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“The Connection Between New and Old”:¹ Rhythmic Process in Late Webern, Late Stravinsky,
and Their Predecessors

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¹ See p. 10 & n. 34 for the remainder and source of this quotation of Robert Craft regarding Stravinsky.

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I. Introduction

From the earliest days of polyphony in the medieval era to today composers have made use of strict rhythmic process — most commonly isorhythm and canon (canon usually also controlling pitch). After a period following the death of Bach in 1750 during which canon and other strict rhythmic process were in a position of relative disfavor, they made a return in the twentieth century, with Anton Webern being one of the primary composers to look to pre-classical forms of rhythmic process (in his case primarily canon and rhythmic canon) as a resource for composition. These techniques could be used as structural devices that could, to some extent, take the place of the tonal structures that had underlain most Western art music in the Baroque, Classical, and Romantic eras but that had been rejected by Schoenberg, Webern, and Berg. Igor Stravinsky in his late period was heavily influenced by Webern's work, and also turned to strict rhythmic processes as a compositional resource. As was the case with Webern, Stravinsky looked to music of the distant past as a model for the rhythmic and pitch techniques he sought to employ in his own music. Despite the huge differences in musical language between the music of the earlier and later eras, we see in works from both times similar questions regarding the extent to which rhythmic process is in tension with other musical parameters, the extent to which it is buried beneath the musical surface, and the structural weight that it has in comparison with the work as a whole. Looking at these factors in the music of late Webern and late Stravinsky, we see a contrasting approach, with rhythmic process for Webern an all-encompassing compositional tool and for Stravinsky a means of signification.

This dissertation will look at uses of strict rhythmic process both in the pre-tonal music that was a resource for Webern and Stravinsky in their use of these techniques (focusing on particular pieces of Machaut, Dunstaple, and Isaac) and in some of the primary pieces of these

twentieth-century composers that made use of these techniques: Webern's Opus 21, Opus 24, Opus 26, and Opus 31; Stravinsky's *Canticum Sacrum*, *Agon*, and *Variations (Aldous Huxley in Memoriam)*. It will seek to compare composers' approaches to these techniques, looking in particular at the extent to which these rhythmic processes work in concert with other musical parameters and with the structure of the rest of the piece, and the extent to which these rhythmic processes conflict, interfere, or interrupt other parameters and the remainder of the work. The pre-tonal pieces I have chosen to focus on (Machaut's *Messe de Nostre Dame*, Dunstaple's motet *Dies dignus decorari*, and Isaac's *Johannis Baptistae* mass-proper cycle) certainly do not exhaust the works that were important to Webern and Stravinsky in their study of earlier music. Nevertheless I have chosen a limited set in order to focus in-depth on these exemplars and how they relate to the techniques used by Webern and Stravinsky in their works. There is historical evidence that all three of these works were to some extent studied by Webern, Stravinsky, or both and that they played a role in these composers' understanding of rhythmic process.

Prior to my discussion of individual works, I will provide some background regarding Webern's and Stravinsky's turn to pre-tonal music and Stravinsky's interest in Webern, as well as some background regarding the types of rhythmic processes these composers used. I have organized my discussion in chronological order of the composition of the pieces. Ordering the pieces in this manner helps to emphasize the historical differences between the works and the fact that Webern and Stravinsky learned from the pre-tonal works, as well as that Stravinsky's late compositions drew on Webern. It is important to emphasize, however, that from the point of view of rhythmic process the connections between pieces occur as much between works of different eras as between those of the same. One of the primary ways of looking at the processes in these works is examining the extent to which they work in concert with or against other

musical parameters (a question that is closely related to whether the techniques are readily identifiable aurally), as well as the structural role these processes play in the given works. An example of the latter concern is that a motet like *Dies dignus decorari* makes use of isorhythm throughout its length, with a single process the foundation for the entire work, while in Isaac's *Johannis Baptistae* mass-proper cycle and even within its sequence (on which I focus), Isaac alternates chant, non-canonic polyphony, and canon, such that the canon is only one element of a more diverse texture. These sorts of concerns — the extent of tension with other musical parameters and the role of the rhythmic process within the larger work — appear in all ten of the works on which I will focus, with no clear lines of demarcation based on musical eras or type of rhythmic process.

While I focus on the rhythmic aspects of isorhythm, canon, and rhythmic canon, ultimately these techniques cannot be separated from the realm of pitch. “Canon,” as the term is normally used today, is usually just as much a pitch construction as a rhythmic construction; isorhythm was often accompanied by isomelism, restating a pitch series with different rhythms. I therefore in this essay consider questions of the relationship of rhythm in these processes to pitch, as well as to other musical parameters. To varying degrees composers using these techniques approach them by either separating rhythm from pitch or by closely aligning rhythm and pitch, with many possible intermediate approaches. There is also a great deal of variety in how composers approach the relationship between rhythm in these processes and other musical parameters besides pitch. Despite the fact that in isorhythm pitch and rhythm are usually more independent than they are in canon, I seek to find the common ground between these two techniques. Even in canon there can be a separation or tension between rhythm and pitch. For instance, in Webern's Opus 26, *Das Augenlicht*, the composer at times uses straightforward strict

rhythmic imitation while employing cancrizans pitch imitation (see, e.g., mm. 8-13); both pitches and rhythm are being strictly imitated (though Webern switches the octaves of some of the pitches), but with two conflicting types of imitation. Even with imitation by inversion, a degree of separation arises between the transparency of the rhythmic imitation and the indirect nature of the pitch imitation. It therefore makes sense to examine the relationship between rhythm and pitch both in isorhythmic passages and canonic passages.

II. Webern, Stravinsky, and their interest in early music.

Webern's compositional interest in early music is unsurprising given that he engaged in serious scholarly study of pre-tonal works as part of his doctoral studies in Vienna. His dissertation was the preparation of a modern edition of the second volume of Heinrich Isaac's *Choralis Constantinus*, originally published in 1555 but composed in 1508-1509.² Webern's effort, undertaken with the guidance of musicology professor Guido Adler, consisted in creating the modern edition and writing an introduction to it.³ Webern's edition from 1909, having been submitted and approved by his doctoral committee in June 1906,⁴ remains the only complete published modern edition of the second volume of the *Choralis Constantinus*.⁵ The volume consists of 25 mass-proper cycles, each designated for a particular Christian feast-day. Imitative writing predominates, with the four voice-parts at times engaging in strict canon. Webern's introduction calls special attention to the varieties of strict canon that appear in the cycles, including canons at various intervals, canons in augmentation, three- and four-part canons,

² Strohm and Kempson, "Isaac": "The Proper of the Mass."

³ Isaac, *Choralis Constantinus II*, ed. Webern; Bailey, *Grove* "Webern": "Life."

⁴ Moldenhauer and Moldenhauer, *Anton von Webern: A Chronicle*, 81.

⁵ Some have noted problems with the edition, however, as the original mensuration and proportion signs are stated inconsistently. See DeFord, "Who Devised," 167 n. 1.

double canons, and cancrizans canons.⁶ The second volume, written for the cathedral chapter at Constanz, contains significantly more examples of strict canon than either Volume I or III.⁷

The work that Webern did with the *Choralis Constantinus* influenced his composing and his way of thinking about music, as evidenced by his compositions, his letters, and his lectures collected in *The Path to the New Music*.⁸ As Schoenberg and Webern in the first decade of the twentieth century turned away from functional tonality, their works also exhibited an interest in contrapuntal techniques associated with Bach and Renaissance masters.⁹ These contrapuntal techniques allowed Schoenberg and Webern a means of elaborating and organizing music that did not depend on the resources of functional tonality.¹⁰ Webern's interest in and exposure to the music of Isaac, among others,¹¹ gave him a deeper understanding of the imitative techniques of the fifteenth and sixteenth centuries. Canon, including double canon, canon by inversion, and cancrizans canon, became an increasingly important element of Webern's works, particularly those coming after his adoption of the 12-tone serial method in his songs of Opus 17 to 19 from 1924-1926. Webern in his *Path to the New Music* lectures and letters makes frequent reference to "the Netherlanders," the Franco-Flemish composers of the fifteenth and sixteenth centuries

⁶ Isaac, *Choralis Constantinus II*, ed. Webern, X.

⁷ Schiltz, "'Aus einem Hauptgedanken,'" 122 & n. 12.

⁸ *Ibid.*, 131 ("Aber seine Studie von Isaacs *Choralis Constantinus* war dennoch eine Inspirationsquelle für die Entwicklung seiner kompositorischen Sprache"); Moldenhauer and Moldenhauer, *Anton von Webern: A Chronicle*, 85 ("What Webern, the musicologist, observed in Isaac's four-centuries-old art was to be applied by Webern, the composer").

⁹ Schoenberg abandoned tonality in 1908, beginning with some of the songs in Op. 15, *Das Buch der hängenden Gärten*, which set Stefan George poems. Neighbour, "Schoenberg": "Life Up to World War I"; "Early Tonal Works." Webern gave up tonality beginning with his Stefan George settings of 1908-1909, opp. 3-4. Bailey, *Grove* "Webern": "Early Aphoristic Style." Regarding the use of contrapuntal techniques, see for example Schoenberg's *Pierrot Lunaire* (1912) numbers 8 (passacaglia) and 18 (canon and fugue); Webern's *Passacaglia*, op. 1, and op. 2 (canon), both from 1908. Webern exhibited interest in contrapuntal techniques even in tonal works that immediately precede his break from tonality, such as the D-minor *Passacaglia*. The standard transformations of the 12-tone row used beginning in Schoenberg's and Webern's early serial works of 1920-26 – inversion, retrograde, and retrograde inversion, also betray a debt to techniques originally seen in early music.

¹⁰ Mann, Wilson, and Urquhart, "Canon": "After 1900" ("Canon provides a composer with a procedure for exploring melodic and harmonic space without relying on functional harmony as a guide. Canon creates its own harmonic functionality, resulting directly from melodic and contrapuntal considerations.").

¹¹ Webern also transcribed works of other Renaissance composers, including the Netherlander Johannes Brassart and Isaac's Swiss student Ludwig Senfl. Schiltz, "'Aus einem Hauptgedanken,'" 120 n. 3.

like Isaac for whom pervasive imitation was one of the defining elements of musical composition. For Webern, “the Netherlanders” represented a historical pinnacle of craftsmanship and profundity in the use of polyphony.¹² Webern himself made the connection between the polyphony of the Netherlanders and that in the music of his own contemporaries:

now we find this process . . . that what we saw in polyphony, the greatest possible unity, that’s to say the so-called Netherlands technique — that this tendency is again gradually taking possession of these things, and that a new polyphony is developing.¹³

The tonal music of Bach was certainly also a resource for Webern (as evidenced by his frequent references to him in *The Path to the New Music*¹⁴ as well as by his famous 1934-35 orchestration of Bach’s six-part rickercar from the *Musical Offering*), but the Netherlanders for Webern demonstrated a way of organizing music that did not require the tonal structures of the eighteenth and nineteenth centuries.

In the early 1950s Stravinsky underwent a major change in his compositional style and methods that involved both a turn towards early (pre-tonal) music as well as increasing interest in and adoption of the methods of the 12-tone music of the Second Viennese School, Webern in particular. The chilly reception by the younger avant-garde to the premiere of Stravinsky’s neo-classical *The Rake’s Progress* in September 1951,¹⁵ his concentrated exposure to the works of Schoenberg and Webern in 1951-52,¹⁶ the influence of Robert Craft,¹⁷ and Schoenberg’s death in

¹² See Webern, *Path*, 32, regarding music in the Renaissance: “in relation to form, the greatest flowering of polyphony, through ever-increasing unity, with the result that in the late Netherland school a whole piece would be built out of a sequence of notes with its inversion, cancrizan, altered rhythm, etc. More unity is impossible, since everyone has the same thing to say.”

¹³ *Ibid.*, 27 (from his lecture of March 20, 1933).

¹⁴ See, e.g., Webern, *Path*, 34 (“*For everything happens in Bach*: the development of cyclic forms, the conquest of the tonal field, and, with it all, staggering polyphonic thought! Horizontally and vertically” (italics in original)).

¹⁵ Straus, *Stravinsky’s Late Music*, 2-3; Craft, “Influence or Assistance?,” 251-53.

¹⁶ In Cologne in the fall of 1951, Stravinsky listened “attentively” to recordings of Schoenberg’s *Violin Concerto* and *Moses und Aron*. Craft, “Influence or Assistance?,” 252. Stravinsky attended all the rehearsals and the February 24, 1952, performance conducted by Craft of Schoenberg’s Opus 29 *Suite*, with Craft calling Stravinsky’s attendance of these “the turning point in his later musical evolution,” coming immediately before his desert

July 1951¹⁸ all contributed to Stravinsky's turn toward the 12-tone method. His transformation even featured a nearly biblical trip into the Mojave Desert on March 8, 1952 (on a journey originally undertaken to eat spareribs in Palmdale¹⁹), in which he underwent an agonizing moment of self-reflection before emerging with a new creative direction.²⁰ Ultimately, in 1950s works like the *Cantata*, *Septet*, and *Canticum Sacrum*, Stravinsky gradually moved into the musical style that characterized his last 15 years as a composer, a way of working heavily indebted to both Webern and to much earlier composers like Machaut, Dunstaple, Isaac and Bach. As time passed, Stravinsky increasingly incorporated Schoenberg's 12-tone method into his works, so that by the late 1950s he was writing fully dodecaphonic works like *Threni* (1957-58) and the *Movements* for piano and orchestra (1958-59).

Stravinsky's enthusiasm beginning in the 1950s for Webern was manifested in numerous statements he made in his books written with Craft, in the scores that he studied, in the arrangements he undertook, and in the compositions themselves. According to Craft, "In the

"conversion" experience. Ibid. Regarding Stravinsky's exposure to the music of Webern in the early 1950s, see *infra*.

¹⁷ See Walsh, *Grove* "Stravinsky": "USA: the late neo-classical works, 1939-51" ("Compositionally, as we shall see, Craft guided Stravinsky into new waters, technically and aesthetically, and it is no exaggeration to say that without his influence the music after 1951 would have been radically different"); Walsh, *The Second Exile*, 314, on Craft's influence. Craft in the late 1940s and early 1950s had gradually entered into the role of Stravinsky's personal assistant and confidante; by 1953, "Stravinsky had come to depend on him, not just emotionally, but musically as well." Ibid.

¹⁸ Druskin, *Igor Stravinsky*, speculates that Schoenberg's death may have helped psychologically free Stravinsky to take serious interest in the 12-tone method (141); see also Joseph, *Stravinsky Inside Out*, 164; 247-48.

¹⁹ Craft, *Stravinsky: Chronicle*, 72.

²⁰ *Public Broadcasting Association*, recorded interview of Robert Craft for "Program VIII: The Serial Years" ("His crisis came in the spring of 1952. I can remember two weeks where Stravinsky was very troubled, he was unable to compose. We took a drive, one day, up into the Mojave Desert. And for the first time since I had known him, which was about five years then, he was very frank and started asking me all sorts of questions about the Schoenberg school, about how certain things were done, what he could read and study"; cited by Elder, *Late Choral Works*, at 41). The event in another telling by Craft shows Stravinsky's desperation: "he startled us, saying that he was afraid he could no longer compose and did not know what to do. For a moment, he broke down and actually wept He referred obliquely to the powerful impression that the Schoenberg piece [the *Opus 29 Suite*] had made on him, and when he said that he wanted to learn more, I knew that the crisis was over; so far from being defeated, Stravinsky would emerge a new composer." Craft, "Influence or Assistance?," 251-253 (Craft also dating the event as March 8, 1952). The story suggests comparison with the desert crises of self-definition of Jesus in Matthew 4:1-11/Luke 4:1-13 and of Elliott Carter in Arizona in 1950-51 (the year before Stravinsky's California experience), among others. Regarding Carter's "conversion" in the desert, see Schiff, *The Music of Elliott Carter*, 54-55.

years between 1952 and 1955 no composer can have lived in closer contact with the music of Webern.”²¹ When Stravinsky first heard Webern’s Opus 30 *Variations for Orchestra* at Baden-Baden in the fall of 1951, he was “stunned” by it and requested the operator to replay it two more times and again the following day (according to Craft, he “showed more enthusiasm than I had ever seen from him about any contemporary music”).²² Webern’s Opus 22 *Quartet* also made a strong early impression on Stravinsky, with him listening to it several times in January and February 1952.²³ On a trip to Belgium in May 1952, Stravinsky heard Craft’s tape of Webern’s *Das Augenlicht* and borrowed it from him.²⁴ Craft beginning in 1950 conducted in the “Evenings on the Roof” series of concerts in Los Angeles that featured programs placing new music alongside Renaissance and Baroque composers (the series was renamed the “Monday Evening Concerts” starting with the September 20, 1954, concert at which Stravinsky’s *In Memoriam Dylan Thomas* was premiered). A collection of “Evenings on the Roof” concerts in 1953, with Craft conducting, featured the works of Webern, and this led to Craft recording Webern’s complete works between 1954 and 1956.²⁵ Stravinsky was the nearly-constant companion of Craft at the time and attended most of the Webern rehearsals (some of them at Stravinsky’s house), spending them “continuously engrossed” in the scores.²⁶ Columbia only funded the recording sessions and released them because Stravinsky insisted on it, with the recording taking place at the conclusion of sessions otherwise devoted to Stravinsky works.²⁷ At some point, Stravinsky went so far as to copy out by hand both the sixth movement of Webern’s

²¹ Craft, “A Personal Preface,” 13.

