serve as an instrument of flexibility, it is not itself an impetus. It fails to explain the strange incongruity of tonal features being infused into music so elaborately systematized in terms of dodecaphony, which originated as an organizing force for composing in avoidance of tonality. It certainly fails to motivate the use of puns as titles, even if it does clarify how to forge and analyze parallelisms between verbal and musical double entendres.

2. Convergent Evolution or Affordances?

[5.4.2.1] Convergent evolution is one way to reconcile the seeming incongruities, in which case Babbitt's titular verbal puns merely project a recognition of this. Fish and dolphins have fins, a similar body shape, and live under water; insects, birds, and bats all have wings and fly; but these animals evolved separately, a case of convergent evolution. The fact that *pitch permeation* can emerge as a form-bearing (form-functional) feature in 12-tone superarray music *and* in common practice tonal music, and the fact that consonant triads, cadential gestures, and entire veiled tonal phrases, can arise noticeably in both, might be regarded similarly as a case of convergent evolution, involving two mutually independent musical systems.

[5.4.2.2] Yet the convergent evolution view is unsatisfactory for two reasons. The general idea of events in Babbitt's compositions simultaneously having multiple references (at least in terms of internal motivic connections) seems to go all the way back to his trichordal array works of the 1940s and '50s, predating by several decades the emergence of *portmantonality* in his late-period superrarray works. And so does his habit of using puns as titles. The other reason is that this convergent evolution view would attribute a passive role to Babbitt. The components of *portmantonality* in his music would thereby be viewed as inevitabilities, which would preclude their being a manifestation of his poetics.

[5.4.2.3] Instead, I would prefer to contemplate *portmantonality* (and double entendre more generally) in terms of the ecological psychology theory of James Gibson (1966, 1975, 1979). Gibson's theory of *affordances* states that objects of our environment are perceived in terms of their potential use in our own actions, that is, what is afforded to a person engaged with an object. An *affordance* is an *action possibility*.[90] In Babbitt's case, the environment is the 12-tone system, or perhaps more specifically an all-partition superarray he uses as the basis for a specific composition. Or perhaps more generally it is the entire field of music.

[5.4.2.4] The partial orderings of all-partition arrays and superarrays *afford* salient fluctuations of pitch permeations and so many other kinds of allusions to tonal music: they *afford* portmantonality. From this perspective it should become clear that portmantonality is not a system, but rather arises as a bricolage of affordances.[91] Portmantonality arises from the exploitation of opportunities, and in this sense exemplifies an improvisational spirit, which I have previously discussed in connection with Babbitt's music (Mailman 2019). If one is prone to associate Babbitt primarily with systematics, this (a bricolage of affordances) might be far from one's mind. Yet it should come to mind when thinking of creativity; and Babbitt was active as a musical creator for over eighty years (ranging from vernacular songs, to film scoring, to avant garde classical music for acoustic instruments, voice, and electronic sound), which was thus a dominant and diverse activity in his 94-year lifespan, more so than writing music theory.

[5.4.2.5] What is even more directly clear is that puns and other double entendres are perhaps best understood as affordances of language[92]—they certainly are not the primary purpose of language. The English language *affords* the formation of puns insofar as it has words of different meaning but which have the same or similar sound. One can exploit these affordances in so far as one is aware of, and has mastered, the difference and sameness of the phonemic and semantic dimensions of the language's words. Puns are *action possibilities* of words. Thus, the ability to form

puns and other double entendres entails a certain kind of, and level of, detached awareness of varieties of sameness and difference. This is its own particular kind of knowledge of one's environment or system. It is in this respect that, without them being language's primary purpose, Redfern can write that "puns illuminate the nature of language in general" (1984, 9). Puns reveal some of a language's affordances.

3. Interpenetrable meaning and pushing the horizon of possibility

[5.4.3.1] Tonality and serialism are in some sense two different musical systems or languages. To realize the affordances of one musical system (or language) regarding how to reference utterances of another musical system (or language) is to advance one's knowledge of both, by illuminating both. Through such dual illumination, our knowledge becomes operational; it takes the form of a self-conscious adaptable skill, an action potential. In so far as it is self-conscious, it can be taught and learned by others.

[5.4.3.2] A difference between knowledge of affordances and other kinds of knowledge is that affordance puts the emphasis on what one can do with something (what we can create with it, what are its possibilities) as opposed to what it is already, what its essence is, and what its limitations are. Knowledge of affordances is knowledge that eschews ideology in favor of adaptability.

[5.4.3.3] Portmantonality and verbal double entendres are mere examples of a certain flexibility of outlook. From Maggart's (2017) assertion that Babbitt believed understanding music leads to an understanding of a great many things, this implies that puns expressed through music illuminate the nature of much else besides music. More broadly, the nature of tonality-associated phenomena (such as triads, voice-exchanges, pitch permeation) is also illuminated through musical punning. Thus, our understanding of tonality is broadened through this.

[5.4.3.4] For instance, it is a mysterious *affordance* of the 12-EDO (equally divided octave) system that consonant triads (which are a quasi-acoustical basis of tonality) and related tertian harmonies figure so prominently as trichordal segments in the 12-tone row that forms the basis of the only known (discovered) four-lyne all-partition array (the array that underpins *Whirled Series* and many other late-period Babbitt works). This fact sheds light into a mysterious corner of the 12-EDO system. More concretely, the world of dodecaphony is illuminated. The set of possible ordered arrangements of notes that are compatible with a particular partial ordering are indeed *affordances* of that partial ordering.[93] So on the contextual level, the specific instances of portmantonality that can be forged from an all-partition array (or superarray) are *affordances* of that array (or superarray). One musical system is invoked by playing with the affordances of another. It could be read as a cautionary allegory for how features of one political system (authoritarianism for instance) could be constituted through the affordances of another political system (democracy for instance).

[5.4.3.5] More optimistically, the fact that the partial orderings of all-partition arrays and superarrays *afford* salient fluctuations of pitch permeation and so many other kinds of allusions to tonal music (that they *afford* portmantonality) suggests how Babbitt's compositional practices reach beyond necessity toward possibility. Previously unknown affordances of both tonality and serialism are drawn out through the process of referencing one through the other. If Schoenberg emancipated dissonance, perhaps Babbitt, in *Whirled Series* (and similar works), has emancipated the consonant triad, tertian harmonies, and the entire aggregate of 12 tones. Thereby, he may have emancipated our expectations of how tonality and serialism can mutually relate. This suggests we ought not be limited by our habitual associations, but rather should habituate ourselves to keep seeking more meanings. "Hermeneutic density" (a "tension between two mental spaces") is then perhaps a sign of such a process taking place.[94]

[5.4.3.6] There's also a declaration of self-definition. To demonstrate double entendres musically is a noncoercive way to avoid being defined by the limitations of others. It does this by setting a model for reaching toward possibility, that is, by pursuing and cultivating new affordances of systems whose meanings were previously thought to be already known. Thus, Babbitt's music

exemplifies the optimism of human creative capability: whatever categories you think define our world (in the musical instance: tonality vs. serialism), our minds can and will create that which transcends them. In this respect it represents an ideal that is infinitely inclusive.

[5.4.3.7] Through Babbitt's music, we glimpse the irreducible power of musical meaning, which his words could never assert. Babbitt nudging the reception of his music in the right direction without compromising his ideals would, on its own, be an impressive feat, but it also suggests how music in some ways propositionally surpasses verbal language, and in that respect cannot be reduced to verbal meaning. The insights into music that Babbitt developed over his lifetime are quite unusual, and so only obliquely conveyed verbally. Thus, his compositions have yet more to say beyond his theories. There is a lot more for all of us to learn from Babbitt, about the openness of musical possibility, if we listen more openly to what he says through his music.

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Works Cited

Adler, David. 2016. "Stanley Jordan: 'My Spirit Transcends Gender.'" *Jazz Times.* January 21. https://jazztimes.com/features/interviews/stanley-jordan-my-spirit-transcends-gender/

Amirkhanian, Charles, and Milton Babbitt. 1984. Public interview. *KPFA-FM.* http://miruidoblanco.blogspot.com/1984/

Babbitt, Milton. 1950. Liner notes to Seymour Barab and William Masselos, *A Recital of New Music for Cello and Piano.* Paradox 10001.

——————. [1958] 2003. "The Composer as Specialist." In *The Collected Essays of Milton Babbitt*, eds. Stephen Dembski, Andrew Mead, and Joseph N. Straus, 48–54. Princeton University Press. Originally published in 1958 as "Who Cares If You Listen?" *High Fidelity* 8 (2): 38–40.

——————. [1960] 2003. "Twelve-Tone Invariants as Compositional Determinants." Reprinted in *The Collected Essays of Milton Babbitt*, ed. Stephen Peles with Stephen Dembski, Andrew Mead, and Joseph N. Straus, 55–69. Princeton: Princeton University Press.

——————. 1987. "Stravinsky's Verticals and Schoenberg's Diagonals: A Twist of Fate." In *Stravinsky Retrospectives*, eds. Ethan Haimo and Paul Johnson, 15–35. University of Nebraska Press.

Ballard, Kim. 2016. "Prose and Verse in Shakespeare's Plays." *Discovering Literature: Shakespeare & Renaissance*. The British Library. https://www.bl.uk/shakespeare/articles/prose-and-verse-in-shakespeares-plays

Bergson, Henri. 1911. *Creative Evolution*. Translated by Arthur Mitchell. Random House.

Bernstein, Zachary. 2015. "Reconsidering Organicism in Milton Babbitt's Music and Thought." PhD diss., The City University of New York.

——————. 2017. "The Problem of Completeness in Milton Babbitt's Music and Thought." *Music Theory Spectrum* 38 (2): 241–64.

Boretz, Benjamin. 2006. "'Where Have We Met Before?' For a 90th Birthday Celebration of Milton Babbitt." *Perspectives of New Music* 4 (2): 6–12.

Brandt, Per Aage. 2006. "Form and Meaning in Art." In *The Artful mind: Cognitive Science and the Riddle of Human Creativity*, ed. Mark Turner, 171–88. Oxford University Press.

Caplin, William E. 2009. "What are Formal Functions?" In *Musical Form, Forms, & Formenlehre: Three Methodological Reflections*, ed. Pieter Bergé, 21–40. Leuven University Press.

Cohn, Richard. 2011. *Audacious Euphony: Chromatic Harmony and the Triad's Second Nature.* Oxford University Press.

Cohn, Richard, and Douglas Dempster. 1992. "Hierarchical Unity, Plural Unities: Toward a Reconciliation." In *Disciplining Music*, eds. Katherine Bergeron and Philip Bohlman, 156–81.

Doll, Christopher. 2015. "Notes on Playing with *Play on Notes*: Babbitt's Music as Recompositional Puzzle." *Music Theory Spectrum* 37 (2): 297–312.

Davies, Benjamin K. 2007. "The Structuring of Tonal Space in Webern's Six Bagatelles for String Quartet Op. 9." *Music Analysis* 26 (1-2/): 25-58.

Dubiel, Joseph. 1991. "Three Essays on Milton Babbitt, Part II: 'For Making This Occasion Necessary.'" *Perspectives of New Music* 29 (1): 90–123.

——————. 1992. "Three Essays on Milton Babbitt (Part Three)." *Perspectives of New Music* 30 (1): 82–131.

——————. 1997. "What's the Use of the Twelve-Tone System?" *Perspectives of New Music* 35 (2): 33–51.

——————. 2008. "With Wanton Heed and Giddy Cunning: Milton Babbitt's *Allegro Penseroso*." In *Around Set Theory*, eds. Moreno Andreatta, Jean-Michel Bardez, and John Rahn, 123–42. Editions Delatour.

Fauconnier, Gilles, and Mark Turner. 1998. "Principles of Conceptual Integration." In *Discourse and Cognition*, ed. Jean-Pierre Koenig, 269–83. Stanford: Center for the Study of Language and Information (CSLI). Distributed by University of Chicago Press.

——————. 2002. *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities*. Basic Books.

Forte, Allen. 1988. "Pitch-Class Set Genera and the Origin of Modern Harmonic Species" *Journal of Music Theory* 32: 187–270.

Furia, Philip. 1991. *The Poets of Tin Pan Alley*: *A History of America's Great Lyricists*. Oxford University Press.

Gagne, Cole, and Tracy Caras. 1982. *Soundpieces: Interviews with American Composers.* Scarecrow Press.

Gibson, James J. 1966. *The Senses Considered as Perceptual Systems*. Houghton Mifflin.

——————. 1975. "The Theory of Affordances." In *Perceiving, Acting, and Knowing*, eds. by Robert Shaw and John Bransford, 67–82. Lawrence Erlbaum.

——————. 1979. *The Ecological Approach to Visual Perception*. Houghton Mifflin Harcourt.

Gilliland, John. 1969. "The British Are Coming! The British Are Coming!: The U.S.A. is Invaded by a Wave of Long-haired English Rockers" (audio). *Pop Chronicles*. University of North Texas Libraries. https://digital.library.unt.edu/explore/partners/UNTML/browse/?start=27&fq=untl_collection%3AJGPC

Hanninen, Dora A. 1996. "A General Theory for Context-Sensitive Music Analysis: Applications to Four Works for Piano by Contemporary American Composers." PhD diss., University of Rochester, Eastman School of Music.

——————. 2012. *A Theory of Music Analysis: On Segmentation and Associative Organization.* University of Rochester Press.

Hepokoski, James. 2009. "Sonata Theory and Dialogic Form." *Musical Form, Forms, & Formenlehre: Three Methodological Reflections*, ed. Pieter Bergé, 71–89. Leuven University Press.

Hepokoski, James, and Warren Darcy. 2006. *Elements of Sonata Theory*. Oxford University Press.

Hilferty, Robert. 2011. *Babbitt: Portrait of a Serial Composer*, "Director's Cut." *YouTube.* https://www.youtube.com/watch?v=JuTRWHAd_IM&t=1297s

—————. n.d. Unpublished transcripts of interviews with various musical figures from 1990s film footage for the Babbitt documentary.

Hilferty, Robert, and Laura Karpman. 2011. *Milton Babbitt: Portrait of a Serial Composer*. *National Public Radio Online: Deceptive Cadence*, January 13, 2011. https://www.npr.org/sections/deceptivecadence/2011/04/10/133372983/npr-exclusive-new-documentary-on-the-late-composer-milton-babbitt

Ito, John Paul. 2019. *Notes on Sonata Form*. https://www.andrew.cmu.edu/user/johnito/music_theory/Form/Form4lrgr/SonataNotes.pdf

Jensen, Thomas Wiben. 2018. "Humor as Interactional Affordances: An Ecological Perspective on Humor in Social Interaction." *Psychology of Language and Communication* 22 (1): 238–59.

Jordan, Stanley. 2019. "Milton Babbitt's Type-E All Combinatorial Hexachord and its Applications to Jazz." Unpublished manuscript.

Kay, Furu. 2013. Transcription of Monk's *Ask Me Now* from Blue Note CDP 7 81511 2. https://www.youtube.com/watch?v=8Mmh2RJIkYU

Kozinn, Allan. 2002. "Many-Faceted Dreams of That Time Round Midnight." *New York Times*, November 21, 2002.

Kroll-Rosenbaum, Nora. 2010. Profile on *NewMusicBox*. https://nmbx.newmusicusa.org/author/norakroll-rosenbaum/

Lake, William E. 1986. "The Architecture of a Superarray Composition." *Perspectives of New Music* 24 (2): 88–111.

Lakoff, George, and Rafael Nunez. 2000. *Where Mathematics Comes From*. Basic Books.

Lee, Gavin. 2020. "Queer Music Theory." *Music Theory Spectrum* 42 (forthcoming).

Leong, Daphne. 2011. "Webs and Snares: Multiple References in Babbitt's *Homily* and *Beaten Paths*." *Music Theory Online* 17 (2).

Lerdahl, Fred. 2001. *Tonal Pitch Space.* Oxford University Press.

Lewin, David. 1986. "Music Theory, Phenomenology, and Modes of Perception." *Music Perception* 3: 327–92.

—————. 1987. *Generalized Musical Intervals and Transformations*. Yale University Press.

—————. 1995. "Generalized Interval Systems for Babbitt's Lists and for Schoenberg's String Trio." *Music Theory Spectrum* 17 (1): 81–118.