²² Craft, “Influence or Assistance?,” 252.

²³ Craft, “A Personal Preface,” 12; White, *Stravinsky*, 431 & n.2.

²⁴ Craft, “Influence or Assistance?,” 253-54.

²⁵ Yates, “Anton Webern Complete,” 39; Walsh, *The Second Exile*, 332-33.

²⁶ Yates, “Anton Webern Complete,” 39 (Stravinsky’s attention to the scores); Walsh, *The Second Exile*, 323 (regarding rehearsals at Stravinsky’s house).

²⁷ Day, *A Century of Recorded Music*, 117-18 (citing an interview with Craft). But see Walsh, *The Second Exile*, 323, where Walsh states that Craft “had persuaded Columbia’s director of repertoire, David Oppenheim, to let him record [Webern] in September” 1954.

Opus 31 *Cantata* and the complete score of Webern's arrangement of the Bach *Musical Offering* ricercar.²⁸ Stravinsky's letters also suggest the extent of his fascination with Webern, as they document his requests for Webern scores (in a September 29, 1955, letter he requests a second copy of the Opus 30 *Variations* to replace his first copy, as "I probably lent it to somebody [which] means that I have to consider it as lost"²⁹). Stravinsky also sought repeatedly in letters to obtain a copy of Webern's edition of the second volume of Isaac's *Choralis Constantinus*.³⁰ In 1955 Stravinsky wrote a brief foreword for the *Die Reihe* issue dedicated to Webern in which he hailed him as an unappreciated prophet who created "dazzling diamonds."³¹ A decade later, in a 1965 interview, Stravinsky revealed which Webern pieces by that time he considered most important — the Opus 20 *Trio*, the *Symphony* (Opus 21), and the *Variations for Orchestra* (Opus 30).³²

Even Stravinsky's genre choices in his own compositions and arrangements in the 1950s and '60s suggested his intense interest in Webern. Stravinsky followed Webern's example in writing a 1952 *Cantata* as well as the de facto cantata, *Canticum Sacrum* (1955; cf. Webern's Opus 29 and Opus 31); a 12-tone piano concerto (the *Movements*, 1959; cf. Webern's Opus 24); an orchestral *Variations* (cf. Webern's Opus 30); and a transcription of a late Bach canonic work (Stravinsky's *Vom Himmel hoch* variations following Webern's *Musical Offering* ricercar orchestration).³³ In addition to his use of canon (see *infra*), other elements of Stravinsky's music

²⁸ Tucker, *Stravinsky and His Sketches*, Vol. 1, 211-12 (the *Cantata*); V. Stravinsky and Craft, *Pictures and Documents*, 384 and 649 n. 72; Moldenhauer, *Chronicle*, 677 n. 23 (the ricercar).

²⁹ Craft, ed., *Stravinsky: Selected Correspondence*, Vol. 3, 391.

³⁰ See 10-27-55 letter to Bielefeldt, *ibid.*, 393; 5-12-57 letter to Nadia Boulanger (Craft, ed., *Stravinsky: Selected Correspondence*, Vol. 1, 259).

³¹ Stravinsky, "Foreword," vii.

³² Moldenhauer and Irvine, *Anton von Webern: Perspectives*, xxvi.

³³ Stravinsky's *Septet* (1952-53) appears to draw inspiration from the Schoenberg Opus 29 *Septet-Suite* that Craft says had made such an impact on Stravinsky in February 1952. Craft, "Influence or Assistance?," 252-53 (describing the impact that Stravinsky's attendance of the rehearsals and performance of Schoenberg's *Suite* had on him); Huscher, "Stravinsky-*Septet*" (noting the effect of Schoenberg's *Septet-Suite* on Stravinsky and the similarity

sporadically suggest Webern's influence, such as row construction and orchestration (see, for example, the pointillistic orchestration in Stravinsky's orchestral *Variations*). The choral canons of *Canticum Sacrum*'s third movement (*Ad Tres Virtutes Hortationes*) appear more than any other moment in late Stravinsky to be modeled after Webern, with their choral double canons by inversion, optional instrumental doublings of the voices, and (in Stravinsky's draft) separate barring for each part strongly recalling the sixth movement of Webern's second *Cantata*, Opus 31.

As Stravinsky delved into Webern's work for inspiration, he simultaneously became enraptured with pre-tonal music, particularly with Webern's subject of study, Heinrich Isaac. Stravinsky's interest in Schoenberg and Webern was closely tied to his interest in early music. According to Craft, "What interested him was the connection between new and old music: between these new procedures of Schoenberg's and music of the very distant past."³⁴ Craft encouraged Stravinsky's interest in early music, even as he did his newfound affinity for the music of the Second Viennese School. As Stephen Walsh puts it, "Stravinsky's interest in old music long predated his association with Craft, but the intensity of the latter's enthusiasm and its practical outcome in concerts that Stravinsky attended meant that its sound was suddenly a presence in his creative ear in a way that it had seldom been before."³⁵ Isaac was a primary focus of Stravinsky's interest. In addition to the later letters of 1955 and 1957 documenting his attempts to obtain Webern's edition of the second volume of the *Choralis Constantinus* (see n.

of instrumentation with Stravinsky's own *Septet*); Taruskin, *Stravinsky and the Russian Traditions*, Vol. 2, 1648 (stating that the influence of Schoenberg's septet on Stravinsky's is "obvious").

³⁴ *Public Broadcasting Association*, recorded interview of Robert Craft for "Program VIII: The Serial Years" (quoted by Elder, *Late Choral Works*, 41).

³⁵ Walsh, *The Second Exile*, 324.

30, above), Stravinsky and Craft played through parts of Isaac's masterwork together at the piano in early 1952.³⁶ Stravinsky in a December 1952 newspaper interview spoke glowingly of Isaac:

He is my hobby, my daily bread. I love him. I study him constantly. And between his musical thinking and writing and my own there is a very close connection. . . . It is his contrapuntal mentality that interests me. See — here is the newly published volume of his 'Choralis Constantinus,' Book III. A great work. Not a home should be without it.³⁷

Stravinsky here referred to the modern edition of the third volume of the *Choralis Constantinus*, edited by Louise Cuyler and published two years earlier in 1950.³⁸ Elsewhere in the interview, Stravinsky claimed, "As never before, I am today interested in purely contrapuntal music."

When asked whether he had Bach in mind, he replied, "not at all. Long before. Dufay, Machaut, and most of all Heinrich Isaak."³⁹

As this statement makes clear, Stravinsky in the 1940s and early '50s was intensely interested in the music of several other early composers besides Isaac, most prominently Machaut, Josquin, and Gesualdo. Stravinsky's interest in Machaut had begun no later than the mid-1940s, when Stravinsky wrote his *Mass* (1944-48). Horst Weber has called Stravinsky's *Mass* "The first work of the 20th century to evoke associations with Machaut."⁴⁰ Craft wrote that Stravinsky was closely studying the music of Machaut and Jacopo da Bologna at the time he was composing his *Mass*.⁴¹ With regard to the question of whether he had been influenced by the Machaut *Messe*, Stravinsky in the 1959 *Expositions and Developments* claimed to have had

³⁶ On January 31, 1952, if not on other occasions. Craft, *Stravinsky: Chronicle*, 71-72.

³⁷ Harrison, "Talk with Stravinsky."

³⁸ Heinrich Isaac, *Choralis Constantinus*, Vol. 3, ed. Louise Cuyler (Ann Arbor: University of Michigan Press, 1950).

³⁹ Harrison, "Talk with Stravinsky."

⁴⁰ Weber, "Zu Stravinskys Machaut-Rezeption," 317 ("Das erste Werk des 20. Jahrhunderts, das Assoziationen an Machaut wachrief").

⁴¹ Walsh, *The Second Exile*, 170; Craft, *Glimpses*, 288.

no knowledge of it at the time he was composing his own.⁴² Nevertheless, in addition to Craft's claim of Stravinsky having studied Machaut at the time, Craft reports that Stravinsky was listening to a recording of the *Messe* in 1948, and that Stravinsky had heard performances of it in the 1920s and 1930s.⁴³ The first complete modern edition of Machaut's *Messe* was published in Liège in January 1948,⁴⁴ two months before Stravinsky completed his *Mass* on March 15;⁴⁵ portions of Machaut's masterwork, however, had been published earlier, and copies of Ludwig's transcription in manuscript form were already circulating.⁴⁶ In any event, Stravinsky apparently ordered Ludwig's published edition of the *Messe* in August 1954 while working on *Agon* and just before the bulk of his work on *Canticum Sacrum*.⁴⁷ Machaut was not the only influence on Stravinsky's *Mass*, however. Musicologist Herbert Murrill wrote a 1951 article in which he showed some close similarities between Stravinsky's *Mass* and Matteo da Perugia's early fifteenth-century mass,⁴⁸ and a letter from Stravinsky of December 10, 1947, requested copies of "Palestrina's Masses."⁴⁹ Stravinsky himself claimed his mass was partly inspired by Mozart masses he had picked up in 1942 or 1943 at a second-hand Los Angeles bookstore.⁵⁰ Taruskin,

⁴² Stravinsky and Craft, *Expositions and Developments*, 77 ("I heard Machaut's *Mass* for the first time a year after mine was composed, and I was not influenced in my *Mass* by any 'old' music whatever, or guided by any example"). Walsh says Stravinsky's claim "is hard to take seriously." Walsh, *The Second Exile*, 170.

⁴³ Weber, "Zu Strawinskys Machaut-Rezeption," 318 (citing a 1985 letter from Craft to Weber).

⁴⁴ Gombosi, "Machaut's *Messe Notre-Dame*," 204.

⁴⁵ Walsh, *The Second Exile*, 219.

⁴⁶ Weber, "Zu Strawinskys Machaut-Rezeption," 317-18.

⁴⁷ Earp, *Guillaume de Machaut*, 282 n. 22. In an August 4, 1954, letter, Stravinsky asked "urgently" for a Machaut volume, the collected works of Luis de Milán (1500-1561), and Schütz's collected works, saying he needed these "at once." Craft, ed., *Stravinsky: Selected Correspondence*, Vol. 3, 382. Regarding the dates of Stravinsky's work on *Agon* and *Canticum Sacrum*, see Walsh, *Grove* "Stravinsky": "The proto-serial works, 1951-9" (dating Stravinsky's work on the two pieces); Tucker, *Stravinsky and His Sketches*, Vol. 1, 287 (noting that Stravinsky's December 4, 1954, letter suggests he had at that point begun planning *Canticum Sacrum*).

⁴⁸ Murrill, "Aspects of Stravinsky." Craft wrote in 2006 that musicologist Manfred Bukofzer (see *infra*) gave Stravinsky some Matteo da Perugia recordings in 1944, that Stravinsky still treasured them in 1948, and that Stravinsky admitted that they had influenced the composition of his *Mass*. Craft, "A Modest Confutation."

⁴⁹ Craft, ed., *Stravinsky: Selected Correspondence*, Vol. 3, 320.

⁵⁰ Stravinsky and Craft, *Expositions and Developments*, 77.

meanwhile, points to the possible influence on the *Mass* of Davison's and Apel's *Historical Anthology of Music* (1946) as well as of other anthologies.⁵¹

The "Evenings on the Roof" concert series helped feed Stravinsky's interest in early music. The Evenings on the Roof and Monday Evening Concerts of the early- to mid-1950s included performances of works by Gesualdo, Purcell, Schütz, Gabrieli, Monteverdi, and Willaert, among many other Baroque and Renaissance composers.⁵² Stravinsky regularly attended Craft's performances of early and new music at these concerts, as well as numerous rehearsals, even allowing his home at times to be used as a rehearsal space.⁵³ Stravinsky also read Ernst Krenek's monograph on Ockeghem, and discussed him with Krenek at their frequent meetings in the summer of 1955.⁵⁴ Lukas Foss reported that Stravinsky in the early 1950s studied Josquin "like a scholar."⁵⁵ Stravinsky compared his use of polyrhythm in his *Movements* for piano and orchestra with that in the second *Agnus Dei* in Josquin's *Missa l'homme armé*.⁵⁶ Craft was involved in the 1950s in making Gesualdo recordings, with Stravinsky also following the progress of the project, and Stravinsky's interest in Gesualdo eventually resulted in two sets of free arrangements of the Renaissance master — the *Tres Sacrae Cantiones* of 1957-59 and the *Monumentum pro Gesualdo di Venosa* of 1960. Finally, Bach's music belonged to the tonal era but in his revival of contrapuntal techniques still must be counted as a primary influence on Stravinsky during his serial period, as Bach had been for the serial Webern as well. Otto Klemperer, who saw Stravinsky "often" while both were in Los Angeles, reported that

⁵¹ Taruskin, *Russian Traditions*, Vol. 2, 1623.

⁵² Reale, "Los Angeles, 1994."

⁵³ Crawford, *Evenings on and off the Roof*, 273.

⁵⁴ Joseph, *Stravinsky and Balanchine*, 221 (asserting Stravinsky read Krenek's book); Walsh, *The Second Exile*, 331 (Stravinsky's discussions with Krenek).

⁵⁵ *Public Broadcasting Association*, recorded interview of Lukas Foss for "Program VIII: The Serial Years" (quoted by Elder, *The Late Choral Works*, 43).

⁵⁶ Stravinsky and Craft, *Memories*, 107 (also comparing it to Baude Cordier's *Pour le deffault du dieu Bacchus*).

Stravinsky played Bach's *Well-Tempered Clavier* on a daily basis.⁵⁷ As Webern had orchestrated the *ricercar* from the *Musical Offering*, Stravinsky made a 1956 arrangement of Bach's *Chorale Variations on Vom Himmel hoch* (like the *Musical Offering* *ricercar*, the *Vom Himmel hoch* variations were among Bach's last works; Stravinsky transcribed them for performance at the same September 1956 Venice concert at which *Canticum Sacrum* was premiered). For both Webern and Stravinsky, Bach remained a model for contrapuntal techniques even as they closely studied pre-tonal music.

Important to recognize in detailing Stravinsky's interest in early music in the late stages of his career is also Stravinsky's personal relationships with two prominent young musicologists of the day — Manfred Bukofzer and Edward Lowinsky. Stravinsky had met the 34-year-old Bukofzer, a University of California, Berkeley, professor, while in Oakland for a concert in October 1944, with Bukofzer playing Stravinsky some early music recordings, and the two maintained a friendship through letters after that.⁵⁸ According to Craft, Bukofzer gave Stravinsky some Matteo da Perugia recordings at their 1944 meeting, and Stravinsky later admitted that these recordings had influenced the composition of his *Mass*.⁵⁹ Bukofzer also at some point (possibly in April 1947) sent Stravinsky his 1942 article "Speculative Thinking in Mediaeval Music," which, with an example from Dunstaple's motet *Dies dignus decorari*, introduced readers to the "very strange technique" of isorhythm.⁶⁰ Craft reports that the article heavily influenced Stravinsky.⁶¹ There is a good chance that this article played a significant role

⁵⁷ Klemperer, *Minor Recollections*, 50.

⁵⁸ Walsh, *The Second Exile*, 162, 196; V. Stravinsky and Craft, *Pictures and Documents*, 645 n. 30.

⁵⁹ Craft, "A Modest Confutation."

⁶⁰ Bukofzer, "Speculative Thinking," 178-180 (quotation on 178).

⁶¹ The article "had an effect on [Stravinsky] comparable to those of Cingria (*Pétrarque*) and Handschin (*Gregorianisch-Polyphones*) a decade earlier." Craft, *Glimpses*, 306 (in the essay "Pluralistic Stravinsky," referring to two Swiss writers who had strongly influenced Stravinsky in the 1930s). Craft here claims that Bukofzer sent Stravinsky this article in 1942, but this was before Stravinsky and Bukofzer had met (as well as before Stravinsky and Craft had met) and appears to be an error (see Walsh, *The Second Exile*, 608 n. 32, casting doubt on Craft's

in opening Stravinsky's eyes to an understanding of isorhythmic techniques — he would go on in the 1950s and 60s to make extensive use of such techniques in works like *Canticum Sacrum* (1955), the *Movements* for piano and orchestra (1959), and the *Variations (Aldous Huxley in Memoriam)* (1964).⁶²

Stravinsky's relationship with Edward Lowinsky, who taught at Berkeley after Bukofzer's death (1956-1961), also contributed to his understanding and interest in early music during his late period. Publications of Lowinsky that he sent Stravinsky included his *Secret Chromatic Art in the Netherlands Motet* (1946), which argued that certain Renaissance motets, by means of unnotated accidentals, engaged in "hidden" modulations.⁶³ Lowinsky also sent Stravinsky his articles "The Goddess Fortuna in Music" and "Adrian Willaert's Chromatic 'Duo' Re-Examined."⁶⁴ Stravinsky engaged in correspondence with Lowinsky that suggests he had read *Secret Chromatic Art in the Netherlands Motet* carefully, and Stravinsky's copy of the book is filled with annotations and highlighting (though these are in Craft's hand).⁶⁵ Later, Stravinsky, fresh off his two Gesualdo arrangements of 1959 and 1960, wrote the foreword to Lowinsky's *Tonality and Atonality in Sixteenth-Century Music* (1961), a work that sought to

claim). It seems possible, if not probable, that Bukofzer's "Speculative Thinking" was the "article on isorhythm" that Craft in *Pictures and Documents* reports Bukofzer sent to Stravinsky on April 8, 1947, given that Bukofzer did not publish any other articles explicating isorhythmic practice. V. Stravinsky & Craft, *Pictures and Documents*, 645 n. 30.

⁶² It is difficult to know to what extent Stravinsky was aware in the late 1940s and early 1950s of the use of isorhythmic or quasi-isorhythmic techniques in the works of younger composers like Messiaen and Boulez (e.g., Messiaen's *Quatuor pour la fin du temps* (1941) or Boulez's *Structures Ia* (1952)). Stravinsky attended the premiere of *Structures Ia* in Paris on May 7, 1952, with Boulez and Messiaen performing the two-piano work (Walsh, *The Second Exile*, 288; Craft, *Chronicle*, 77), and at some point even acquired the score and began marking row-forms on it (Joseph, *Inside Out*, 251). It is unclear, however, to what extent and at what point in time Stravinsky was aware of the approach to duration used by Boulez in the piece. Stravinsky also attended rehearsals of Boulez's *Polyphonie X* in the fall of 1952 (after having first heard a recording of the work in October 1951) and, according to Craft, analyzed the score. Craft, "Boulez in the Lemon and Limelight," 209 (attending rehearsals and analyzing the score); Straus, *Stravinsky's Late Music*, 33; Craft, *Stravinsky: Chronicle*, 67 (hearing the recording in 1951).

⁶³ Cf. David Hockney's 2001 book *Secret Knowledge*, about Renaissance painters' purported secret use of lenses or concave mirrors to make paintings with accurate perspective. New York: Viking Studio, 2001.

⁶⁴ Craft, ed., "Selected Source Material," 356.

⁶⁵ Joseph, *Inside Out*, 252.

trace the origins of common-practice tonality in sixteenth-century music. It's difficult to know the extent to which Stravinsky himself, as opposed to Craft, gained knowledge of Renaissance music through these works,⁶⁶ but his friendship with both Bukofzer and Lowinsky seemed to further contribute to his knowledge and interest in early music during this time period.

III. Strict rhythmic process generally.

“Isorhythm” (or in its original German form “*Isorhythmie*”) is a term coined by musicologist Friedrich Ludwig in 1904 for an originally medieval process. Ludwig used it to describe the return of a rhythmic pattern in the motetus part of a thirteenth-century motet when the pitches were different than in the first appearance of the rhythmic pattern. Over the course of the twentieth century the term “isorhythm” was applied to an increasing diversity of works from the fourteenth and fifteenth centuries (as well as twentieth-century works) and Margaret Bent, among others, has been critical of the expanded usage of the term.⁶⁷ The relevant medieval terms that were used were *talea* (“a cutting”), for the returning rhythmic pattern, and *color*, for a returning series of pitches (though medieval theorists did not always view these terms in precisely this fashion⁶⁸). The practice gradually evolved over the course of the thirteenth and fourteenth centuries from the simpler rhythmic repetitions with shorter patterns of the rhythmic modes to longer *taleae* that were independent of the rhythmic modes. The use of a repeating

⁶⁶ Joseph is highly skeptical, saying regarding Stravinsky's interest in early music in the early 1950s, “There is nothing suggesting that he wrestled with deeper musicological or analytic problems.” Ibid.

⁶⁷ Bent, “What is Isorhythm?” (early use of the term discussed at 123-24; Bent's arguments summarized at 138-39); Bent, *Grove* “Isorhythm.” Bent's primary criticisms of broad application of the term “isorhythm” are: 1) that a *talea* that undergoes mensural or proportional changes is not the same as the original *talea*, so the term “isorhythm” should not be used to describe the relationship between the two forms of the *talea*; 2) twentieth-century musicologists have hindered understanding of the wide variety of medieval and Renaissance approaches to the use of chant in their creation and privileging of a genre, the “isorhythmic motet,” that did not in fact exist as such in early music. (“The emphasis on identity has fostered a view of the isorhythmic motet as a rule-bound monolith, whence it became the prestigious and defining genre of the French Ars Nova, to the detriment of the varied range of motet strategies both covered by and excluded from it.” Bent, *Grove* “Isorhythm”: “5. Generic status; limits of the term.”) Bent associates twentieth-century musicologists' approach to this genre with the rise of serialism and total serialism among twentieth-century composers. Ibid.

⁶⁸ Bent, *Grove* “Isorhythm”: “1. Medieval theory”; Sanders, “Talea.”

talea in a tenor chant melody represented another means of making creative use of a chant repertory that had already been in place for centuries, and continued the long-existing tendency to create tension between the structure of the polyphonic work and the long-established, preexistent chant structure. Isorhythm was originally used primarily in the tenor voice of a motet, but composers over the course of the fourteenth and fifteenth centuries increasingly made use of isorhythm in the upper voices as well. By the time of Dunstaple's fifteenth-century motets, "panisorhythm," with isorhythm in all parts, was common. In addition, isorhythm, which was originally used almost exclusively in motets, began in the fourteenth century to appear in other genres, such as the mass, most famously in Machaut's *Messe de Nostre Dame*. The repetition of a *color* or *talea* in diminution was often a part of isorhythmic practice from its earliest appearances, and by Dunstaple's time had largely been standardized into the three-part diminishing structure of many of his motets. After Dunstaple and Dufay, strict isorhythm became increasingly regarded as an outdated technique, though Bent points out that vestiges of isorhythmic practice continued in the cyclic mass of the fifteenth century.⁶⁹ Isorhythmic techniques remained mostly dormant for nearly 500 years until composers like Berg (most famously in *Wozzeck*'s Act III, Scene 3 (1925)) and Messiaen (most prominently in the first movement of the *Quatuor pour la fin du temps* (1940)) again began engaging in large-scale rhythmic repetition in which the pitches change.

Canon as a technique originated in oral traditions predating the first notated examples of the thirteenth century. The thirteenth-century rota *Sumer is icumen in* is the first known notated example of what we now call canon. An early distinction existed between the rota or round, which could go on indefinitely, and fuga, which consisted of strict imitation with a definite ending. What we now call canonic imitation achieved prominence in some fourteenth century

⁶⁹ Bent, "What is Isorhythm?," 135-37.

works of Machaut, most especially *Sanz cuer m'en vois*. In the fifteenth century canon gradually replaced isorhythm as the strict rhythmic process of choice. Ockeghem in his *Missa prolationum* expanded canonic technique beyond just exact intervallic imitation to include imitation in which the qualities of intervals were adjusted, the latter allowing for strict imitation at imperfect intervals. This innovation helped propel canonic technique to a position of greater prominence in the late fifteenth and early sixteenth centuries. Zarlino in the sixteenth century specified the term *fuga* as the older technique of maintaining a strict intervallic relationship and *imitatione* for the more recent technique of adjusting the quality of intervals. During the sixteenth century, the term “canon” gradually began to be used in its modern sense. Composers and theorists in the sixteenth century viewed canon and freer imitation as part of a continuum of imitative textures rather than as categorically distinct approaches. After the sixteenth century canon was viewed primarily as a pedagogical tool, though Bach, in the last two decades of his life, brought the art to another historical high point. In the twentieth century, composers like Schoenberg and Webern returned to canon as a means of structuring post-tonal music, much as other composers came to return to isorhythm.

Canon, like isorhythm, involves the strict repetition of a rhythmic pattern, but differs from the latter technique most prominently in that 1) pitches (or a systematically altered form of the original pitches) are repeated as well; and 2) the repetition occurs overlapping with the original iteration. There is nonetheless overlap between canon and isorhythm, and there are techniques that have attributes of both. Rhythmic canon can be seen as an amalgam of the two techniques: the imitating line overlaps with the original iteration as in canon, but only the rhythm is repeated while pitches change, as in isorhythm. Webern employs rhythmic canon most prominently at the start of the third movement of his Opus 24 *Concerto* and in Opus 26, *Das*

Augenlicht. Another variation on these approaches is that used by Messiaen in the first movement of his *Quatuor pour la fin du temps*, where two independent isorhythmic processes proceed simultaneously in two separate instruments, accompanying two other instruments performing non-isorhythmic lines. Strict rhythmic technique of another sort can be seen in Stravinsky's *Canticum Sacrum*, wherein the first movement of the piece is retrograded as a whole (with few changes) in the fifth movement. The process here applies both to rhythm and pitch, as with canon (with a transformation, cancrizans, familiar from canonic uses), but the repetition is occurring to a large chunk of music without any overlap of the original iteration, as with isorhythm. Stravinsky engages in a similar technique in the *Saraband-Step* movement of *Agon* (II(i)), where the second half of the movement repeats the rhythm of the first half while inverting the intervals of the pitches both melodically and in chords. The number of possible varieties of rhythmic process, using elements of canon, isorhythm, or both, is endless.

One question that arises is the extent to which the strictness of the composer's approach to rhythmic process, whether it be isorhythm, canon, or some variant, governs the effect of the process. This question comes up especially with Isaac and Webern. Isaac's *Johannis Baptistae* mass proper engages in a fair amount of imitation that is nearly canonic or that is canonic for only a very brief span, yet it also has passages of extended strict canon. At the time of Isaac's composition of the *Johannis Baptistae* proper (the early sixteenth century), composers and theorists did not see sharp dividing lines between strict and freer imitative techniques, with both as part of a continuum. Meanwhile, Webern has a very strict approach to canon in the Opus 21 *Symphony*, but in *Das Augenlicht* (Opus 26) he makes frequent adjustments to the rhythmic canon in the orchestra, such that the distance between *dux* and *comes* varies and the roles of *dux* and *comes* are even at times exchanged. The listener in some contexts may be able to perceive

the presence or absence of strict process, though it is possible for a composer to give the aural impression of strictness while still making subtle alterations to the system. In the end we can distinguish analytically between strict applications of rhythmic process and free applications of it, if only because of 1) the difference that is created from a symbolic or philosophical point of view; and 2) the difference created in the composer's work process. Strictness is ultimately a matter of degree, as even the strictest applications of rhythmic process may have subtle irregularities. As Leech-Wilkinson says of Machaut's *Messe*,⁷⁰ the instances of deviations from a strict process give clues as to the composer's priorities. By the same token, instances where a composer strictly maintains a process without exception reveal a prioritization of the process itself.

Another overarching issue relevant to any discussion of rhythmic process in the composers at issue is the extent to which the process interacts with a controlling pitch series, whether it be the pitches of a chant in pre-tonal music or the twentieth-century analogue in some respects — the 12-tone row.⁷¹ Isorhythm arose in chant-based works as a means of cutting up (as in *talea*, “a cutting”) a chant. The composer subjected the underlying chant, the *color*, to the regimen of the *talea*, the rhythmic process effectively doing violence to the chant by chopping it up in a manner that usually was in opposition to the melodic and textual structure of the chant. When isorhythm was extended to one or more upper voices, the texts of these upper parts could also be compromised.⁷² Our understanding of a given application of rhythmic process in a

⁷⁰ Leech-Wilkinson, *Machaut's Mass*, 22-23.

⁷¹ Both chant in early polyphonic music and the 12-tone row in twentieth-century compositions function as simple fixed pitch structures that are elaborated upon or varied in order to form more elaborate musical structures. In both cases the original series of pitches may not be audibly discernable in the resultant composition.

⁷² See Ludwig's discussion of the effect of isorhythm on medieval motets: “a purely rhythmic principle prevails over verse metre and word accent, which soon establishes itself just as despotically as at the beginning of the history of the motet when, conversely, text metre completely governed the musical rhythm. The new principle [on the contrary] even extends the application of isorhythm to the upper voices . . . This necessarily leads to acts of violence [*Gewalttätigkeiten*] . . .” Ludwig, “Studien,” 223-24; translated and cited in Bent, “What is Isorhythm?,” 124.

fourteenth- or fifteenth-century isorhythmic work must take into account the relationship of that process to the *color*. Some works from the period are isomelic — with the repetition of a series of pitches in different rhythms from the first appearance of the series — in addition to or instead of being isorhythmic,⁷³ and in such circumstances it is important to assess the relationship of the pitch process to the rhythmic process. The 12-tone serialism of the twentieth century is a latter-day form of isomely, and rhythmic process in the serial works of Webern and Stravinsky must be assessed in light of its relationship to the use of the row. One way of comparing Webern's and Stravinsky's use of rhythmic process with their pre-tonal predecessors is by looking at the extent to which rhythmic process is in conflict with or supporting the structure of the pitch process. While Stravinsky tends to proceed by having his rhythmic processes support the presence and structure of the row, we see in Webern much more of a proclivity to make his rhythmic processes in conflict with his 12-tone structure. Both approaches have antecedents in the pre-tonal music that Webern and Stravinsky looked to for inspiration.

IV. Three pre-tonal composers and rhythmic process.

Machaut's *Messe de Nostre Dame*, Dunstaple's motet *Dies dignus decorari*, and Isaac's *Choralis Constantinus* apparently played crucial roles in Stravinsky's study of pre-tonal music in the late 1940s and early 1950s. The second volume of the *Choralis Constantinus* also was central to the education of Webern on the subject of the Franco-Flemish masters of the fifteenth and sixteenth centuries. The approaches of Webern and Stravinsky to the use of isorhythm, canon, and rhythmic canon draw significantly on these earlier works, and the pre-tonal pieces reflect many of the same issues that arise in analysis of rhythmic process in Webern's and Stravinsky's serial music. Machaut's *Messe* shows a carefully-tailored approach to the use of rhythmic process, employing different varieties of isorhythmic approaches as well as non-

⁷³ See Bent, "What is Isorhythm?," 128-29.

isorhythmic passages to create a varied palette of textures. In Dunstaple's fifteenth-century motet *Dies dignus decorari* isorhythm and diminution govern the entirety of the work, though the complexity of the scheme creates enough variety so as to sustain interest across its duration. The *Johannis Baptistae* mass proper cycle from Isaac's sixteenth-century *Choralis Constantinus* employs canon rather than isorhythm, selectively applying strict imitation in a larger scheme that also includes instances of monophonic chant, near-homophony, and freer imitative polyphony.