Lundmark, Carita. 2003. "Puns and Blending: The Case of Print Advertisement." Paper presented at the 8th International Cognitive Linguistics Conference, Logroño, Spain, July 20–25. Available at http://wwwling.arts.kuleuven.ac.be/iclc/Papers/Lundmark.pdf.

Maggart, Alison. 2017. "Referential Play in 'Serious' Music: Allusions to the Past in Several of Milton Babbitt's Works from the Late 1980s." PhD diss., University of Southern California.

Magritte, René. 2016. "On Titles." In *Selected Writings*, trans. Jo Levy and eds. Kathleen Rooney and Eric Plattner, 112–16. University of Minnesota Press.

Mailman, Joshua Banks. 2010. "Temporal Dynamic Form in Music: Atonal, Tonal, and Other." PhD diss., University of Rochester, Eastman School of Music.

—————. 2014. "Trajectory, Material, Process, and Flow in Robert Morris's String Quartet Arc." *Perspectives of New Music* 52 (2): 249–83.

—————. 2016. "Cybernetic Phenomenology of Music, Embodied Speculative Realism, and Aesthetics Driven Techné for Spontaneous Audio-visual Expression." *Perspectives of New Music* 54 (1): 5–95.

—————. 2018. "Pragmatist Ironist Analysis and Embodied Interactivity: Experimental Approaches to Sensor-Based Interactive Music Systems inspired by Music Analysis." In *Music, Analysis, and the Body: Experiments, Explorations and Embodiments*, eds. Nicholas Reyland and Rebecca Thumpston, 295–328. Leuven Studies in Musicology. Peeters.

—————. 2019. "Babbitt's Beguiling Surfaces, Improvised Inside." *SMT-V: Society for Music Theory Videocast Journal* 5 (1), 5 (2), 5 (3), http://doi.org/10.30535/smtv.5.1

—————. 2020. "Babbitt's *Canonical Form* Revisited." *Perspectives of New Music* 58 (1) (forthcoming).

Maus, Fred. 1997. Liner notes to *Milton Babbitt: Piano Music since 1983*. CRI.

Mead, Andrew. 1983. "Detail and Array in Milton Babbitt's *My Complements to Roger*." *Music Theory Spectrum* 5: 89–109.

—————. 1994. *Introduction to the Music of Milton Babbitt*. Princeton University Press.

—————. 2009. "The String Quartets of Milton Babbitt." In Vol. 2 of *Intimate Voices: The Twentieth Century String Quartet*, ed. Evan Jones, 210–37. University of Rochester Press.

Morgan, Robert P. Obituary of Milton Babbitt. *The Guardian*. https://www.theguardian.com/music/2011/jan/30/milton-babbitt-obituary

Oteri, Frank. 2001. "Part 5: Popular Standards." In "Milton Babbitt: A Discussion in 12 parts." *NewMusicBox*. https://nmbx.newmusicusa.org/milton-babbitt-a-discussion-in-12-parts/6/

Patrick, James S. 1975. "Charlie Parker and the Harmonic Sources of Bebop Composition: Thoughts on the Repertory of New Jazz in the 1940s." *Journal of Jazz Studies* (2): 3–23.

Purin, Peter Charles Landis. 2011. "'I've a Voice, I've a Voice': Determining Stephen Sondheim's Compositional Style through a Music-theoretic Analysis of His Theater Works." PhD diss., University of Kansas.

Redfern, Walter. 1984. *Puns.* Basil Blackwell Inc.

Robin, Will. 2016. "Imagining a Community at Bang on a Can's First Marathon." *New Music Box*. https://nmbx.newmusicusa.org/imagining-community-at-bang-on-a-cans-first-marathon/

Rubin, William. 1982. "De Chirico and Modernism." In *De Chirico: Essays by Maurizio Fagiolo dell'Arco*, ed. William Rubin, 55–79. Museum of Modern Art.

Sacks, Oliver. 2007. *Musicophilia: Tales of Music and the Brain*. Revised and expanded. Random House.

Saslaw, Janna K., 1992. "Gottfried Weber and the Concept of Mehrdeutigkeit." PhD. diss., Columbia University.

Schachter, Carl. 1985. "Either/Or." Paper read at the First International Schenker Symposium at the Mannes College of Music, New York City, NY.

——————. [1990] 1999. "Either/Or." In *Unfoldings: Essays in Schenkerian Theory and Analysis*, ed. Joseph N. Straus, 121–33. Oxford University Press. Originally published in *Schenker Studies*, ed. Hedi Siegl, 165–79. Cambridge University Press.

Schauerte, Uli. 2007. Transcription of Monk's June 7, 1954, Paris rendition of *'Round Midnight.* https://www.youtube.com/watch?v=qKwMMzM-frY

Scotto, Ciro. 1988. "Preparing a Performance of Babbitt's *Arie da Capo*." *Perspectives of New Music* 26 (2): 6–24.

——————. 2000. "A Hybrid Compositional System: Pitch-Class Composition with Tonal Syntax." *Perspectives of New Music* 38 (1): 169–222.

Seeger, Charles. 1930. "On Dissonant Counterpoint." *Modern Music* 7 (4): 25–31.

Soderberg, Stephen. 2011. "My Dinner with Milton." *In the Muse: Performing Arts Blog,* Library of Congress, February 1, 2011. https://blogs.loc.gov/music/2011/02/my-dinner-with-milton/

Smith, Kile. 2011. "How I learned to love Milton Babbitt, Milton Babbitt's ultimate message: Stop trying to hold on" *Broad Street Review.* February 8, 2011 https://www.broadstreetreview.com/music/how_i_learned_to_love_milton_babbitt (Republished May 16, 2011, https://kilesmith.com/2011/05/16/how-i-got-milton-babbitt/)

Sondheim, Stephen, and Derek Bermel. 2012. "A Conversation with Stephen Sondheim." *YouTube*. https://www.youtube.com/watch?v=4tBVLHv01WE

Spitzer, Michael. 2004. *Metaphor and Musical Thought*. University of Chicago Press.

——————. 2018. "Conceptual Blending and Musical Emotion." *Musicae Scientiae* 22 (1): 4–37.

Stern, Bobby. 2015. Compilation of transcriptions of Monk's *Skippy* from Blue Note CDP 7 81511 2. https://bobbysternjazz.com/blog-b-natural/not-peanut-but-uhhh-thelonious-monks-skippy

Straus, Joseph. 1990. *Remaking the Past*. Harvard University Press.

——————. 2009. *Twelve-tone Serialism in American Music*. Cambridge University Press.

——————. 2011. *Extraordinary Measures: Disability in Music* Oxford University Press.

Sun, Kevin. 2013. "Swing Meaning: Flirting with Coherence." *The Harvard Crimson*, April 9, 2013. https://www.thecrimson.com/column/flirting-with-coherence/article/2013/4/9/Swing_Meanings_Kevin_Sun/

Swed, Mark. 2011. "Critic's Notebook: Open your ears to Milton Babbitt." *Los Angeles Times*, February 3, 2011.

Threadgill, Jacob. 2015. "Milton Babbitt: 50 years ahead of his time" *Clarion Ledger* , November 14, 2015. https://www.clarionledger.com/story/life/2015/11/14/milton-babbitt-legacy/75588424/

Tréfousse, Roger. 2012. "The Strange Life of Ben Weber." *American Composers Alliance.* https://composers.com/content/strange-life-ben-weber-roger-tréfousse

Vande Moortele, Steven. 2015. "The Philosopher as Theorist: Adorno's *materiale Formenlehre*." In *Formal Functions in Perspective. Essays on Musical Form from Haydn to Adorno*, eds. Steven Vande Moortele, Julie Pedneault-Deslauriers, and Nathan John Martin, 411–33. University of Rochester Press.

Wyatt, Judith. 1985. "Jazz Guitarist will Open Cosby Show." *Sunday Call-Chronicle: The Morning Call*, February 17, 1985. https://www.mcall.com/news/mc-xpm-1985-02-17-2457920-story.html

Zbikowski, Lawrence. 1999. "The Blossoms of 'Trockne Blumen': Music and Text in the Early Nineteenth Century." *Music Analysis* 18 (3): 307–45.