A. The Agnus Dei of Machaut's *Messe de Nostre Dame*.

Machaut's *Messe de Nostre Dame*, an apparent inspiration for Stravinsky in his employment of isorhythm in *Canticum Sacrum*, *Agon*, and the *Variations (Aldous Huxley in Memoriam)*, makes significant use of the technique. It was likely composed in the 1360s.⁷⁴ Of this mass's six movements, each of which polyphonically sets to music one of the principal portions of the mass ordinary, four are built primarily on isorhythmic structures; the other two, the Gloria and Credo, are principally homorhythmic, but have isorhythmic or quasi-isorhythmic Amen sections at their conclusions. The use of isorhythm in the Kyrie, Sanctus, Agnus Dei, and *Ite Missa Est*, as well as in the Amens of the Gloria and Credo, is a borrowing from motet style, where a chant in the Tenor would be "cut" up by a repeating *talea*. In the isorhythmic portions of his *Messe*, Machaut puts the chant in the Tenor, applies a repeating *talea* to it, and creates a counterpoint to the Tenor in the equally isorhythmic Contratenor. The upper two voices are for the most part isorhythmic only sporadically, most commonly in hocket-like passages, though Machaut uses panisorhythm in the Credo Amen and in the second section of the Agnus Dei. This essay will focus on the mass's Agnus Dei because of the variety of rhythmic approaches within it, both isorhythmic and not, as well as because of the connection with Webern's second *Cantata* (the final movement of which Webern likened to the Agnus Dei of a mass; *see infra*).

⁷⁴ Leech-Wilkinson, *Machaut's Mass*, 8.

Machaut's *Agnus Dei* is in three sections, with the first and second sections containing contrasting isorhythmic schemes (the third section replicates the first, except for a change in the text). Each section also contains a non-isorhythmic introduction.

The three-part structure of this *Agnus Dei* movement accords with the tripartite division of the text that by Machaut's time had been established for centuries: *Agnus dei qui tollis peccata mundi, miserere nobis; Agnus dei qui tollis peccata mundi, miserere nobis; Agnus dei qui tollis peccata mundi, dona nobis pacem.*⁷⁵ While the form of the text is thus AAB, Machaut's polyphonic setting adopts the design ABA', making the first and third sections identical except for the change in text in the third part, with a contrasting middle section. Machaut uses different but related chants for the first and second sections. The Tenor in both of the first two sections has a *color*/chant of 34 pitches, the first eight of which differ between the two sections and the last 26 of which are the same. The structures of the chants are as follows:

Chants used in Machaut's *Agnus Dei* (Roman numerals indicate Machaut's *talea* statements)

Agnus I

a b a'

A - gnus de - i qui tol - lis pec - ca - ta _____ mun - di mi - se - re - re ___ no - bis;

I II

Agnus II

c b a'

A - gnus de - i qui tol - lis pec - ca - ta _____ mun - di mi - se - re - re ___ no - bis;

I II III IV V VI

Agnus III

a b a'

A - gnus de - i qui tol - lis pec - ca - ta _____ mun - di do - na no - bis pa - cem.

I II

⁷⁵ Lamb of God, who takes away the sins of the world, have mercy on us; Lamb of God, who takes away the sins of the world, have mercy on us; Lamb of God, who takes away the sins of the world, grant us peace.

In each of the first two sections, Machaut makes the music for the initial words “Agnus dei” (covering the first nine chant notes in the Tenor) nonisorhythmic. These differing first nine pitches are labeled “a” and “c” in the musical example above. Excepting these nine pitches leaves 25 chant notes (identical in both of the first two sections) for the remainder of each section, which can be divided into a contrasting “b” and the return of a variant of the initial statement (a’). Machaut’s isorhythmic structure follows the ABA structure of the chant melodies he uses. In the first section (“Agnus I”), Machaut imposes a *talea* of 12 durations on the Tenor chant, resulting in an allocation of the 25 *color* notes of 12+12+1 final. In this first section of the Agnus Dei (thus as well in the nearly identical third section, “Agnus III”) the Tenor and Contratenor follow this isorhythmic pattern while the upper two voices are isorhythmic only when engaged in hocket-like rhythmic alternations (see mm. 8 and 15; 10-11 and 17-18⁷⁶); the rest of the time the upper voices have rhythms that vary in the second appearance of the *talea*. In the unique second section (“Agnus II”), the nonisorhythmic “Agnus dei” introduction (again, nine chant notes in the Tenor) is followed by music that sets the remaining 25 chant notes, but with a different *talea* that is only four durations long. The *talea* divides the Tenor chant in this case as 4+4+4+4+4+4+1 final. As a result of Machaut using two different *taleae* in Agnus I and Agnus II, the same chant pitches (b and a’ in both) have different durations in the two sections. The *talea* structure governs the aural impression of cadences because Machaut employs longs (notated as dotted whole notes in the Leech-Wilkinson edition) only as the first duration of a *talea* and uses simultaneous longs in all four parts at these junctures. The extremely short *talea* in Agnus II therefore results in the effect of frequent cadences. In another contrast with Agnus I and Agnus III, in Agnus II the entire texture is panisorhythmic throughout, all four voices replicating their first rhythmic pattern in each iteration of the tenor *talea*.

⁷⁶ Measure numbers from Leech-Wilkinson’s edition in *Machaut’s Mass*, 183-212.

The use of isorhythm to “cut” the Tenor chant melody into equal segments almost inevitably results in a greater or lesser disruption of the chant’s melodic and textual structure, and that is the case here. In fourteenth-century isorhythmic motets such disruption of the preexistent chant by the use of isorhythm was common practice.⁷⁷ But Machaut’s isorhythmic design is not arbitrary; instead it creates an aesthetically compelling structural tension in his polyphonic setting of the movement that is only resolved at its conclusion of individual sections. Machaut’s division of the Agnus Dei movement into three larger musical sections accords with the musical and textual structure of the chant: he sets the three sections of the chant, each beginning with the words “Agnus dei,” as three distinct polyphonic musical sections that each end with longs in all four voices and a perfect fifth on the final F (F-C; m. 21 in Agnus I and III; m. 25 in Agnus II). The breaking off of the words “Agnus dei” into non-isorhythmic introductions also is consistent with the melodic structure of the chant, whose “a” and “c” divisions are distinct from the repeated melodic material that follow them and end after a melisma with a cadence on the final F (m. 6 in each section). The isorhythmic portion of the first Agnus Dei, however, divides the last 24 pitches (excluding the final) in half, which leads to a cadence (longs in all four parts) on a B-minor triad at the conclusion of the word “peccata” (m. 14).⁷⁸ A cadence in this spot seemingly undermines to a significant extent the meaning of the text as well as the melodic structure of the chant, since the “mundi” that immediately follows modifies “peccata” and ends the textual and melodic phrase on a C, a fifth above the final F. In

⁷⁷ Leech-Wilkinson, *Machaut’s Mass*, 22. Leech-Wilkinson, however, suggests that the closer, more holistic relationship between the chant and the polyphonic setting in the case of a mass as opposed to a motet might have led Machaut to take greater care not to conflict with the structure of the chant: “In an isorhythmic mass . . . the situation was rather different. Here the composer was using the whole chant, and using it for its original purpose.” Ibid.

⁷⁸ My analysis of text-setting uses Leech-Wilkinson’s edition. The variations in text-setting in extant copies of the *Messe* make the precise assignment of syllables to notes somewhat speculative (particularly with regard to the Contratenor, where the copies give no indication of how the words are to be set to the music). The approximate setting of text, however, is discernable for the top three parts. See *ibid.*, 109-110, for a discussion of the process of aligning text and notes in his edition.

the chant there then follows a return to a varied version of the original melodic material (a') and the final textual phrase "miserere nobis." A seemingly more logical cadence point in Machaut's polyphonic setting would therefore be at the end of "mundi," rather than on the B that is structurally unaccented in the chant original. But Machaut's cadence on "peccata" on the B creates a compelling structural tension in Agnus I. Cadencing on the B (and on the B-minor triad) is not wholly in conflict with the structure of the original chant, as the B in the chant falls at the conclusion of the only significant melisma in the middle of the chant (on the "ta" of "peccata"). Furthermore, cadencing on the chant B here and on a B-minor triad creates a melodic and harmonic structural tension in the section because the B is a tritone away from the final of the chant (and of Machaut's polyphonic setting of it), F. That tension also reflects the word being sung — "peccata," or "sins" (a correlation suggested by the chant itself ending the melisma on B). This large-scale melodic, harmonic, and textual tension is only resolved in the Agnus I with the conclusion of the section on the final F with "miserere nobis." Machaut's isorhythmic structure in Agnus I can therefore be seen as creating a compelling new formal design that is in counterpoint with the structure of the preexistent chant.

In Agnus II Machaut engages in a similar structural counterpoint, though the disruptions to the original chant structure are more frequent because of his use of a much shorter, four-duration *talea*. This shorter *talea*, with a long as its first duration, results in cadences (with longs in all four parts) at junctures in the original chant that received no structural accent in the chant. Machaut avoids complete disruption of the chant text, ensuring that the upper voices at least cadence on the ends of words: "tollis" (m. 10), "peccata" (m. 13), "mundi" (m. 16), "miserere" (m. 22), and "nobis" (m. 25) (the only cadence where this is not the case is at m. 19, where the voices are split between singing "se" or "re" of "miserere"). The large-scale structural tension

that was present in Agnus I also appears in Agnus II because the third *talea* statement in Agnus II, like the first *talea* statement in Agnus I, concludes on a B-minor triad in Machaut's setting. Unlike in Agnus I, Machaut here has this important formal junction occur at the end of the word "mundi," which accords with the natural division of the chant text. The sense of harmonic departure and return present in Agnus I is extended in Agnus II by the additional presence of cadences on G (m. 10) and D (m. 19). The greater disruption of the chant text and melodic structure in Agnus II is not as problematic as it otherwise would be because Agnus I exposed the listener to the text in a more straightforward way; Agnus II, with its constant cadences, acts on many levels as a variation of and contrast to Agnus I and Agnus III, creating a sense of departure and return in the overall three-section structure of the movement. The contrast between the outer sections and Agnus II extends even to the extent to which the underlying rhythmic process is apparent to the listener: in Agnus I and Agnus III the process is largely occult because the isorhythmic repetition occurs mostly in the Tenor voice, buried within the texture, and the rhythmic pattern is so long as to make recognition and memory of it very difficult. In Agnus II, by contrast, the short *talea*, the constant cadences, and the panisorhythm bring the underlying isorhythmic structure very much to the surface.

The differing approaches to isorhythmic construction in the first and second Agnus Dei's reflect Machaut's selective and tailored use of the technique in the *Messe de Notre Dame* as a whole. Machaut's music would be interspersed among other elements of the mass ceremony, including a good deal of monophonic chant. His polyphonic settings are a combination of isorhythmic and non-isorhythmic approaches, and even in the mostly isorhythmic movements there is significant variety in the extent and means of application of the technique. Machaut uses a homorhythmic style in the Ordinary portions — the Gloria and Credo — where the text is

prose and much more extensive, while he primarily reserves the isorhythmic technique for those sections — the Kyrie, Sanctus, Agnus Dei, and Ite Missa Est — where the text is shorter and completely known to his listeners. Homorhythmic style in the Gloria and Credo allows the more complex texts there to be more easily understood and to govern the structure of the movement, while the simplicity of the texts in the remaining movements allows for the isorhythmic structure to govern, with the singers often simultaneously singing different syllables.⁷⁹ Even within these more general divisions, Machaut’s approach is not monolithic: the Gloria and Credo have isorhythmic (in the case of the Credo) or quasi-isorhythmic (in the instance of the Gloria) *Amens* at their conclusion, and Machaut renders portions of the other movements, such as the words “Agnus dei” in their three occurrences in the Agnus Dei movement, nonisorhythmically. The isorhythmic technique in Machaut’s hands, as we have seen, tends to interfere significantly with the intelligibility of the text in performance, both because the four parts are frequently singing different syllables at different times and because the isorhythmic structure tends to interfere with the syntax of the text in its placement of cadences. Thus it is logical for Machaut to use isorhythm only where the text is simple and well-known enough that the disruptions caused by an isorhythmic approach are more tolerable. The decision of when and where to use isorhythm also involves the exact numbers involved. For example, for the three sections of the Agnus Dei movement, Machaut was faced with a chant of 34 pitches in each section. He could have created a 17-duration *talea* ($17 \times 2 = 34$) or an 11-duration *talea* ($11 \times 3 + 1 \text{ final} = 34$), but he instead chose to separate out the first nine pitches as a nonisorhythmic introduction and then use a 12-

⁷⁹ Leech-Wilkinson refers to the less coordinated text declamation in the isorhythmic movements as a “more dangerous alternation of chaos and order” than homophonic texting, and believes it more likely that Machaut intended such an effect than that the effect is “no more than a side-effect of copying the work in separate parts.” Leech-Wilkinson, *Machaut’s Mass*, 110. Having the singers simultaneously sing different syllables suggests an affinity with the style of the fourteenth-century isorhythmic motet, in which multiple texts were often sung simultaneously.

duration *talea* ($12 \times 2 + 1 = 25$) in the first Agnus Dei and a 4-duration *talea* ($4 \times 6 + 1 \text{ final} = 25$) in the second. As Leech-Wilkinson points out, Machaut's arrangement allows the three sections of the movement to share a large-scale bipartite division with a cadence on B in the middle.⁸⁰ The use of the number 12, a number of sacred perfection in Christian tradition, also may have had numerological significance in Machaut's decisions in this movement, as Owen Rees argues.⁸¹

Machaut's varied approach can be seen as well in the diversity of the applications of isorhythm in the *Messe*. This is true both within the Agnus Dei and in the other movements of the work. Agnus I and Agnus III use a 12-duration *talea* and restrict the use of panisorhythm to hocketed passages at the conclusion of *talea* iterations, while Agnus II uses a much shorter four-duration *talea* and employs panisorhythm throughout its isorhythmic portion. These differences lead to a significant contrast of character between the outer and inner sections of the movement, affecting everything from the text-setting to the degree of transparency of the underlying rhythmic structure. Outside of the Agnus Dei, Machaut uses a differing approach to isorhythm in the tightly-structured Credo Amen. There, he employs an even longer *talea* (with 19 attacks), has the Tenor and Contratenor effectively trade rhythmic patterns in the middle of each *talea*, has the Tenor and Contratenor actually exchange *taleae* for their third *talea* statement, and makes use of independent repeating rhythmic patterns in the upper voices that overlap the seams of the Tenor's *talea* statements. The opening Kyrie movement features its own isorhythmic idiosyncrasies. In the Kyrie I section the Tenor and Contratenor simultaneously employ *taleae* of differing lengths, and the Kyrie III section seeks to connect with the Kyrie II *talea* by using a repeating rhythmic pattern that alternates a series of 10 attacks with a shorter, seven-attack version of itself. Despite the fact that isorhythmic technique is a significant part of the *Messe*,

⁸⁰ Leech-Wilkinson, *Machaut's Mass*, 51.

⁸¹ Rees, "Machaut's Mass and Sounding Number"; see p. 107 in particular, discussing the significance of the number 12 in medieval Christian symbolism.

the technique for Machaut is not a bludgeon to be used indiscriminately and always in the same fashion; rather it is a very fine brush to be applied with discretion only where it fits, and in the manner that it fits.

B. Dunstaple's *Dies dignus decorari*.

John Dunstaple's three-part motet *Dies dignus decorari*, used by Manfred Bukofzer in his influential essay on medieval "speculative thinking" to demonstrate the technique of isorhythm⁸² and thereby possibly a significant influence on Stravinsky,⁸³ makes use of this technique in a more systematic and pervasive fashion than did Machaut in his mass. In the case of this motet, likely composed between 1415 and 1435,⁸⁴ the entire work is nearly strictly isorhythmic⁸⁵ in all three parts from beginning to end, though rhythmic identity in the upper parts occurs primarily *within* each of the three sections rather than across them. The most significant difference here from the treatment of isorhythm in the Machaut *Messe* is the combination of isorhythm with changes in mensuration that result in a nearly proportional tripartite diminution:⁸⁶

⁸² Bukofzer, "Speculative Thinking," 178-180. Thanks to Margaret Bent for helping me identify this motet, since it is unnamed by Bukofzer. Bukofzer says his musical example is from "the beginning" of the motet, but it is actually from the point at which the tenor first enters at m. 9 (subsequent to the initial passage with just voices I and II). Measure numbers are from the 1970 revised Bukofzer edition.

⁸³ There is no reason to believe that Stravinsky would have known from which motet Bukofzer was quoting, but the article and its use of *Dies dignus decorari* to illustrate the technique of isorhythm influenced Stravinsky and helped introduce him to the use of the technique. See p. 14 and n. 61 above.

⁸⁴ Bent discusses the lack of specific information about the dating of Dunstaple's motets in *Dunstaple*, 5-9. She speculates that his three-part isorhythmic motets, one of which is tentatively dated 1426, may have been composed later than his four-part isorhythmic motets. *Ibid.*, 8-9.

⁸⁵ Some discrepancies in the intra-*color* isorhythmic repetition of the two upper parts do occur, most of them in the latter halves of the *talea* statements and in Voice II. The changes occur in *color* I at: Voice II m. 5/41; Voice II mm. 27-31/63-67; in *color* II at: Voice II m. 81/99; Voice II mm. 86-88/104-106; and in *color* III at: Voice I mm. 122-126/140-143; Voice II mm. 124-126/142-143. Dunstaple's isorhythmic motets frequently contain slight changes between *talea* statements.

⁸⁶ Machaut does not strictly employ the diminution of an isorhythmic tenor in his *Messe*, though Leech-Wilkinson notes that the non-isorhythmic Gloria Amen of Machaut's *Messe* seems to allude to the motet practice of diminishing an isorhythmic tenor in its sudden switch to much shorter durations in its latter half. *Machaut's Mass*, 38. Though Dunstaple's motet gives the effect of diminution of the tenor durations presented in the first section, the first and second tenor statements are technically augmentations of that in the third section (see below).

Color statement #: 18 notes	Talea statements: 9 durations	Time	Prol.	Meter in Bukofzer edition	Length of 1st tenor note in Bukofzer ed.	Text lines used (syllables in Voices I/II)
I (mm. 1-72)	2 (9+9=18)	Imp.	Major	3/4	12 ♩	6 (90/45)
II (mm. 73-108)	2 (9+9=18)	Imp.	Minor	2/2	8 ♩	4 (60/30)
III (mm. 109-143)	2 (9+9=18)	Perf.	Minor	3/4	6 ♩	2 (31/15)

Each of the three sections, each with a different mensuration, corresponds to a complete appearance of the 18-note *color*, which is a fragment from the start of the Vespers hymn *Iste confessor Domini*.⁸⁷ The 18 notes of the *color* are cut by the *talea* into two nine-note portions, the second nearly an inversion of the first. The first section is in imperfect time and major prolation, the second in imperfect time and minor prolation, and the third in perfect time and minor prolation. The tenor is written out only once in the manuscript, in its form for the third section (imperfect *modus*, perfect time, and minor prolation), leaving the performers to derive the augmented versions of it to be used in the first two *color* statements.⁸⁸ The effect of these mensural transformations is to speed up the tenor (and thereby the entire musical texture) in three discrete steps with durations in the ratio of 6:4:3 (what Jeremy Noble called “an arbitrary way of producing a climax”⁸⁹), while also setting off the middle section as duple between two sections with a predominantly triple feel. Each section containing one iteration of the *color* in the tenor

⁸⁷ Dunstable, *Complete Works*, ed. Bukofzer, 190.

⁸⁸ As Bent points out, the notated tenor would be effectively read as if up a duration level from the notated durations to create the augmented versions of the tenor in the first two sections, rather than as a proportional augmentation. Bent, “What is Isorhythm?,” 132. This would result in imperfect *modus* and perfect time for the first section and imperfect *modus* and imperfect time for the second section. Deriving the augmented versions of the tenor by moving up a duration level results in the nonproportional change in rhythm in the tenor part in the notated Bukofzer edition from the third section (mm. 118/136) to the first (mm. 20/56) and second (mm. 82/100) sections. The augmentations of the tenor are thus not strictly proportional. Bent argues that it is inaccurate to refer to the relationship between tenor *color* statements in a motet such as this as “isorhythmic,” because the use of diminution as well as the non-proportional changes cause the rhythms in the tenor between *color* statements to be not exactly the same. Bent, “What is Isorhythm?,” 127-28.

⁸⁹ Noble, “John Dunstable,” 186.

contains two statements of the nine-duration *talea* ($9 \times 2 = 18$), making each section isorhythmic within itself. While the tenor parts in the first and second sections are mostly proportional augmentations of that in the third, the rhythms of the upper parts change between sections and are isorhythmic only within sections. The tenor *talea* iterations in the first two sections are proportional versions of those in the third section except for where a pair of semibreves occurs in the third section tenor (mm. 118 and 136 in the third section; see n. 88, supra).

Following established practice in the isorhythmic motet,⁹⁰ the complexity of Dunstaple's piece is further increased by the role of the three parallel and simultaneous texts, one for each of the three parts. The two upper-part texts may have been the only ones actually sung, given that the tenor may have been performed by one or more instruments rather than singers.⁹¹ The motet was written for the feast of the confessor St. Germanus of Paris, who had a reputation for healing and whose relics were transferred to a reliquary in Paris in 1408, and the three texts relate to him. The tenor uses a fragment from the opening of the vespers hymn *Iste confessor Domini*, not originally composed for St. Germanus in particular but rather generically used for the feast days of confessors. Its text makes significant reference to the healing of the sick, a theme fitting for St. Germanus.⁹² Consistent with established practice in isorhythmic motets, however, Dunstaple uses only a fragment of the hymn as his *color*, cutting it off abruptly in the middle of a phrase (in the middle of the line *Festa plebs cuius celebrat per orbem*, between “*plebs*” and “*cuius*”).

⁹⁰ The use of simultaneous texts in isorhythmic motets began in the thirteenth century. Bent, *Dunstaple*, 67-68.

⁹¹ Noble states that the tenor in *Dies dignus decorari* would have been played by instruments rather than sung. Noble, “John Dunstable,” 186. See Bent, “Text Setting,” 303-305, for a more general discussion.

⁹² The complete translated text of the Latin hymn, with the portion not used by Dunstaple in parentheses: This holy confessor of the Lord, whose festival the people (celebrate throughout the world, has this day deserved to rise in blessedness to the highest hall of heaven. He who was godly, prudent, humble, modest, sober and quiet of life, yet was prompt to exert himself in bodily action. At his sacred tomb the limbs of many sick, by whatever disease they are afflicted, are quickly restored to health. Therefore now this our choir gladly sings this hymn in his honour, that through the ages we might be helped by his holy merits. Salvation, glory and power be to Him who from his throne above the heavens governs the whole frame of earth. Three and One. Amen) Translation by Jeremy White.

Voice I uses the poem “Dies dignus decorari,” which celebrates the festival of St. Germanus in 12 lines of 15 syllables each, the rhyme scheme AAAABBBBCCCC.⁹³ Dunstaple allots the 12 lines of text in a 6:4:2 ratio among the three sections of the motet, a ratio which contrasts with the rhythmic ratio of 6:4:3. The difference between the two ratios results in the third section of the motet being significantly more melismatic than the first two. Voice II uses a separate poem, “Demon dolens,” which celebrates the healing powers of St. Germanus.⁹⁴ “Demon dolens”

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*Dies dignus decorari solemniter recolitur,
quo Germani corpus cari sacrum tumba conditur,
urbis voto salutari properanter funditur:
vix est lingua, que scit fari modum, quo incipitur;*

Honored solemnly is the worthy day
on which the sacred body of dear Germanus is placed in its
tomb,
with the prayers of the city it is quickly laid out:
but no tongue can say the way in which this begins;

*adest chorus clericorum valde venerabilis,
multitudo monachorum cordi commendabilis.
Turma venit validorum procerum spectabilis,
hinc occurrit laicorum plebs vix innumerabilis;*

a choir of august priests is on hand,
a crowd of monks with praiseworthy hearts.
A respectable band of strong leaders arrives,
on the other side, a countless number of laity;

*omnes simul concurrentes agebant exequias,
hii gaudentes, illi flentes voces mittunt varias.
Ordinabantque psallentes turbas multipharias,
laudes Deo persolventes, collecti sic reliquias.*

They all come together to conduct the funeral rites,
Some rejoicing, others weeping as they make diverse
utterances.
Teeming crowds are calmed with the singing of psalms,
giving praises to God as they gather before the relics.

Translation of this poem and of “Demon dolens” by Neil Coffee, John White, David Butterfield, and David Carter. The poem, like the poem in Voice II, was likely composed specifically for Dunstaple’s motet. It is not known in any other sources, and the poems in Voice I and Voice II complement one another in subject matter, use of alliteration, use of rhyme, and structure. See Bent, *Dunstaple*, 62-68, for a discussion of the likely origins and characteristics of the texts in Dunstaple’s isorhythmic motets that have not been found in other sources.

*Demon dolens dum domatur,
per Germanum vincitur;
surdus satis gratulatur,
auditus dum redditur.*

The demon of suffering is overcome,
Germanus vanquishes him;
the deaf man is jubilant
upon the return of his hearing.

*Cecus certe jocundatur,
videre dum cernitur.
Claudus surgit et letatur,
dum directe graditur;*

The blind man fully delights
when he realizes he can see.
The lame man rises and rejoices
when he can walk straight;

*paralyticus curatus
vias vadit proprias.
Mortuus resuscitatus
Deo reddit gratias.*

the cured paralytic
goes his own way.
The dead man raised to life
gives thanks to God.

contains exactly half as many syllables of text as does the triplum's "Dies dignus decorari," with 12 lines which alternate in length between eight and seven syllables, and a rhyme scheme similar to that of "Dies dignus" (AAAAAAAABCBC). Dunstaple allots the 15 lines of "Demon dolens" to the three sections of the motet in the same fashion as he does "Dies dignus": 6 in the first section, 4 for the second, and 2 for the third. The ratio of the number of syllables in Voice I to the number in Voice II, 2:1, provides yet another contrasting ratio among the several that govern the design of the motet, the abundance of ratios suggesting that they were a source of interest in themselves to the composer. This 2:1 ratio also causes Voice II to be more melismatic than Voice I, given that the upper two voices have approximately the same amount of rhythmic activity.⁹⁵ Not only are the rhyme schemes and lengths of the two poems closely related, but there are also close correspondences with the actual rhymes used: both use "-tur" at the ends of lines in their first stanzas (the Voice II poem also uses it for the second stanza), and both use "-as" in their third stanzas (Voice II alternates it with "-us," while Voice I uses "-as" exclusively in the third stanza). Both poems also make prominent simultaneous use of "d-" alliteration at their starts ("*Dies dignus decorari*" in Voice I and "*Demon dolens dum domatur*" in Voice II). In addition to these correspondences, there are other moments in the piece where Dunstaple ensures that the two top voices are singing the same or related syllables (for instance, m. 122, where both parts sing "Deo"). Thus, while actual comprehensibility of the texts in performance is highly remote given the simultaneous presentation of two apparently newly composed texts sung in an archaic language, it is clear that Dunstaple takes pains to coordinate them with respect to their sound.⁹⁶

⁹⁵ Voice I has significantly more rhythmic activity than Voice II in the second section, but the levels are approximately equal in the first and third sections.

⁹⁶ Thanks to Blue Heron vocal ensemble for permitting me to listen to their performance of this motet.

Unlike Machaut's approach to the use of chant in his *Messe*, Dunstaple does not make any attempt to preserve the integrity of the hymn that is the basis for the tenor part. He uses only a small fragment of it and uses it in long durations in a part likely performed by instruments rather than sung. The connection with the text and melody of the original hymn is an allusive, symbolic one, rather than a direct, straightforward link to the structure of the original. The use of a *talea* to cut the fragment into two equal parts can be seen as an extension of a series of decisions that undermine the integrity of the original hymn. Dunstaple's approach to the original chant is consistent with tradition in isorhythmic motets going back to the thirteenth century.⁹⁷

The other question that arises is the extent to which the isorhythmic structure is at odds with the textual, melodic, and harmonic structure of Dunstaple's polyphonic setting. Though the structure of the *color* statements governs the motet and is largely consistent with the structure of the harmony, melodic lines, and text, the two-statement *talea* structure within each of the three larger sections is mostly in conflict with other parameters. The tripartite *color* structure coincides exactly with the changes in mensuration, and Dunstaple ensures that the end of each section coincides with the end of a line of verse (though the resulting division of poem lines into 6+4+2 conflicts with the 4+4+4 rhyme schemes). The slow-moving tenor *color* provides a harmonic underpinning for the motet that reflects the three-part *color* structure, with cadences falling on G (G-D-G in m. 69), D (D-D-F#(-A) in m. 107), and G (G-D-G in m. 143) respectively at the conclusion of the three sections. The harmonies at corresponding points within the three sections also tend to be related because of the effect the tenor, as the lowest and slowest of the three voices, has on the harmonic structure (compare, for example, the D-A sonorities at mm. 9, 77, and 113).

⁹⁷ Bent, *Dunstaple*, 52. Using a fragment of chant as a tenor part originated in the thirteenth century; greatly extending the durations of the chant notes began in the fourteenth century. Ibid.

On the other hand, the two-part *talea* divisions within each section largely conflict with the pitches and text, and are mostly not reflected in them. The return of the *talea* within the *color* in each instance falls in the middle of melodic and textual phrases (mm. 37, 91, and 127). In the first two sections of the motet, text line endings in both of the upper parts and a C(-E)-G harmony occur shortly before *talea* statement endings (mm. 33, 89), but new textual and melodic lines begin before the next *talea* statement starts. In the third section, the C harmony is present at the corresponding spot but the *talea* join occurs very much in the middle of poetic and melodic lines (m. 127). And despite the recurrence of the C harmony near the conclusion of each *talea*, Dunstaple only provides a sense of clear cadence when it occurs in the first section (m. 33), declining in the second and third sections of the motet to mark the moment as especially significant.

Yet there are certain respects in which other parameters, including text and melody, show consistency with the *talea* structure. Dunstaple provides a highly audible (and visual) cue that indicates the restart of the *talea*, and that is the dropping out of the tenor to allow for a duet between the upper voices (see, for example, m. 37). This cue, used regularly by Dunstaple in his isorhythmic motets, would be especially apparent if the tenor part was being performed by one or more instruments. There are also respects in which Dunstaple coordinates the isorhythmic structure and other parameters without aligning structural divisions entirely consistently with the overall panisorhythmic repeat structure. Dunstaple places cadences on the first and last attacks of tenor *talea* statements (such as at m. 33), choosing to draw more attention to those moments than to those where the panisorhythmic structure restarts (such as at m. 37). The first attacks in *talea* statements occur significantly after the start of the repeating rhythmic structure as a whole because each rhythmic repetition features at its start a prolonged duet between the upper voices,

with the tenor remaining silent until (in the Bukofzer edition) nine bars in.⁹⁸ There is also a separation between the last attack in each tenor *talea* statement and the restart of the rhythmic scheme because the final tenor note in each case is sustained (a breve in the notated third *color*). The cadences on the first or last attacks of the tenor are in most cases also marked by the end of verse lines. In two instances, these cadences coincide with the ends of rhyming verse lines in both upper voices: measures 9 (*recolitur* and *domatur* at the first tenor attack of the first *color*), and 143 (*reliquias* and *gratias* at the conclusion of the motet); in two additional instances, cadences occur on the first or last tenor attack of a *talea* and the upper voices both conclude non-rhyming verse lines (m. 69, the last tenor attack in the first *color* statement; m. 95, the first tenor attack in the second *talea* of the second *color*). In two further instances (m. 33 and m. 45), a cadence occurs on the first or final tenor attack and Voice I concludes a verse line but Voice II is in mid-line. There are also three cadences on the first or last tenor attack that do not coincide with the ends of verse lines (m. 77, m. 113, and m. 131). The combined simultaneous occurrence of first or last attacks in the tenor, cadence, and the conclusion of verse lines in six instances in the motet demonstrates a degree of audible coordination between the isorhythmic structure, the harmonic and melodic structures, and the text, even though the actual *talea* joins do not line up with cadences and verse line endings.