—————. 2018. "Conceptual Blending, Creativity, and Music." *Musicae Scientiae* 22 (1): 6–23.

Zuckerman, Gabrielle. 2002. "An Interview with Milton Babbitt." *American Public Media*, July 2002. http://preparedguitar.blogspot.com/2016/05/an-interview-with-milton-babbitt-by_6.html and http://preparedguitar.blogspot.com/2016/05/an-interview-with-milton-babbitt-by.html

Discography

Arciuli, Emanuele. 2011. *Round Midnight: Homage to Thelonious Monk.* Stradivarius. 33898.

Babbitt, Milton. 1996. *Soli e duettini.* Group for Contemporary Music. Koch Classics. 3-7335-2H1. Rereleased in 2006 as Naxos 8.559259.

—————. 1997. *A Tribute to Milton Babbitt : Concert and Presentation of Honorary Degree* (September 25, 1997). Sibley Music Library, Eastman School of Music. OCLC (OCoLC) 38116523.

—————. 2003. *Occasional Variations.* Tzadik. 7088.

—————. 2017. The Ars Combinatoria String Quartet. Self-produced by Erik Carlson. https://erikcarlson.bandcamp.com/album/milton-babbitt-string-quartets

Composers Quartet. 1990. *Three Contemporary American String Quartets.* Music & Arts. 606.

Goldray, Martin. 1997. *Milton Babbitt: Piano Music Since 1983.* CRI. 746.

Jordan, Stanley. 2011. *Friends.* Mack Avenue. 1062.

Monk, Thelonious. 1952. *Genius of Modern Piano Music*, v. 2. Blue Note. CDP 7 81511 2.

—————. 1996. *Piano Solo.* BMG France. 74321409362.

Nabb, Nathan. 2009. *Tangled Loops.* Amp. B07F5FYWZJ.

Taub, Robert. 1986. *Babbitt: Piano Works.* 1986. Harmonia Mundi. 905160.

Footnotes

* Especially in regard to the possible links between mid-century jazz traditions and Babbitt, I thank Steve Lampert for his knowledge, enthusiasm, and encouragement.
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1. Bernstein (2015, 208) also discusses diatonic and triadic surface groupings in Babbitt's *Virginal Book* that are foreign to (not drawn from) the array. Leong (2011, [15] and [17]) devotes a little more than a paragraph to discussing the presence of major and minor triads and other tertian harmonies in another late-period work, *Beaten Paths* (1988), but does not tie these to ideas of punning or multiple meaning, instead observing that "[t]hese, and other prominent tertian sonorities expressed in the marimba's particular timbre, lend the work a mellow and mellifluous sound."
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2. Straus (2009) lists, as one of 12 myths, that 12-tone serialism cannot be tonal, and provides examples of tonal 12-tone music.
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3. Lakoff and Nunez (2000) explain mathematical knowledge as arising through the accumulation of layers of virtuoso blending of embodied metaphors.
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4. In regard to what I define as *pitch permeation*, it was actually previously applied in one way to Babbitt's *Whirled Series* in my PhD dissertation (Mailman 2010).
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5. Christopher Doll ([2015](#)) applies a different kind of recomposition, recomposing an aspect of Babbitt's precompositional structure to reveal possibilities at a more abstract level. My recent trilogy ([Mailman 2019](#)) applies one of the two kinds of surface recomposition I employ here, both of which differ from Doll's array recompositions.
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6. Dubiel ([1997](#)) suggests the alternative term *pre-notational*, arguing that the creation of the array and so forth is a bona fide part of the compositional process (rather than just a precursor to it).
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7. If this seems paradoxical, just consider: There are infinite even numbers but not every number is even; there are infinite novels that could be written in English, but this would exclude those written in gibberish or in another language; and infinite games of chess could be played out, still excluding moves disallowed by the game's rules. Similarly Babbitt's rules of play include infinite choice (for instance, allowing infinite repetitions) while still being partly restrictive in other ways.
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8. See my recent trilogy, [Mailman 2019](#), which delves more fully into this topic.
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9. A *lyne* is a totally ordered series of pitch classes that forms a contrapuntal strand in a pitch-class array, the type of structure that serves as a background for Babbitt's music.
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10. In practice Babbitt often imposed further constraints on the realization of an array, for instance assigning each lyne to a different register (see [Hanninen 1996](#)). Yet there is no such consistent rule across all of Babbitt's compositions. In principle there is no such constraint on the array itself.
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11. A *posetinomium* could be configured this way so that if the second of the two consecutive pitches is introduced within a simultaneity (with the first) the first pitch will continue to be available with a caveat and only provisionally: once that second pitch is introduced, the first pitch will automatically also sound that second pitch whenever it itself is played, and the first pitch will be withdrawn as soon as the second pitch is played on its own.
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12. Examples of Babbitt's music being compared to jazz include the Columbus, Ohio musician Toby Hartleroad, who states: "If there is any comparison, he is Mississippi's Sun Ra. . . . It's (essentially) freeform jazz" ([Threadgill 2015](#)). The former *New York Times* critic Allan Kozzin said "Once I closed the score, it was like listening to a Cecil Taylor concert or a certain corner of avant garde jazz; it seemed to make sense and had emotional weight" (also quoted in [Threadgill 2015](#)). Babbitt's former student Laura Karpman (herself a jazz singer) describes Babbitt as having "[grown] up playing jazz with the clarinet and [being] immersed in jazz, blues and Southern music." She further remarks that "Those early vocal pieces like *Philomel*, . . . all come out of jazz. . . . If you listen to Ella Fitzgerald singing scat, there is a tiny little step between that and Milton's work" ([2015](#)). Babbitt's *Phonemena* (1969/75) is even closer to scat singing, as it employs exclusively non-semantic phonemes for their timbral variety, as Louis Armstrong and Ella Fitzgerald do in their vocal improvisations. After a repeated high-pitched descending minor third (perhaps alluding to Dizzy Gillespie's "Groovin' High" or Monk's "52nd Street Theme"), *Phonemena* ends with electronic white-noise (and a bluesy A major-minor chord) accompanying a vocalized "Rah . . . Y," where the final "Y" is only partly pitched (a *sprechstimme* note head) over which appears the instruction "whispered," which together conjure a wispy jazz-voice "yeah!"—an allusion to Armstrong's gravelly motto "Oh yeah!" (Thanks go to David Kowalski and Nina Berman, in a semi-private internet forum, for mentioning the white-noise, final phoneme, and "whispering" instruction.) Kile Smith ([2011](#)) compares listening to Babbitt's *Whirled Series* to experiencing a live performance of the avant-garde jazz group the Art Ensemble of Chicago. Being a bit more specific, Joseph Dubiel explains "I might never have suspected that something could feel so much like a line while its consecutive elements were so dissimilar. In that way [Babbitt's] music seems a lot like