In addition, among the relatively few instances where Dunstaple does depart from the strict isorhythmic scheme are examples of changes that better fit the new text. For example, in Voice I at measures 122-23 the word “Deo” is sung with , with a quarter rest after the word (durations in the Bukofzer edition). At the corresponding point in the second *talea* statement of this *color*, at measures 140-141, Voice I is in the midst of a long melisma on “qui” of “reliquias,” and so Dunstaple is free to include a rest in the first measure and remove the rest in measure 141.

⁹⁸ Most of Dunstaple’s isorhythmic motets have such an upper-part duet at the start of each *talea*.

Were the rhythm in measures 140-41 to be used at 122-23, the very short melisma on “Deo” would be broken up by a rest and there would be no rest at the end of the word. The long melisma on “qui” in the second *talea* allows Dunstaple to freely insert a rest where it would not have fit at the same point in the first *talea* and removes the need for the rest that set off “Deo” from “persolventes” in the first *talea*. Other instances where deviations from the panisorhythmic scheme appear to at least in part be due to textual considerations include measures 27/63 in Voice II (first *talea* features rest at end of poetic line which is not present in the melisma at 63), and measures 86/104 in Voice II (first *talea* includes rest between words which is not present in the melisma at 104).

To the extent that Dunstaple does *not* align his isorhythmic scheme with textual, harmonic, and melodic divisions, his choices in this respect can be seen as artful and subtle. The discrepancies between the placement of *talea* joins and divisions in other parameters serve as elisions that add interest to the work and prevent it from being didactic and predictable. The textural change at the start of each *talea* statement clues in the knowing listener that rhythmic repetition is beginning, but other connections between the isorhythmic structure and the pitches and text of the motet are subtle and designed less to make the listener aware of the underlying architecture of the work than to make it musical.

The most audible element of Dunstaple’s elaborate system in this piece is thus the large-scale tripartite separation according to mensuration. Clear cadences occur at the end of each of these three larger sections, and the effective changes in tempo combined with the switch from triple meter to duple and back to (a faster) triple conveys to the listener the larger structure. The characteristic ascent to the high D at the conclusion of each tenor *color* further reinforces the audible tripartite structure of the work. The two-part division by *talea* statement within each *color* statement is also audible because of the sudden textural shift from three parts to two at the

start of every *talea* statement, though hearing the actual repetition of particular rhythms from *talea* statement to *talea* statement presents great difficulties.⁹⁹ Thus the listener becomes aware of a two-part (or four-part) division within each larger section, but likely will not know that these divisions reflect isorhythmic seams unless familiar with Dunstaple's approach or viewing a score or parts. The use of long held notes in the tenor both aids and hinders the audibility of the underlying structure. The fact that the tenor's durations are much longer than those of the upper two parts allows the ear to pick it out of the texture, and thus to perceive discrete pitches (with it being even more discretely audible in the instance of instrumental performance). But the long durations prevent the listener from hearing the part as rhythmic — the effect is instead one of long sustains of irregular length. This makes the perception of the tenor's *talea* as a rhythmic repetition all the more difficult. Since the texture is panisorhythmic, isorhythm can potentially be perceived in the upper parts, but the sheer number of durations involved and the length of the *talea* makes recognition of the rhythmic repetition difficult in these upper parts as well. The upper parts repeat their rhythms with the second statement of the *talea* within each of the three larger sections, but their rhythms, unlike that of the tenor, change drastically between sections, making recognition of specific recurrences even more challenging.

The larger structural role of the isorhythmic scheme in *Dies dignus decorari* is very different from that in Machaut's *Messe*. In the Dunstaple motet, a single scheme underlies the entire work and the piece is isorhythmic in all parts at nearly all times, while in the Machaut isorhythm was predominant but was used in a carefully-tailored fashion, being employed only in the sections and the parts where Machaut deemed it appropriate. Certainly one explanation for this difference between the two works is the respective size of the two pieces — Machaut's mass

⁹⁹ Jeremy Noble presumably was referring to this level of aural recognition when he said in his 1954 discussion of this motet, "it is almost impossible to detect the isorhythmic periods without the aid of a score." Noble, "John Dunstable," 186.

is a large-scale work, consisting of six different sections that would be interspersed among the other elements of a liturgical service. Dunstaple's motet, on the other hand, is a relatively compact setting for which variety would not be as much of a necessity. But another justification for Dunstaple's more monolithic approach is the very complexity of his system. The machinery that he sets up is sophisticated enough to allow for subtlety within its boundaries. The 6:4:3 mensuration scheme, the 2:1 syllabic scheme of the simultaneous texts, the 6+4+2 division of the poetic lines, and the $9 \times 2 = 18$ scheme of the *talea* and *color* when combined together make for a sufficiently varied whole as to maintain the listener's attention. While Machaut's isorhythmic schemes superimposed numerical regularity on a long-established chant structure, we see in Dunstaple's motet the composer taking this notion much further, so that ratios and numerical schemes pervasively govern the musical result. Within the structures created by Dunstaple, however, there is still a great deal of compositional freedom. In particular, the changing rhythms of the upper two parts across *color* statements reflect a freer approach that ensures the final result is a musical one. And while the sustained notes of the tenor's hymn fragment exercise significant influence on the harmonic content of the piece, Dunstaple still realizes a level of freedom in pitch choice in the upper parts, particularly in the introductions to each *talea* where the tenor rests. This mostly non-systematic approach to the upper two parts (excepting the panisorhythmic rhythmic repetition within sections) further prevents the pervasive rhythmic and textual schemes from rendering the motet monotonous.

C. Isaac's *Johannis Baptistae* proper from *Choralis Constantinus*, Volume II.

The mass-proper cycles in the second volume of Heinrich Isaac's *Choralis Constantinus*, studied closely by Webern and to at least some extent by Stravinsky, were composed in 1508 and 1509,¹⁰⁰ 80 to 90 years after Dunstaple's *Dies dignus decorari*. During this span of time

¹⁰⁰ Strohm and Kempson, "Isaac": "2. Works: (ii) The Proper of the Mass."

isorhythm as a technique had fallen by the wayside and been replaced by pervasive imitative textures. The rise of canon to a position of high esteem in the fifteenth and sixteenth centuries brought with it many of the same concerns that medieval and early-Renaissance users of isorhythm had faced, such as the degree of tension with non-rhythmic parameters, the extent to which the rhythmic process is on the audible surface, and breadth of application. Volume II of the *Choralis Constantinus* contains 25 mass-proper cycles, each designated for a particular feast-day. The cycles contain polyphonic settings of components of the mass proper (in most cases, introit, alleluia (or tract), sequence (or prosa), and communion) for the given feast, but do not include portions of the service that were intended to be performed as monophonic chant (other than the incipits to the polyphonically set verses). In the polyphonic settings of the second volume, the discantus is usually the chant-bearing voice, performing the incipits as well as the chant melody as part of a four-part texture. The material of all four voices is typically closely related to the chant.¹⁰¹

The second volume of the *Choralis Constantinus* in general contains more strict canonic procedures than either the first volume or the third. The *Johannis Baptistae* cycle, number 10 in the second volume, was a cycle particularly cited by Webern in his introduction to his edition as containing exemplars of a variety of canons. In it, as with most of the other cycles in Volume II, Isaac provides a polyphonic setting of the introit, alleluia, sequence, and communion. Most of the texture in Isaac's *Johannis Baptistae* proper is polyphonic and imitative, with some brief sections of homophony. Most of the imitation, however, is not strictly canonic, but instead either imitates freely or engages in canonic imitation for short periods of time. As is usually the case

¹⁰¹ Schiltz briefly discusses how Isaac typically incorporates the chant melody into the texture of the Volume II proper settings: he puts the chant in longer note values and/or makes it the basis for imitation; in either or both cases, and even where there is no strict imitation, most or all of the voice parts sing related melodic material derived from the chant. Schiltz, ““Aus einem Hauptgedanken,”” 128-29.

with Isaac's proper cycles, the sequence in the *Johannis Baptistae* cycle is the primary location where strict canon appears. The sequence in this cycle, on which I will focus, contains three contrasting applications of canonic technique. In the sequence (designated as "Prosa" in the Altus part) Isaac sets the music as an alternation between polyphony and chant (the chant not being notated in the printed parts). This results in the first line of each of the nine verses of the chant being set polyphonically (with the exception of the single-line first and ninth verses), with the responding second line in each case left as chant; Isaac makes the first line of the fifth and seventh verses and the sole line of the ninth verse strictly canonic. Here is the text of the sequence, with chanted text in brackets and polyphonically set text outside brackets; canonically-set text is in bold along with an indication of the type of canon:

<i>[1. Sancti baptistae Christi praeconiis,]</i>	[St. John the Baptist, the herald of Christ,]
<i>2a. Solemnia celebrantes moribus ipsum sequamur,</i>	Celebrating his festival let us follow his example,
<i>[2b. ut ad viam quam predixit asseclas suos perducatur.]</i>	[that he may lead his followers in the way that he foretold.]
<i>3a. Devoti te, sanctissime hominum amice Jesu Christi, flagitamus, ut gaudia percipiamus,</i>	Devotedly we ask you, O holiest of men and friend of Jesus Christ, that we may come to know the joy
<i>[3b. apparens quae Zachariae Gabriel repromisit, qui tuam celebrarent obsequiis nativitatem.]</i>	[promised by Gabriel at his appearance to Zachariah as we celebrate your saint's day]
<i>4a. Ut per haec festa aeterna gaudia adipiscamur,</i>	Through this festival may we obtain that eternal joy
<i>[4b. qua sancti Dei sacris deliciis laete congaudent.]</i>	[at which the saints of God gladly rejoice in holy bliss.]

5a. Tu qui praeparas fidelium corda, ne quid devium vel lubricum Deus in eis inveniatur, [double canon; disc. split and bass out]

You who prepare the hearts of the faithful, we pray to you that God not find anything dishonest or deceitful in them,

[5b. te deprecemur, ut crimina nostra et facinora continua prece studeas absolvere,]

[and we ask that you strive, through continual prayers, to absolve our sins and wickedness in God's sight.]

6a. Placatus ut ipse suos semper invisere fideles,

Thus placated, may He always look upon his faithful,

[6b. et mansionem in eis facere dignetur,]

[and deign to build his home in them,]

7a. Et agni vellere, quem tuo digito, [cancrizans canon in disc. & tenor]

And the fleece of that lamb who you chose

[7b. mundi monstraveras tollere crimina, nos vellit induere,]

[to take away the sins of the world, may we wear it.]

8a. Ut ipsum mereamur angelis associi,

Thus for our merits, in company with the angels,

[8b. in alba veste sequi per portam clarissimam,]

[may we follow Him in white clothing through the shining gate,]

9. Amice Christi, Johannes! [4-part canon] O John, friend of Christ!¹⁰²

The first line of the fifth verse of the sequence, beginning “Tu qui praeparas,” consists of a prolonged double canon. Isaac for this segment (and only in this segment within the entire *Johannis Baptistae* proper setting) has the Discantus split into two parts and the Bassus remain silent. The Altus and Tenor are the *duces* and begin together, with the Discantus I and Discantus II following two (semibreve) beats later at an octave above the first two parts. The four voices remain in strict canon until the end of the verse section, cadencing with a G-minor triad on “*inveniatur.*” After the first line of the sixth verse (“Placatus . . .”), which is more freely imitative

¹⁰² Translation (with slight reordering of translated text to match the content of the relevant individual verse) and numbering of text from Musica Spei, “Musica Spei Presents.” Dr. Patrick Macey created the edition used by Musica Spei for the concerts. Thanks to Musica Spei and Dr. Macey for permitting me to listen to a recording of a 2005 performance of this mass proper.

with suggestions of imitation by inversion, in the seventh verse of the sequence (beginning “Et agni vellere”) Isaac writes a strict cancrizans canon at the octave in the Discantus and Tenor, with the Altus and Bassus providing free counterpoints against these two strict lines. All four voices start and end together, with the Tenor ending as the Discantus began and vice versa. The canon here is brief, unsurprising given the nature of the strict imitation being used and matching the relative brevity of the text (only 11 syllables). The polyphonic setting of the eighth verse (“Ut ipsum . . .”) is again freely imitative, but not canonic, containing short passages of strict canon amidst freer imitation. Then in the concluding single-line ninth verse (“Amice Christi Johannes!”) Isaac creates a melismatic four-part canon, each line derived from the Altus as *dux*. The Bassus enters two breves after the Altus entry an octave below, and the two parts proceed for five more breves’ duration until the second pair of voices enters. At this point the Discantus enters a perfect fourth above the original Altus entry, followed two breves later by the Tenor an octave below the Discantus. The four parts continue for seven more breves before cadencing on G and D and concluding the sequence as a whole.

We see in Isaac’s use of canon in the *Johannis Baptistae* sequence, particularly in the double canon (“Tu qui praeparas”) and the four-part canon (“Amice Christi Johannes”), more cooperation between rhythmic process and other musical parameters than we see in Machaut’s *Agnus Dei* or Dunstaple’s *Dies dignus decorari*. This is in large part due to the nature of canon in comparison with isorhythm — the even divisions of isorhythm create tension with pitch and text structures, while canon assumes a close relationship between rhythms and pitches. The rhythmic imitation in “Tu qui praeparas” and “Amice Christi Johannes” is paired with the straightforward imitation of intervals (though not pitches per se, as neither contains imitation at the unison). Textual imitation is further aligned with the rhythms and intervals, though the

resulting repetition of words is a kind of distortion of the spoken liturgy, in which repetition of this sort would not be present. From the perspective of the treatment of the preexistent chant, Isaac's canonic technique in "Tu qui praeparas" and "Amice Christi Johannes" can also be seen as taking more of a cooperative than a conflicting approach. Particularly in the four-part canon of "Amice Christi Johannes," the original chant (and its text) is paraphrased and presented one voice at a time in a manner that allows that chant to be immediately and clearly audible to the listener. The registral separation of successive entries (A-B-D-T) and the inclusion of rests in the *dux's* line (and thus in the other parts) further clarifies the texture and allows the chant to be heard. The four-part canonic treatment, though, does result in some distortion of the text beyond that deriving from the repetition inherent in staggered four-part imitation: in order for all four voices to sing the complete text, the voices that enter earlier (Altus and Bassus) must engage in extensive melisma as well as entire word repetitions (each voice singing "Johannes" twice; three times in the Altus in Webern's edition) not present in the original sequence text.

In the double canon ("Tu qui praeparas"), Isaac adopts a different yet equally straightforward approach at the beginning of the verse in comparison with the four-part canon. The two *duces*, like the two *comites*, start together and work as a unit, creating the effect of two-part imitation at the start of the verse. The two *duces* are registally adjacent (Tenor and Altus) and begin with a simultaneous pair of semibreves before proceeding to engage in significant voice-crossing; the fact that the two *comites* are subdivisions of the Discantus part further ensures a timbral and registral unity in the *comites*. The virtual two-part imitation allows for the text and chant melody to be readily perceived, with the upper part in each case initially carrying the chant paraphrase. Later in his setting of this verse, Isaac complicates the texture by creating

more divergence of rhythms in the two *duces*. This results in the effect of an actual four-part texture, in which text and melody become more indistinct.

While in the double canon of verse five and the four-part canon of verse nine there is a relatively high degree of coordination between rhythmic process and other parameters (particularly in the four-part canon), rendering the canonic process audible and on the musical surface, Isaac's use of cancrizans canon in the seventh verse ("Et agni vellere") represents a much more opaque approach. The fact that Isaac engages in cancrizans canon only in the Discantus and Tenor parts and has the other two parts simultaneously engage in free counterpoint, with few rests present, causes the texture to be sufficiently dense and opaque that the likelihood of aurally identifying the canon is decreased (though the use of shorter durations in the Altus and of syncopation in the non-canonic Altus and Bassus allows some auditory separation between those voices and the canonic ones). Recognizing audibly the reversal of rhythms and pitches over such a span of time (eight breve-length measures in the Webern edition) is difficult in itself; Isaac makes that recognition even less likely. The degree of consistency and cooperation between words and music we see in the double canon and the four-part canon is also not present here: while the Tenor sings the music of the Discantus in retrograde (down an octave), it proceeds textually in the same direction as the higher part. Furthermore, the nature of the musical line in the Discantus *dux* makes recognition of the simultaneous retrograde difficult, as it begins with an arch-shaped phrase ("Et agni vellere") that itself sounds identical forwards and backwards. Because the Tenor subsequently sings the same phrase, Isaac creates the aural impression of straightforward imitation of the Discantus by the Tenor rather than the cancrizans process that is actually unfolding. Isaac's abundant use of even semibreves in the canonic lines also undermines any sense of reversal, as these rhythmically

sound the same forwards and backwards. The shorter durations (minims) that conclude the Discantus line along with the use at this point of B-flats/B-naturals make it possible to recognize a kind of exchange of material that goes on between the Discantus and Tenor if one is listening for it, but Isaac's cancrizans canon is overall much more of an opaque, hidden process, beneath the musical surface.