bebop to me: that something can continue to feel like a melody when it makes a big jump, and is so much louder, and so forth" (Hilferty, n.d.). For further discussion of Babbitt's music in relation to jazz, consult Mailman 2019, especially note 24 referenced in video 2 at 17:07–17:52. The notes can be downloaded directly here: http://www.smt-v.org/bibliographies/5_123_Mailman.pdf
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13. The quote continues: "And so there's another level that's in there that I often gets missed when you're overwhelmed by his theories," a point I address in the conclusion (Part V) of this article. I have slightly edited the quote for continuity, but most if it can be heard in Hilferty 2011, at 57:34–58:26.
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14. A performance of Babbitt's *Composition for One Instrument* (1999) played on celesta by Jeffrey Kresky can be heard here: https://www.youtube.com/watch?v=BWSNNr38ITY
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15. To my knowledge there has not yet been any initiative to uncover actual quotes of popular songs in Babbitt's classical compositions, but it would be a plausible endeavor.
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16. That is, whereas the already dozenfold, hundredfold, thousandfold, or ten- or hundredthousandfold order permutations of an array's partial orderings are technically finite, they are actually made literally infinite by the prospect of potentially infinite repetitions of (or oscillations or arpeggiations between) pitch classes designated in these partial orderings.
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17. The conjured or suggested qualities of tonality typically do not occur in a pristine guise, but rather occur in an imperfect way that comports with the spontaneous flow of the music and with popular lyrics, a practice called "ragging" which I explain further below.
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18. Maggart (2017, 234) persuasively argues that tonal chords and progressions in Babbitt's *Virginal Book* mark "an intersection between serial and tonal lexicons" signifying "tradition in the text," or (quoting Michel Riffaterre) "as acting as an 'effective symbol of the past . . . framing the context through which we should listen to the entire work.'"
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19. One might associate it with Satie's *Gymnopédies*, the first movement of Webern's Symphonie Op. 21, or the *sostenuto, quasi giusto* of Kurtag's *Officium Breve*. Satie's *Gymnopédie 1* starts with an oscillation between G maj7 and D maj7 chords. Much more subtly Webern's Symphonie's exposition (for instance at mm. 9–14) oscillates bass pitches G and D with F♯, C♯, and B above, suggesting an oscillating G maj7 and D maj7. And Kurtag's *Officium breve*, part III, slowly oscillates between F maj9 and C maj9 chords. These excerpts have a gently floating texture that helps their weakly tonal allusions fit in their essentially post-tonal contexts, as they relate more closely to Satie's weakly tonal-vernacularly inflected style that is also slow and gentle in his *Gymnopédies.*
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20. Because of their strict requirements, the construction of each 12-tone all-partition array is very much entangled with the specific pc ordering of the 12-tone row that constitutes its fabric. There's no fungibility whereby a different 12-tone row can be swapped into the same array or a different all-partition array easily constructed from the same row. Therefore, generally, in Babbitt's practice, a particular 12-tone row class is entailed by a particular all-partition array, and vice-versa. As far as we know, only one four-lyne all-partition array exists; and it forms the basis for all these works mentioned. Therefore, all these works are also based on the same 12-tone row.
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21. Babbitt assigns each lyne pair to a disjunct registral band spanning a minor 10th. (Each lyne occupies an octave; from lowest to highest the octave bands are D♭3–C4, F3–E4, F4–E5, and A4–G♯5. Notice that the two lower lynes mostly overlap, sharing a major 6th, as do the two upper

lynes.) With E4 versus F4 as the boundary, he treats the range of the lower lyne pair (D♭3–E4) and the range of the upper lyne pair (F4–G♯5) as a distinct "registers," in the sense that he activates and deactivates them separately (to create all their combinations). Thus the conventional musical term "register," rather than denoting the entire middle range of the piano, could, in Babbitt's practice, take on this more specific meaning (in this case the specific minor 10th ranges D♭3–E4 and F4–G♯5). I have chosen this usage previously (Mailman 2019). In the main text of this article, however, I will simply refer to the entire range D♭3–G♯5 as the middle register and the array presented in this register as the piano middle register array (while some of the analytical diagrams distinguish the constituent "registers" within this more broadly construed middle register).
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22. The recordings are by Robert Taub and Martin Goldray. Two recordings are offered because the rhythms and textural balances of Babbitt's music are so complex and subtle that no single performance captures all relevant possibilities.
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23. These and other aspects of canonicity are treated in my forthcoming article on *Canonical Form* (Mailman 2020).
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24. Consult my video trilogy (Mailman 2019) for demonstrations and explanations of such possibilities. (In that context I referred to this array as the piano middle registers, plural. See note 21.)
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25. A paraphrase of Video 2's narration is as follows: The superarray of *Whirled Series* contains one array for the piano middle register, one for the saxophone, and one for the piano outer registers. Each array is actually a series of partial orderings, each of which can be ordered in many different ways. (The number of possible orderings for each is indicated in red text.) Pairs of lynes are collapsed into the same register. (In Example 16 these are distinguished by color.) Consider the partial orderings that underlie mm. 95–98. Here Babbitt aligns pitches from the different lynes of the piano arrays to forge initially triads E major, E♭ minor, and A major. Gathering up appropriate pitches from the partial orderings, he continues this for eight more measures, whipping up a lively flurry of major and minor triads. These are heard best by listening to just the piano part.

This especially triadic episode ends with a series of six high-register chords, forming a sort of antecedent-consequent pair, where each triplet of chords (E, G♯ minor, and C minor, then D minor, B♭ and G♭) articulates the same pair of Neo-Riemannian transformations*: L (Leittonwechsel)* then *PL (Parallel* combined with *Leittonwechsel)* known from nineteenth century harmony (Cohn 2011). The two chord-triplets (which conclude a tritone away from one another) each traverses hexatonic poles (E major to C minor and D minor to G♭ major) while also presenting all and only the pitches of one of the two hexachords of the work's 12-tone row. The parallelism between these progressions is marked by the repeated mid-low-high contour of the upper voice. Although formed from a merge of all four of the array's lynes, this *LPL* chord transformation serves as an echo, reminder, or demonstration of the two consecutive trichords that comprise one of the row's hexachords, as heard a few measure's prior in the saxophone part.

The saxophone part, which at this point is just one lyne with no ordering flexibilities, nevertheless contributes four triads of its own directly from the triads of the 12-tone row. Thus, both the saxophone and piano contribute, in quite different ways, to the emphasis on major and minor triads during this passage.
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26. Babbitt's entire *Gloss on 'Round Midnight,* can be heard here: https://www.youtube.com/watch?v=O9LpHozClyM. I thank Emanuele Arciuli and Alan Feinberg for providing me the score of Babbitt's *Gloss,* which was commissioned by Joel Hoffman for the MusicX Festival in 2001 as part of a set of piano works by various composers all based on Monk's famous tune.
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27. Robert Morris has called this "pitch articulating pitch," as quoted by Lake (1986) and discussed (in relation to one of Morris's own compositions) in Mailman 2014.
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28. The recordings are by Marshall Taylor (sax) and Charles Abramovic (piano) and by Nathan Nabb (sax) and Winston Choi (piano). Both recordings are offered because, as explained above, the rhythms and textural balances of Babbitt's music are so complex and subtle that no single performance captures all relevant possibilities.
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29. Leong (2011, [16]) similarly notices that in his *Beaten Paths*, "Babbitt tends to combine [distinct] pc arrays in ways that align, or closely align, duplicate pcs between concurrent aggregates where possible."
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30. Andrew Mead (in email correspondence) recounts an anecdote in which Babbitt describes meeting Schoenberg in New York (presumably in 1933–34) and asking him about the issue of octaves, and pointed out that sometime thereafter Schoenberg composed his piano concerto, which is full of octave doublings. Babbitt ventured to claim credit, but backed off.
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31. A mathematical definition of *pitch permeation* is provided in Appendix 1 and will be discussed again below.
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32. Besides the studio recordings by Taylor and Ambramovic and by Nabb and Choi, also included here is an excerpt from a live performance by Chad Smith and John Orfe at Kilbourn Hall at the Eastman School of Music, in Rochester, New York, on September 25, 1997. It was a tribute concert for Babbitt, at which he was presented with an honorary degree.
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33. The idea of quantifying the relative amount (the degree or intensity) of pitch permeation is discussed later in this essay. A mathematical model for it is provided.
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34. An interesting point I will discuss below is that most (or sometimes all) pitches in most partitions have the potential to *permeate*—hence the role of Babbitt's choice—but in most partitions some pitches have *more* of a propensity to permeate than others, due to the particular shape of the partition.
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35. See Lake (1986), Dubiel (2008), and, more extensively, Bernstein (2015) for discussion of serial anomalies.
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36. Although I did not explicitly model this recomposition on Charles Seeger's theories, the idea of composing so as to favor dissonant pitch configurations was certainly influenced by an awareness of his and Cowell's theory of "dissonant counterpoint" (Seeger 1930). It is interesting to contemplate the highly dissonant approach of the mid-century "ultra-moderns" (such as Ruth Crawford Seeger, Ruggles, Varèse, and so forth) with the somewhat opposite tendency found in Milton Babbitt's late-20th and early-21st century compositions.
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37. There is a resonance with Schachter's remark that, in regard to two superficially similar but structurally different passages, "we can remain aware of [the difference in harmonic structure] while also acknowledging the validity of a perspective from which the similarity in linear contour and over-all direction outweighs [this difference]" (1999, 132; see also 1985).
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38. Bernstein (2017) has even explicitly identified *closing rhetoric* in Babbitt's music (as well as a different kind of *opening* rhetoric that is more subtle and basically unrelated).
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39. Caplin uses the slightly longer term *formal functionality*, as well as *formal function* and *form functional*, which he says [private correspondence] he adapted from Schoenberg or Ratz. I use the latter two terms, but for the first term, I substitute the more succinct *form functionality*, by which I mean the same thing as *formal functionality*.
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40. It is intriguing that a significant aspect of Babbitt's music is perhaps illuminated by a notion put forward by Adorno, whom Babbitt disdained. (Actually neither Babbitt's nor Adorno's theories were the original inspiration for developing the concept *pitch permeation*; but the shoe fits.)
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41. By "unspecified" or "unattached," I mean that elevated pitch-permeation serves more generally and open-endedly as a formal differentiator, such that it cannot be simply reduced to closing (or opening) rhetoric. Bernstein (2017, 258) demonstrates that several Babbitt works end with a prevalence of repeating notes ("Repeating notes—admittedly a simple closing technique, but a very widespread one in Babbitt's practice—echo the traditional device of tonic affirmation."). Also in regard to *Whirled Series's* ending, Mead (1994, 226–27) notices the extended duration of the final aggregates, and Maggart (2017) shows a protracted sequence of order permutations of a major triad and then a [015] trichord within the last 25 measures of the saxophone part, as representing a "timeless finale." These examples indeed involve elevated levels of pitch permeation. However insightful, meaningful, and satisfying these analyses are contextually, we cannot generalize that *all* instances of elevated pitch-permeation signify closing rhetoric, as I have already pointed out other such instances in the first half of *Whirled Series,* such as at mm. 1–11, mm. 24–46, mm. 104–8, mm. 160–78, and 201–3, as indicated in Examples 38 and 44. (Nor can we conclude that a prevalence of order-permuted trichords or tetrachords necessarily signals a closing function. For instance, previously [Mailman 2010, 604–6] I showed in an earlier passage, mm. 161–70, a salient flurry of retrograded trichords and tetrachords, mostly involving recurring pitch classes 0, 5, 8, and 9.) Thus, although elevated pitch-permeation, through an association with sonata-form formal rhetoric, can resonate with a sense of closure or finality to which Bernstein and Maggart allude, this in no way exhausts its form-functional capability. On the contrary, elevated pitch-permeation tends to differentiate certain partition shapes (those with more *lyne part size diversity*) from others (those with less *lyne part size diversity*). Therefore, flux of pitch-permeation has a more robust form-functional capability, as a more general differentiator which is linked not only to closings or openings, but rather, albeit indirectly, to all parts of an all-partition array (thus "express[ing] their own location within musical time"). In the case of *Whirled Series* in particular, the second half presents the retrograde of the first half's array. Since the array begins with a $4^2 31$ partition, which has relatively high *lyne-part size diversity* (which creates the opportunity for elevated pitch permeation), it is logical to assume that Babbitt, to sculpt the form as it were, knowingly arranged the arrays in a palindrome so as to present elevated pitch-permeation at the beginning and ending of the work, creating a rounded-off arc trajectory, albeit with several larger waves of elevated pitch permeation in the interim.
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42. See Hepokoski 2009 for a discussion of *dialogic form,* which basically means that considerations of form of each individual piece take place in the landscape of all other pieces, especially those with the same or similar stylistic, generic, and formal features.
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43. As I suggested in note 41 above, and will explain more below, heightened *pitch permeation's* "capacity to express [its] own location within musical time" arises from how it relates to the shape of the aggregate partition from which it is realized.
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44. This reading of such a common tonal process brings out the *materialist* aspect of pitch permeation: As compared to the more multifaceted higher-level concept that is tonal prolongation, pitch permeation is more superficial, or materialist, except that, in Babbitt's late style it gains depth through its emergence from an all-partition array, because this makes pitch permeation pervasively form-functional.
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45. Whereas two spans that lack pitch permeation (have zero or near zero pitch permeation) cannot be distinguished by virtue of their pitch permeation, two spans that have equally high pitch permeation *can* be thus distinguished by virtue of their pitch permeation, because of, potentially, a difference in which particular pitches permeate in one span as opposed to the other.
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46. Emergent properties in music are discussed extensively in my 2016 article on cybernetic phenomenology.
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47. An interesting thing about "ragged" lyrics ("ragging" the lyric) is that "ragged" originally was used as a characterization of syncopation ("ragged time" = ragtime) but was, apparently, later used as a characterization of distortions of language in lyrics (which also sometimes included slang). The word "ragged" actually occurs with a related meaning within this particular song (which is by Harry Woods): "Oh, we ain't got a barrel of money. Maybe we're ragged and funny."
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48. As suggested above, in reference to music and song lyrics, the verb "rag" has no pejorative connotation whatsoever (in sense of "poke fun at" or "rebuke"). Rather, "rag" (as well as "ragging" and "ragged") relates to ragtime music, in the sense of the adjective "ragged," meaning an irregular or uneven surface, edge, or outline, a notion subsequently applied to song lyrics. Since the uneven or irregular quality can result from the creative process of making puns, rhymes, or rhyming puns (or forging double internal references in music), the predicate "ragged" simultaneously stands for the one-syllable past participle of the verb "to rag" and the two-syllable adjective "ragged" (to have a variegated edge or surface).
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49. Here I have employed Dora Hanninen's (1996, 2012) convention for labeling associated segments. Capital C stands for a contextual association and subscripts indicate the basis of association.
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50. This and other features of *Canonical Form* are treated more extensively in Mailman 2020.
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51. Hypothetically at least, such a semitone shift of tonic would often be useful when composing tonal allusions within aggregate-based music, because it automatically provides "diatonic access" to all the pitch classes that were not diatonic to the tonality whose root is a semitone above or below. For instance, shifting from C major to B major automatically provides "diatonic access" to all five sharped pitch classes {F♯, G♯, A♯, C♯, D♯}, which complete the aggregate left incomplete by the seven diatonic pitch classes of C major.
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52. Some of these renderings omit the B major addendum, since it is auxiliary to the tonality of the excerpt.
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53. The idea of radically normalizing octave displacements in post-tonal music to reveal smooth voice leading is familiar from, for instance, Benjamin Davies's (2007) analysis of Webern's Six Bagatelles for String Quartet, op. 9. Such liberties, regarding register (octave equivalence) and micro-timing (which might otherwise distinguish simultaneities from grace notes) are even more appropriate here, in that Babbitt's music, in other ways, references the "ragged" texture of

improvisational pop music (jazz), which routinely (for instance in the use of guitar, banjo, or simply by virtue of lead-sheet chord symbols) plays rather loosely beyond the registral constraints (or parsimony) expected in traditionally composed classical music. Beyond this, the interweaving of different timbres (saxophone vs. piano) simultaneously active in several of the same registers discourages a listener from relying on actual register or timbre as guides to chordal hearing. Thus, for the "ragged" surface Babbitt has fashioned, the Schenkerian graph provides an idealization that might subtly underpin its being heard tonally.
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54. A Schenkeresque tonal reading of another excerpt of *Canonical Form* (mm. 200–3) is presented in my forthcoming article on that work (Mailman 2020). Upon publication, it can be viewed and heard here: http://www.perspectivesofnewmusic.org/soundexx/
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55. The parsimony of this motion is described as *LP*, which is a *leading-tone exchange* and a motion to a *parallel* minor or major triad.
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56. See also Cohn and Dempster 1992 for a discussion of *product networks*.
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57. I encourage readers to seek out Maggart's (2017) exegesis of Babbitt, as it brings to bear a scholarly literature on visual art, humor, and poetics to highlight the ontological and intentional function of artwork titles.
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58. For a discussion of *contrafact*, see Patrick 1975. For discussion of how contrafact relates to Babbitt's use of arrays, see Mailman 2019, in particular note 30 (referenced in video 3, 10:02-10:33). The auxiliary document containing the notes is accessible directly here: http://www.smt-v.org/bibliographies/5_123_Mailman.pdf
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59. This is amusing because, two years earlier at Brandeis University, Bill Evans played in the premiere of Babbitt's *All Set*, which is one of the first known instances of Babbitt employing a pun to title a composition. This could be just a coincidence; or perhaps it was partly prompted by Babbitt's rubbing elbows with such bebop musicians during this period, or just through familiarizing himself with their titles as prompted by his connection to Evans, or to Gunther Schuller, to whom he dedicated *All Set* and who played horn on Miles Davis's album *Birth of the Cool* (recorded in 1949–50 and released in 1957).
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60. Refer to Gilliland 1969, show 27, track 4.
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61. It is perhaps a stretch to quibble with Maggart that *Post-partitions* (1966) might also be a pun on postpartum; although certainly *Semi-Simple Variations* (1956) is a pun on *semi-simple algebraic group.*
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62. This temporal dislocation maneuver is demonstrated in an animation in my recent trilogy (Mailman 2019).
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63. In my PhD dissertation (Mailman 2010), I develop the concept of *pitch permeation* but do not analyze the finale of *Whirled Series*, focusing instead on numerous passages from the first half of the work. Maggart (2017) incorporates *pitch permeation* as an aspect of her analysis of the finale.
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64. This interpretation of the title *Whirled Series* was suggested to me by Robert Morris in a personal conversation in 1999. Maggart (2017, 279) observes: "It is notable that [almost] all of Babbitt's works