Isaac's use of rhythmic process is a much more selective one in the *Johannis Baptistae* proper than that used by Dunstaple in *Dies dignus decorari*, and in its tailored approach is more akin to the selective use of isorhythm in Machaut's *Messe*. Isaac's use of strict imitation constitutes only a limited part of the totality that is his *Johannis Baptistae* mass proper. Isaac uses canon in only three of the nine verses of the sequence, and that sequence is only one section of a larger mass that would have included the other sections of the proper as well as the ordinary portions. Within the sequence itself, Isaac alternates paraphrase-technique polyphony and chant within particular verses, with the polyphonic settings ranging from brief bits of homophony to the kind of strict canon we have examined. Over the course of the sequence, Isaac frequently engages in strict or near-strict canonic technique for brief periods of time, with the "Tu qui praeparas," "Et agni vellere," and "Amice Christi Johannes" verses representing instances where the strict imitation is sustained sufficiently so as to encompass the entirety of the verse. Isaac concentrates the stricter imitation in the second half of the sequence. The fourth, sixth, and eighth verse settings also contain significant portions of strict or near-strict canonic settings (with the fourth starting with a double canon before breaking into freer polyphony, the sixth beginning with a canon and imitation by inversion, and the eighth starting with a three-part canon against a quasi-augmented version of the melody in the Discantus), while verses two and three and the Introit, Alleluia, and Communio have less in the way of canonic or near-canonic writing. These

sections tend instead to engage in freer polyphony and sometimes brief moments of homophony. One result of this design is to make the closing of the sequence, “Amice Christi Johannes,” with its strict four-part canon, a particularly dramatic moment.

The particular varieties of canon made use of by Isaac in the sequence can partially be explained by the characteristics of the text. In particular, the “Et agni vellere” verse (7a) is suited for cancrizans treatment because of its textual brevity, being the second-shortest in terms of number of syllables among the sequence verses set polyphonically (second to the closing “Amice Christi Johannes”). The brevity of the text makes possible the use of the difficult cancrizans technique, allowing a brief enough setting that the retrograde nature of the process is at least potentially recognizable aurally (an extremely long cancrizans setting representing both an extreme technical challenge for the composer and representing a challenge for a listener who would be required to recall further back in time to the beginning of the setting).¹⁰³ The shortest, syllabically speaking, of the verses designated for polyphonic setting is the final “Amice Christi Johannes,” where the melisma resulting from the brevity of the text further contributes to the sense of concluding exultation that the verse’s jubilant apostrophe provides. Similarly to how Machaut reserved isorhythmic treatment for shorter, simpler texts in his *Messe*, Isaac was freest to engage in strict canonic technique when setting shorter sequence verses.

Webern in his introduction to the second volume of the *Choralis Constantinus* marvels at the variety of canonic techniques that appear in it (the variety prefiguring Webern’s own collection of contrasting canonic approaches in the second movement of his Opus 21 *Symphony*), and we see in Isaac’s sequence of the *Johannis Baptistae* proper that kind of catalog in its most compressed form. Between the three types of strict canon in the second half of the sequence and the additional somewhat freer varieties in the fourth, sixth, and eighth verses (the forms used or

¹⁰³ This is not to say that Isaac necessarily *wanted* the process to be aurally recognizable.

suggested including double canon, canon, canon by inversion, and three-part canon), Isaac seems intent on demonstrating within a single mass movement the possible varieties of canonic imitation. The use of strict imitation as opposed to freer imitation in some instances can make for a subtle yet potent audible distinction, but also works symbolically as a marker of compositional craft and solemnity. One audible result of the distinction between strict and freer canonic treatment is rhythmic flexibility and the lack thereof: owing to the demands of strict canonic composition, we see in the fifth, seventh, and ninth verses stodgier, less compelling rhythms (the ninth verse “Amice Christi Johannes” still retaining some rhythmic interest in its Alto *dux* line). In contrast, in the more freely polyphonic sections, there is greater rhythmic flexibility and thus increased rhythmic interest in the music. Isaac’s overall approach in this mass proper is one of carefully cultivated variety, so that strict (including an assortment of varieties of strict) and freer polyphonic approaches, in addition to monophonic chant, are presented in turn, with the result a subtly differentiated whole.

V. Strict rhythmic process in Webern and Stravinsky.

Like many other composers of the first half of the twentieth century, Webern and Stravinsky turned to strict rhythmic processes, including canon and isorhythm, as resources for organizing non-tonal music. Both complemented their use of 12-tone serial techniques with intensive study of pre-tonal composers like Machaut, Dunstaple, and Isaac. While Webern and Stravinsky adapted the early composers’ approaches to twentieth-century pitch languages, vestiges of their study of pre-tonal works are apparent in the 12-tone music that they wrote. Furthermore, the same concerns important in analyzing Machaut, Dunstaple, and Isaac, such as the degree to which strict rhythmic process is brought to the musical surface and its relationship to portions of music that do not employ such techniques, continue to be essential in analyzing

their use in the twentieth century. Ultimately we see in Webern and Stravinsky a contrasting approach to the use of strict rhythmic process in a 12-tone context, with such techniques for Webern a subterranean means of creating a piece and for Stravinsky a way of engaging in musical signification.

A. Webern's use of canon in his 12-tone works.

Despite having closely studied Isaac's canons very early in his career as a student, canon and other forms of strict rhythmic process were not particularly prevalent in Webern's pre-serial work. He employed canon in his last tonal work, the choral *Entflieht auf leichten Kähnen* of 1908 (Opus 2), written two years after he completed his dissertation, and the Opus 1 *Passacaglia* makes use of another, eponymous contrapuntal technique. But from Opus 3 through Opus 14 canons do not appear. Webern's renewed interest in canon nearly coincided with the development of the 12-tone technique by Schoenberg and himself in the early 1920s. Opus 15, completed in 1922, contains a double canon in its final song (though that song had been written in 1917). The *Fünf Canons* of Opus 16 (completed 1924), Webern's last non-serial work, is completely canonic, and in the Opus 21 *Symphony* (completed 1928), Webern's first orchestral work using the 12-tone method, he created a veritable catalog of canonic technique, one in which canon is used in an extremely strict manner but in a way as to make it nearly inaudible. In his works subsequent to Opus 21 he tended to veer away from the strict process in all parameters that he had used in the *Symphony* and instead either employed strict rhythmic process divorced from pitch (including rhythmic canon) or in the course of his compositional process made an originally strict process into a much freer end result (his extant sketches providing evidence of his approach). In the late choral works (*Das Augenlicht* and the two cantatas), Webern to some extent uses canon in a more explicit, signifying manner, creating associations with the sacred

choral music of the past in his own sacred works setting the religious poetry of his close friend Hildegard Jone.

1. *Symphony, Opus 21.*

In Webern's *Symphony*, one of his earliest dodecaphonic works, he draws in part on the stricter instances of Isaac's use of canon in order to create a completely canonic composition that is a veritable encyclopedia of canonic technique in addition to being a thorough exploration of the concept of musical palindromes. The first movement, idiosyncratically modeled after sonata or rounded binary form with its A:BA' structure (with literal repeats after A and after BA'), consists of four successive double canons by inversion, one in each A section and two in the central B section:

A (mm. 1-26) B (mm. 25b-44) A' (mm. 42-66b)

The designation of the third section of the movement as A' is reflective of the return in that section of the same row forms in the same order as appeared in the A section. The sounding result, however, is more of an A:BC:, given that the third section bears little aural resemblance to the first due to significant changes in rhythm, dynamics, register, and orchestration. The *duces* in each double canon successively present multiple row forms,¹⁰⁴ with each *comes* beginning two measures of 2/2 after the corresponding *dux* with row forms that are (in most cases transposed) inversions of the *dux* row forms (Webern's use of cut-time 2/2 in itself appears to recall Isaac's mensuration schemes). In each of the double canons, the two *duces* are initially separated by a measure. This results in each double canon in a series of four successive voice entries, each beginning at the same point in the bar and each separated by a measure. The order of entry in each case is thus *dux 1-dux 2-comes 1-comes 2*.

¹⁰⁴ Kathryn Bailey's charts of row apportionment in Appendix IV of *The Twelve-Note Music of Anton Webern* are an invaluable reference for analysis of Webern's 12-tone works. The charts for Opus 21 are on pp. 360-61.

In the first A section (mm. 1-26), the two *duces* have differing rhythmic patterns, but the *comites* in both cases follow these patterns faithfully, with timbral and dynamic imitation as well (see chart on page 53). The double canon in section A, like those in B and A', differs markedly from its historic predecessors in its use of pointillistic orchestration, the *dux* and *comes* jumping more or less rapidly between orchestral instruments, but the orchestrational segmentation of row forms by each *dux* is followed by each corresponding *comes*. Timbral imitation is somewhat generalized — different types of string instruments imitate one another, and the bass clarinet imitates the B-flat clarinet, but within this level of generality it remains strict. The first *dux-comes* pair in section A uses two row forms in each voice (I4-P7 in the *dux* and P4-I1 in the *comes*) and switches instruments every four pitches, while the second *dux-comes* pair presents two row forms twice in each voice (P0-I9-P0-I9 in the *dux* and I8-P11-I8-P11 in the *comes*) and switches instruments more rapidly, at least initially. In addition to the rapidity of instrumentation changes, the double canon departs markedly from tradition in its use of large registral leaps within lines. The combination of these two factors undermines any sense of linearity in the components of the double canon.

The second section (“B,” starting in the second ending at 25b) consists of two consecutive double canons by inversion with the voices two measures apart. The two double canons in this section, however, differ from the one in the A section in their use of the same rhythmic pattern in all four voices. Thus they can also be thought of as four-voice canons. They are distinguishable as double canons, however, because the voices can be broken into *dux-comes* pairs by contour relationships and instrumentation switches. In this section each voice makes its way through two row forms, the second row form in each case the exact retrograde of the first. Once the midpoint of the section is reached (at the end of measure 34), the four voices enter in

Webern *Symphony*, Opus 21, First Movement

Section A (mm. 1-26): each dux has its own rhythmic pattern

Order of entry (row form, 1st & last instrument)

Dux 1: (I-4, Hn. 2-Vc.)

(P-7, Vc.-Hn. 2)

Dux 2: (P-0, Hp.-Hp.)

(I-9, Hp.-Vla.)

(P-0, Vla.-Vla.)

(I-9, Hp.-Vc./Hp.*)

Comes 1: (P-4, Hn. 1-Vla.)

(I-1, Vla.-Hn. 1)

Comes 2: (I-8, Hp.-Hp.)

(P-11, Hp.-Vn. 2) (I-8, Vln. 2-Vc.) (P-11, Hp.-Vla./Hp.*)

Section B (mm. 25b-44): single rhythmic pattern in all four voices

1st dbl. canon order of entry (row form, 1st & last instr.) 2nd dbl. canon: m. 35 on

Dux 1 (P-11, Bb Cl.-Vln. 1)

Comes 4 (R-11, Vln. 1-Bb Cl.)

Dux 2 (P-7, Vc.-Bb Cl.)

Comes 3 (R-7, Bb Cl.-Vc.)

Comes 1 (I-11, Bb Cl.-Vln. 2)

Dux 4 (RI-11, Vln. 2-Bb Cl.)

Comes 2 (I-3, Vla.-Hp.)

Dux 3 (RI-3, Hp.-Vla.)

Section A' (mm. 42-66b): each dux has its own rhythmic pattern

Order of entry (row form, 1st & last instrument)

Dux 1: (I-4, Vla.-Vln. 1)

(P-7, Vln. 1-Vln. 1)

Dux 2: (P-0, Hp.-Hn. 1)

(I-9, Hn. 1-Bs. Cl.)

(P-0, Bs. Cl.-Vln. 1) (I-9, Vln. 1.-Hn. 2)

Comes 1: (P-4, Vln. 1-Vc.)

(I-1, Bb Cl.-Bb Cl.)

Comes 2: (I-8, Hp.-Cl.)

(P-11, Bb Cl.-Vn. 2) (I-8, Vln. 2-Vla.)

(P-11, Vla./Vln. 2)

*The last iterations of I-9 and P-11 in the A section differ according to whether the first or second ending is taken. Before the slash is the last instrument on the first time through the section (with both of these row forms concluding in the restart of the section), and after the slash is the last instrument in the row form when the second ending is taken.

the reverse order of their original entry at the start of the section with the row forms that are retrogrades of their initial row forms. This entry in reverse order (with *comes* 2 becoming *dux* 1, *comes* 1 becoming *dux* 2, *dux* 2 becoming *comes* 1, and *dux* 1 becoming *comes* 2) and retrograding of pitches allows for the entire B section to constitute a palindrome, complete with symmetrical rhythms and instrumentation (though Webern does take some license with grace notes to make his scheme work).

In the A' section, Webern returns to a scheme similar to that used in the A section in its use of a single extended double canon by inversion. He also uses the same row forms as in A, but the musical result sounds very different as a result of changes in rhythm, texture, register, and orchestration. Again here the *comites* follow at a distance of two bars with an inverted form of the *dux* lines, but timbre is not imitated as systematically as it was in the A section. In the first *dux-comes* pair timbral imitation is mostly strict, but in the second *dux-comes* pair it occurs only very rarely. The first *dux-comes* pair again, as in section A, uses two row forms in each line, and the second *dux-comes* pair has each line use two row forms twice, but here the first *dux* and *comes* finish significantly earlier (at m. 60) than the second *dux* and *comes* (m. 66b). This results in a thinning and simplification of the texture in the final six measures of the A' section, a musical expanse that sounds even longer because of the multiple *ritardando* indications present. This change of texture and tempo, combined with a distinctive orchestrational switch to solo string instruments, gives the conclusion of the movement a coda-like quality that is echoed in the coda featuring a solo violin at the conclusion of the second movement.