that imply cyclicism in their titles—*Canonical Form*, *My Ends Are My Beginnings*, and *Around the Horn*—do use this series." I hasten to add though that they also use the same four-lyne all-partition array, as this array and series mutually entail each other in Babbitt's compositional practice. Therefore, though Maggart relates this notion of cyclicity to the "whirling" (order-rotated) presentation of [037] and [015] trichord types within the row, it applies equally well to this singular passage within the array. That is, *Canonical Form*, *My Ends Are My Beginnings*, *Around the Horn*, *Beaten Paths* (which also suggests cyclicality as retreading), the Fifth Quartet, and so on, all feature a 12 partition (single-lyne aggregate) with the first pitch class of the row whirled around to the back, as they are all based on this same array. One of the earliest works based on this array (and row) is Babbitt's brief piano work *My Complements to Roger* (1977), which realizes this 12 partition in an extreme high register solo (see Mead 1983, 93, 104). One work, not mentioned by Maggart, whose title implies cyclicity but is *not* based on this array is the solo viola work *Play it Again, Sam* (dedicated to the Juilliard Quartet's violist Samuel Rhodes.) As Mead (1994, 246) explains, in that work Babbitt infuses a lot of local repetition of notes and dyads within short spans of time.
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65. See Maggart (2017) and Babbitt (1987). In personal email correspondence with me, Andrew Mead recounts that David Lewin claimed to have suggested the title *Whirled Series* to Babbitt, while he was studying with Babbitt as a graduate student.
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66. This was a private email exchange between myself and Dubiel, in response to an earlier draft of this essay. At a 1997 symposium at the Library of Congress, in which several papers discussed his composition *Around the Horn*, Babbitt also described it as "the most difficult double play in baseball . . . and it's what the infield does as a hustle after an easy out . . . 5-4-3 – throw the ball from third to second to first – 'around the horn'" (Soderberg 2011). Thus 5-4-3 ("around the horn") can be a double play or triple play. As a double play, the ground-ball is recovered at third base and then thrown to second and first, for outs on both, whereas the identically named triple play has outs on all three bases. On the 1997 Library of Congress occasion Babbitt seems to be referring to the far more common double play (noting that this type is most difficult among double plays), whereas on other occasions, such as when talking to Dubiel, Babbitt refers to the identically named triple play.
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67. This data was drawn from the Society for American Baseball Research Triple Plays Database: https://sabr.org/tripleplays in September, 2018. Even beyond my explanation, perhaps such statistics are relevant because "[Babbitt's] love of sports, above all baseball, and knowledge of sports statistics was legendary" (Morgan 2011).
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68. Among three-lyne-part partitions, only the totally even partition 444 has more possible orderings. See Mailman 2019 for an extensive discussion of the ordering possibilities of various partitions.
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69. An example of a title involving wordplay that is not a homophonic pun is Babbitt's 2003 composition *Swan Song No. 1*, written for the Cygnus Ensemble (*cygnus* being Latin for swan). The title is ironic since it suggests it is his final work but simultaneously implies that it is not. (He never composed a second "swan song" though he composed three more works over the next three years.)
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70. As his former student Stanley Jordan says: "There's another level [in Babbitt's music] that I think often gets missed when you're overwhelmed by his theories" (Hilferty n.d.).
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71. In the interview with Frank Oteri (2001), Babbitt begins by disputing the validity of teaching music using rap and by denying the affinity between rap and Schoenberg's *Pierrot Lunaire*. But then frankly admitting his own ignorance, he says "I don't even know what hip-hop is, to be honest with you, do you understand hip-hop? What is all this scratching of records?" at which point Oteri

explains scratching technique, which Babbitt follows up with "But how do they repeat it from the one time? Do they record it then?" This prompts Oteri to explain some intricacies of DJs' sampling technique, at which point Babbitt acknowledges its affinity to his own kind of sophisticated compositional techniques and defers to Oteri's greater knowledge on the matter, replying: "Little did they realize that they are writing what is now called serious music. Go ahead, I'm sorry." At this point Babbitt affirms Oteri's simultaneous fascination with his music *and* with hip-hop: As Oteri says "there are things in hip-hop that I also find fascinating," Babbitt follows with "Oh, I don't doubt that for a moment! I grew up with popular music." Babbitt on another occasion seems to deride rap music, while again ultimately throwing his own credibility on the matter into doubt, saying "But we have a popular music now which is the most primitive and rudimentary popular music that has ever, ever, ever taken place in this country. It's like Chinese water torture. No one denies it is primitive, but that seems to be its virtue. I mean, what can you compare at your own turn with what you hear now by way of rap? . . . See, I'm an old timer" (Zuckerman 2002). In the same interview Babbitt says of popular music "it is my native idiom." Babbitt, acknowledging that "scratching of records" can be taken seriously, implies that his taste in popular music was linked to his own youth and thereby denies his own authority on the matter of contemporary popular music, by contextualizing himself ("See, I'm an old timer."). As Mark Swed (2011) explains, "Babbitt was always ready to defend expertise. Where would, say, medicine be without it? One could also add that not football, not hip-hop, nor the stock market is for anyone ignorant of their intricacies."
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72. It seems unlikely that Milton Babbitt directly influenced this, since he had died four years earlier and Sondheim's fame far exceeded Babbitt's; although, according to former student Zachary Bernstein, Babbitt voiced his support for Obama during the 2008 campaign, and Maggart's (2017) interview with Babbitt's daughter Betty Ann documents that "he [Babbitt] voted for Hubert Humphrey in the 1968 Presidential Election and continued supporting democratic candidates up to and including Barack Obama in 2008." According to Betty Ann and her partner Paula, because of Babbitt's physical decline by that point, getting him to the polling station in 2008 was "quite an ordeal . . . but he was determined" (phone interview on November 17, 2019). The political side of Babbitt has sometimes been misunderstood because of his cultural high standards (which some have called "elitist"), his complaining about asymmetrical reverse-discrimination, and because of facile associations, for instance perhaps because Babbitt's friend Ben Weber (a gay twelve-tone composer known for his cooking and for performing in drag at his own dinner parties) was photographed in 1959 with Richard Nixon while awarding the American Composers Alliance's Laurel Leaf award to comedian Jack Benny (Tréfousse 2012). Also, apparently Babbitt once praised the Nixon administration's increased funding for the arts "but he *never* voted for him" (interview with Babbitt's daughter Betty Ann and her partner Paula, on November 17, 2019). He was however rumored to have developed a habit of provocative remarks, understood by some to be a mannerism of social survival within the waspy anti-Semitic atmosphere of Princeton and other Ivy League schools. A 1982 interview shows Babbitt, like many other intellectuals, deriding Ayn Rand's writings as not serious philosophy (Gagne and Caras 1982, 39).
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73. Sondheim explains his indebtedness to Babbitt's mentorship in an on-stage interview (Sondheim and Bermel 2012) at 14:20–15:00 and 16:20–20:00. Babbitt's remarks on Sondheim are found in Peter Purin's (2011) dissertation.
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74. Wuorinen was an acolyte but did not formally study composition with Babbitt.
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75. For a brief discussion of Picker in regard to disability studies and music, see Straus 2011, 43–44.
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76. Karpman played and did scat singing in Manhattan jazz clubs, while studying with Babbitt at Juilliard.
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77. The album was co-produced, mixed, and engineered by Karpman's wife Nora Kroll-Rosenbaum, who is also a film composer and who also studied composition with Babbitt at Juilliard. She was also co-librettist of the Langston Hughes *Ask Your Mama* production. See Kroll-Rosenbaum 2010.
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78. Interweaving a prerecorded voice along with live instruments is also something Karpman does with a recording of Babbitt's voice in her *Now All Set* (2011), a posthumous homage to her former teacher. (By way of comparison, in the 1950s Charlie Mingus and Langston Hughes collaborated, but they performed together simultaneously, with members of Mingus's band).
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79. ACT UP is an acronym for AIDS Coalition to Unleash Power, a grassroots organization that arose after a rallying speech by the gay activist Larry Kramer in 1987. Hilferty's voiceover and witty use of film clips is apparent in the less polished but more quirky "Director's Cut" version of the film. A poignant example of added meaning created through the juxtaposition of old Hollywood clips with footage of Babbitt interviews is when, at 10:45–13:15, clips from on old Gershwin biopic are interspersed with clips of Babbitt discussing antisemitism at Princeton and in the Ivy League; the sequence culminates in an idealized inspirational speech about Wagner's professional struggles, that at rehearsals of *Rienzi* he "didn't have lunch, just dreams of music of the future."
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80. Babbitt once referred to his 1930s interest in 12-tone music somewhat ironically, saying that other composers "knew something of my deviant interests" (Amirkhanian and Babbitt 1984). I find that, in retrospect, Hilferty's "deviant ear, a queer ear" confession has new resonance, as Gavin Lee (2020) finds commonality between queer theory and the phenomenological theories of Babbitt's protégé David Lewin.
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81. Hilferty's *Stop the Church* gained national attention when various PBS affiliate stations around the country supported or countered each other by canceling or airing Hilferty's film, creating further controversy.
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82. The quote is from Charles Amirkhanian in 1984 interviewing Milton Babbitt in front of an audience (Amirkhanian and Babbitt 1984). A few seconds later Babbitt pokes fun at his own lack of height (along with that of Hindemith's and Stravinsky's), which again prompts the audience to laugh with him. A few minutes later, as a prelude to playing for the audience his own electronic work *Occasional Variations,* Babbitt plays for the audience a somewhat silly early 20th century Russian electronic music demonstration, a "novelty" with cartoon-like portamento whistling a children's song, after which he says "I'll say only one thing; I hope when you leave here you won't say 'well that's the best electronic music I've ever heard,'" which again prompts laughter as intended.
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83. Besides playing in Dixieland bands in his youth, Babbitt also in the late 1930s frequented Nick's Tavern, on West 10th street, a speakeasy that became a jazz club, where such musicians as saxophonist Sidney Bechet, drummer Zutty Singleton, banjoist Eddie Condon, as well as Benny Carter and Fats Waller played (Gagne and Caras 1982, 46–47). Former Babbitt student Matt Barber reports that in a 1999 composition symposium at Juilliard, Babbitt explained how he set up the array realization in his *All Set for Jazz Ensemble* to emphasize [0369] tetrachords and other related sonorities "in homage to Dizzy and Bird" (personal communication with Barber, November 22, 2019).
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84. The entirety of Jordan's *One for Milton* can be found here: https://www.youtube.com/watch?v=D2CPnaa2Fa8

85. For instance, {C, E, G} embellished with B and A♭ might conjure the tonal hearing of a C major triad with two neighbor tones (or added M7th and b13th). Yet if such a configuration smoothly rubs elbows with {A♭, C, E♭} embellished by G and F♭ (E♮), then the co-presence of both configurations in the same hexatonic scale {C, E♭, E, G, A♭, B} allows a hearing of embellished A♭ major to easily slip in without altogether relinquishing or displacing C major, such that the tonal attractions of both chords or tonalities (as well as possibly E major) are simultaneously buoyed, thus avoiding a collapse into any one chord or tonality as a preponderant force of tonal attraction. Such phenomena exemplify Cohn's (2011) "overdetermined" triad, as well as an important aspect of Babbitt's *portmantonality* demonstrated in *Whirled Series.* (For a discussion of triadic tonal attraction not just in tonality as traditionally conceived, but also within hexatonic and octatonic systems, see Lerdahl 2001, 249–63.)

86. For instance Allen Forte (1988, 263), in analyzing works by Chopin, Mussorgsky, Debussy, Ravel, Schoenberg, Stravinsky, Stockhausen, and Carter, suggests the possibility of distinguishing various "harmonic styles" based on the prevalence or salience of different families of pitch-class set-classes, grouped into a dozen *genera*, based on distinct trichord progenitors.

87. Though not related to this improvisation or Babbitt directly, Jordan, in a recent interview with Adler (2016), offers some intriguing reflections on gender fluidity, race, and personal identity.

88. Part of the issue here is possibly a confusion between the "formalist" stance in music aesthetics (such as Eduard Hanslick's or Peter Kivy's) and the use of formalisms (usually mathematical formalisms) in discourse about music.

89. "shed the semantic" is Maggart's (2017, 181) phrase, quoted in [4.4.1] above.

90. Gibson provides this definition: "The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb to afford is found in the dictionary, the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment" (1979, 127).

91. One could contrast with Ciro Scotto's (2000) "hybrid system," a systematization of fusing aspects of tonality with dodecaphony.

92. More generally, humor can be regarded as generated through interactional affordance. See Jensen 2018.

93. Babbitt's "improvisations," as discussed in my 2019 video trilogy, are indeed realizations or exploitations of partial-ordering affordances.

94. Spitzer (2004) discusses hermeneutic density as a property or state, but it can also be conceived dynamically as a phase through which we are passing, as we gain the ability to hold two seemingly incompatible ideas in mind at once.

Appendix 1: Formal definition of *Pitch Permeation*

e = a notated event, such as a pitch performed by an instrument (or voice)

p_e = the pitch of event e

E_p = the set of events that have pitch p

S = a span of music, conceived as a set of contiguous events

$E_{p,S} = E_p \cap S$, or in words: the events in span S that have pitch p

Recurrence$(p, S) = |E_p, S|$, or in words: the size of the set of events in S that have pitch p. (The number of pitch p events in S.)

pSp = the subspan within S from the first event having pitch p to the last event having pitch p

P_S = the set of pitches represented in span S

P_{pSp} = the set of distinct pitches occurring between the first occurrence of pitch p and the last

Infusion$(p, S) = |P_{pSp}| - 1$, that is, the size of the set of distinct pitches occurring between the first and last occurrence of pitch p, aside from p itself. (The number of other pitches infused between the first and last occurrences of pitch p.)

$$PitchPermeation(p, S) = Recurrence(p, S) \times Infusion(p, S)$$

$$PitchPermeation(S) = \sum_{p \in P_S} PitchPermeation(p, S) = \sum_{p \in P_S} Recurrence(p, S) \times Infusion(p, S)$$

A pitch p is permeating in span S if *PitchPermeation*$(p, S) > 0$, meaning it must occur more than once and have at least one other pitch infused between its first and last occurrences.

Appendix 2: Formal definition of *Lyne Part Size Diversity*

The *Lyne Part Size Diversity* for a partition span $_PS$ is defined:

$$LPSDiv(_PS) = \frac{n}{12} \sum_{i \in _PS} \frac{1}{n_i}$$

where N is the total number of pcs in $_PS$ and n_i is the length of lyne part i in $_PS$.

Equivalently, it is computed as the number of parts divided by their *harmonic mean*, then scaled by the proportion of 12 the parts sum to, thus:

$$LPSDiv(_PS) = \frac{\#parts}{HarmMean(_PS)} \times \frac{N}{12}$$

If $_PS$ has four lynes: $LPSDiv(S) = \frac{N}{12} \times \left(\frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3} + \frac{1}{n_4} \right)$

For instance, for the partition $7 \, 3 \, 1^2$ the *L. P. S. Diversity* is

$$\frac{12}{12} \times \left(\frac{1}{7} + \frac{1}{3} + \frac{1}{1} + \frac{1}{1} \right) = 1 \times \left(\frac{52}{21} \right) = 2.476$$

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