The second movement of Opus 21 consists of a theme, seven variations, and coda that fly by with stunning rapidity, each section providing a lightning-quick glimpse of a canonic technique and a palindrome or near-palindrome. Webern's primary tool in this movement, as it

was in the first, is the double canon by inversion with disjunct lines and pointillistic orchestration (Variations I, II, IV, VI, and VII), but he also incorporates here four two-part cancrizans canons (Theme, Var. III, Var. V, Coda). Webern's overriding preoccupation here is with symmetry both horizontal (canon by inversion) and vertical (palindromes and cancrizans), such that the canons by inversion have cancrizans aspects and are near-palindromes, while the cancrizans canons have a degree of horizontal symmetry. Webern also makes the structure of the movement as a whole to a degree vertically symmetrical, as each variation in the first half of the movement has significant parallels (including in the use of row forms) with the corresponding variation in the second half of the movement (e.g., Theme and Coda, Variation I and Variation VII, etc.):

Section	Tempo	Metronome	Instrumentation	Canon Type
Thema	Sehr ruhig	$\text{♩} = 54$	Cl., Hns., Hp.	Cancrizans pitch and independent cancrizans rhythm
I Var.	lebhafter	$\text{♩} = 66$	Strings	Double canon by inversion
II Var.	sehr lebhaft	$\text{♩} = 84$	Ensemble (Hn. 1 vs. remaining)	Double canon by inversion
III Var.	wieder mäßiger	$\text{♩} = 66$	Ensemble	2-part cancrizans
IV Var.	äußerst ruhig	$\text{♩} = 40$	Ensemble	Double canon by inversion/4-part canon
V Var.	sehr lebhaft	$\text{♩} = 84$	Hp., Strings	2-part cancrizans (pitch and timbre only)
VI Var.	marschmäßig	$\text{♩} = 66$	Cl, B Cl., Hn. 1	Canon by inversion (clarinets) and pitch canon by inversion (horn)
VII Var.	etwas breiter	$\text{♩} = 54$	Ensemble	Double canon by inversion
Coda	---	($\text{♩} = 54$)	Hp., Strings	2-part cancrizans (including timbre and dynamics)

The Theme, Variation III, Variation V, and the Coda are two-part cancrizans canons. The Theme is a cancrizans canon in terms of pitch, rhythm, dynamics, and timbre, but the pitch cancrizans canon is independent of the rhythm/dynamics/timbre cancrizans canon. The two

canonic voices in the pitch cancrizans canon are embodied in the B-flat clarinet on the one hand and the harp and horns on the other. From the perspective of pitch class, the harp and horns as *comes* play the pitches of the *dux* B-flat clarinet line backwards (there are registral changes). The rhythmic, timbral, and dynamic cancrizans canon is independent of the pitch cancrizans relationship. The second half of the clarinet's line (beginning in the middle of m. 6) is a rhythmic, timbral, and dynamic retrograde of the first half, as is true of the rhythmically independent harp/horn voice. Two implied rhythmic/timbral/dynamic "lines" thus start in one instrumental group and jump to the other at the halfway point in measure six. This results in two rhythmic/timbral/dynamic lines that also have a cancrizans relationship to one another, but that are independent of the cancrizans pitch relationship. The third variation (mm. 34-44) is a more straightforward two-voice cancrizans canon in some respects, though the extremely pointillistic orchestration and disjunct "lines" obscure its nature. The fact that timbre and dynamics are not imitated consistently with the cancrizans pitch and rhythmic structure also undermine the recognizability of the canonic structure. Webern does, however, imitate the segmentation of the *dux* row in the *comes*, and the cancrizans pitch relationship is strict as to register and not just pitch class. Here only four row forms are used between the two voices (I3 and P6; RI3 and R6), with both the *dux* and *comes* alternating between two. Each voice makes its way through five iterations of the row (I3-P6-I3-P6-I3 in the *dux*; RI3-R6-RI3-R6-RI3 in the *comes*) such that the entirety of each "line" is a retrograde of the other in pitches and rhythmically. The fifth variation (mm. 55-67) is the structural palindromic counterpart of the third and uses the same row forms. It, however, is a cancrizans canon only from the perspective of pitch and timbre; the rhythms of the *dux* and *comes* differ. The structure of this canon is particularly opaque because of the way that the "lines" are orchestrated; because of the use of repeating chords; and because of the

highly teleological gradual crescendo that takes place in the variation. Here, both the *dux* and *comes* consist of fast repeated chords in the strings and a leaping harp line, with the *comes* following the *dux* a tritone away (from the perspective of pitch-class) and one quarter-note beat behind it. In five instances a single harp pitch acts as a row member in both the *dux* and *comes*. The use of the same instrumentation in both voices and the use of apparently static repeating chords prevent this variation from at all looking or sounding like a 12-tone canon, but Webern follows the plan strictly. In the Coda (mm. 89-99; the palindromic complement of the theme), Webern presents his sparest and simplest structure — a two-voice cancrizans canon in which timbre and dynamics are part of the structure. The pointillistic splitting of the lines between the harp and solo strings as well as the plentiful rests are the only factors complicating this simple construction.

Similarly to the first movement, the principal technique used by Webern in the second movement is the double canon by inversion: five of the nine sections of the structural palindrome use this method. As Webern tends to use similar structures (though with very different sounding results) in each pair of sections within the larger structural palindrome, these double canon by inversion sections appear in the first, second, fourth (the central variation), sixth and seventh variations. The first variation (mm. 11-23) is straightforward structurally but not necessarily in a way that is audible: the cellos (*comes* 1) imitate the first violins (*dux* 1) in inversion while the violas (*comes* 2) imitate the second violins (*dux* 2) in the same fashion. Webern strays here from his usual practice of pointillistic orchestration, but the aural effect is still not at all linear because of the density of the texture, the timbral similarity of the instruments, and the highly disjunct nature of each part. In the second variation (mm. 23-34) the first horn performs a canon by inversion with itself (alternating pitches) while the other instruments in the ensemble play a

second canon by inversion pointillistically distributed among the clarinets, harp, and strings. The fourth variation (mm. 45-55) falls in the center of the structural palindrome of the second movement and fittingly is unique among the variations in certain respects. Webern ties this center of the second movement to the center section of the first movement (section B) by similarly creating a structure that can be understood as either a single four-voice canon or a double canon by inversion. As was the case with the canons in section B of the first movement, the fourth variation can be thought of as a single four-voice canon in that a single rhythmic pattern is used in all four voices and each line has a different row form; yet it can also be considered a double canon by inversion, with *dux*-*comes* pairs distinguished by prime-inverse relationships as well as by contour/register. The repeating rhythmic pattern in each voice is two triplet quarters followed by a triplet quarter rest, with the middle measure of the variation (50) and its *molto ritardando* set off by two fermata rests being the only break in this pattern. The four voices with respect to pitch are paired into two *rectus ducēs* and two inverted *comites*, with pointillistic yet regularly-segmented orchestration of the voices (two notes at a time per instrument). The sixth variation (mm. 66-78) mimics its counterpart the second in its having the first horn play a canon by inversion with itself, again by alternating pitches. Here, however, only the horn's pitches are canonic; rhythm is not imitated. The other, simultaneous canon between the clarinet and bass clarinet is a more straightforward canon by inversion in which rhythm is also imitated strictly; the only twist is that the two instruments exchange roles in the middle of the variation at measure 72, with the clarinet assuming the role of *dux* and the bass clarinet as *comes*. This, in combination with the use of retrograded row forms from this point forward (R2 and RI10 in place of the initial P2 and I10), allows the two-clarinet canon (though not the simultaneous horn canon) to be a rhythmic and pitch palindrome. Webern's avoidance of

pointillistic orchestration in this variation recalls the first variation, in which complete row forms were performed by individual string parts. In the seventh variation (mm. 77-89) Webern returns to using the entire orchestra in a pointillistic manner to play another double canon by inversion, the *dux* and *comes* in each canon separated by a quarter-note beat and beginning a major second away from one another. The extreme orchestrational pointillism here seems intended as an opposite extreme from the alignment of contrapuntal voice and instrument section in the first variation.

Webern's approach to canon in the two movements of the *Symphony* systematically hides the process and puts it in conflict with other musical parameters. The concept of canon is abstracted nearly to the point of becoming a metaphor.¹⁰⁵ Both the ubiquity of the use of strict process in the piece as well as the degree of conflict between the process and the aural surface of the music recalls more Dunstaple's approach in *Dies dignus decorari* than it does Isaac's more tailored and transparent design in his *Johannis Baptistae* mass-proper cycle, despite its reliance on canon as opposed to isorhythm. Webern's principal tool in the *Symphony* in both movements is the double canon by inversion, a technique that in itself stretches the notion of imitation: while rhythmic replication is exact, inversion of a line is a significant transformation of it with a limited aural connection to the original. As we also saw with Isaac's double canon, the use of two *duces* and four overall voices can create a texture complex enough to interfere with the listener's ability to perceive the nature of the underlying process. In both movements of the *Symphony* (with four double canons by inversion appearing in the first movement and five in the

¹⁰⁵ Cf. Webern's comments on Bach's *Art of Fugue*: "It's important that Bach's last work was the 'Art of Fugue,' a work that goes wholly into the abstract, music lacking all the things usually shown by notation . . . It's almost an abstraction – or I prefer to say *the highest reality!*" *Path*, 34. Thus abstraction for Webern could actually make a technique more "real." Webern's abstract, metaphorical use of the concept of canon is similar in some respects to the way in which he abstracted tonal principles in creating his formal structures – for him the tonal conventions of the eighteenth and nineteenth centuries were analogues to the role of the 12-tone row in his music. See Bailey, *The Twelve-Note Music*, xi, regarding Webern's metaphorical, abstract view of tonal conventions.

second), Webern further undermines any sense of one line imitating another in his double canons by inversion through his use of pointillistic orchestration and large (often more than an octave) leaps. Because of these factors, the concept of a contrapuntal “line” in these canons is an abstract notion rather than an audible structure.

In the instances of double canon by inversion in the *Symphony* where Webern does orchestrate his lines so that they remain within a single instrument or instrument group, the underlying structure of the process remains hidden. In the first variation of the second movement (mm. 11-23), the four lines of the double canon by inversion are allocated consistently and in full to the four string instrument sections: *dux* 1 to Violin I, *comes* I to Cellos, *dux* 2 to Violin II, and *comes* II to Violas. Yet the timbral similarity of the instruments (with all four string sections making use of arco and pizzicato) as well as the dense texture and disjunct lines prevent the listener from hearing individual imitating lines. The use of timbral similarity to interfere with the aural perceptibility of contrapuntal lines appears also in the two variations of the second movement (numbers two and six) in which a horn part plays a canon by inversion with itself. Here what the listener perceives as a single horn part is in fact two imitative contrapuntal lines emerging in alternating notes. Yet another example of this approach comes in the cancrizans canon of Variation 5 (mm. 55-67), where the two contrapuntal voices make use of the same instrumental forces (the strings and the harp).

Webern’s treatment of rhythm and rests also interferes with the perception of the underlying canonic processes: frequently in these double canons by inversion he uses simple, repetitive rhythms and sustained notes and places rests within the contrapuntal “lines.” In the first section (A) of the first movement the texture is filled with half and whole notes that in their lack of distinctiveness interfere with the listener’s ability to recognize rhythmic imitation. In the

central fourth variation of the second movement (mm. 45-55) nearly all of the durations are triplet quarter notes, similarly making the aural distinction of individual lines nearly impossible. Webern also inserts frequent *ritardando* indications and fermata rests in the middle of contrapuntal lines, which further disguise the presence of rhythmic imitation. Perhaps the most notable example of this comes at the start of the third section (A') of the first movement of the *Symphony* (beginning at m. 42): only a couple of measures into the new double canon, at measures 45-47, Webern inserts two *ritardando* indications and a fermata rest, making the underlying rhythmic imitation extremely difficult to perceive.

In the four two-voice cancrizans canons of the *Symphony* the texture is simpler than in the double canons by inversion but the underlying process is at least as hidden. In Isaac's cancrizans canon in the *Johannis Baptistae* proper we saw Isaac at his most opaque: reversing a line, playing it simultaneously with the forward version of the line, and accompanying both canonic lines with two free contrapuntal voices renders the underlying process almost completely obscure upon listening. Even more than canon by inversion, cancrizans canon involves a substantial transformation of the original contrapuntal line to such an extent that it bears little audible connection to the original. Webern takes up the notion of cancrizans canon with gusto in the *Symphony* in part because it is a form of hidden process (in addition to it being conducive to vertical symmetry), using it in his second-movement Theme, Variations Three and Five, and the Coda. In all four of these instances Webern extends the difficulties in audibly identifying underlying process beyond those already inherent in the notion of cancrizans canon. The theme of the second movement is an elegant structure in which the notion of cancrizans canon is effectively the inspiration for a new process. Webern here essentially puts the constituent elements of a cancrizans canon such as is used by Isaac in his *Johannis Baptistae* sequence at

odds with each other: it is a pitch cancrizans canon as well as a rhythmic one, but the two canons are independent of one another. The sounding result is thus even more complex than the simultaneous layering of the forwards and backwards versions of a line. In Variation Three (mm. 34-44) Webern makes use of an orchestration of the contrapuntal lines that is completely at odds with the canonic structure of those lines, each line constantly jumping from instrument to instrument, using the entire ensemble. In the fifth variation Webern's use of the same instruments for both contrapuntal voices and use of repeating chords obscures any sense of counterpoint, in addition to thoroughly disguising the use of a 12-tone row. Webern uses pointillistic orchestration at odds with the underlying canonic structure in the Coda to the second movement (although the orchestration is much simpler in using only the harp, a solo Violin I, and a solo cello) and here makes use of extended rests in the middle of the line and large leaps within each line that undermine the notion that one is listening to two contrapuntal voices.

Webern's approach to the use of canon in the *Symphony* is therefore both one where canon is ubiquitous and strict and one where the perceptibility of it is undermined to the point of inaudibility. This is not to say that the listener cannot perceive the presence of process on a generalized level; the audible repetition of musical elements and the economy of means in the music are surface elements that imply the presence of a strict underlying scheme. And making his canons aurally perceptible may very well not have been a priority for Webern — he may in fact have desired that they be imperceptible or only perceptible in a very general way. The use of canon here may depend on other concerns. The precise musical result that Webern achieves in the *Symphony* can perhaps most directly be achieved by the use of canon and symmetry in the manner that Webern has used them, even if his means remain occult to the listener. The use of strict process also created structural integrity consonant with Webern's philosophical beliefs and

provided limitations that enabled his compositional process. Webern was obsessed with organicism and “unity” in music and art, the derivation of an entire work from a single idea.¹⁰⁶ He looked to models such as Goethe’s *Urpflanze* in support of his notion of unity.¹⁰⁷ With canon by inversion and the palindrome (horizontal and vertical symmetry, respectively) as his guiding principles, Webern seeks to create a whole in which every part can be seen as organically related and deriving from the same principles. Out of the simple concept of symmetry complex results like the *Symphony* (or like an entire plant) can be derived. Analogy can be drawn to the role of numerology in Machaut and Dunstaple, with numbers there assuming symbolic significance and, in combination with their connections to Christian tradition, acting as justification for imposing an abstract order on the musical work. Canon for Webern also represents a means of limiting himself, a way to guide compositional process. By requiring that the entire *Symphony* rely on canon and palindromes, Webern provided himself with a guiding principle for the work, one that could in some measure replace the tonal system that had dominated in the eighteenth and nineteenth centuries. The 12-tone serial system and the classical forms (rounded binary/sonata, theme and variations) that Webern makes use of in the *Symphony* similarly provide other constraints within which to work in a cultural environment that in the 1920s may have seemed

¹⁰⁶ See, e.g., Webern, *Path*, 25: “How is it possible for several parts to sing the same thing one after the other? That’s the essence of canon, the closest conceivable relationship between several parts . . . the reason is always the urge toward the greatest possible unity.” Also *ibid.*, 32, regarding Renaissance music: “in relation to form, the greatest flowering of polyphony, through ever-increasing unity, with the result that in the late Netherland school a whole piece would be built out of a sequence of notes with its inversion, cancrizan, altered rhythm, etc. More unity is impossible, since everyone has the same thing to say.” Also *ibid.*, 34, regarding Bach’s fugues: “This is a structure that arose absolutely from the urge to create a maximum of unity; everything is derived from the theme.” Regarding Bach’s *Art of Fugue*: “All these fugues are based on *one* single theme, which is constantly transformed: a thick book of musical ideas whose whole content arises from a single idea! [¶] What does all this mean? The desire for maximum unity. Everything is derived from one basic idea . . .” *Ibid.* Regarding the composers of “Schoenberg and his school”: “There’s this constant effort to derive as much as possible from one principal idea.” *Ibid.*, 35.

¹⁰⁷ See the 8-23-41 letter to Willi Reich regarding his Opus 31 Cantata: “Now, the melody the soprano soloist sings in my piece as the introduction (recitative) may be the *law* (Nomos) for all that follows! As with Goethe’s ‘primeval plant’ – ‘with this model, and the key to it, one can straightway invent plants ad infinitum . . . The same law will be found to apply to all other living matter’! *Isn’t that the meaning of our law of the row, at its deepest?*” Webern, *Path*, 62-63.

bereft of direction without these aids. The composer limits the number of choices he must make, and by doing so ensures that he can carefully think over those choices and make them artfully.

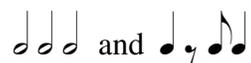
Webern cared equally for the hidden underlying process of his music and for the audible sounding result; he couldn't envision one without the other, so he exerted equal travail and attention on both.

From a structural point of view, Webern's employment of canon falls somewhere between the uses of rhythmic process in Dunstaple and those in Machaut and Isaac. Like Dunstaple, Webern employs process strictly throughout the entire work — Dunstaple's "Dies Dignus Decorari" was isorhythmic (nearly) throughout and in all voices, while Webern deploys canon strictly throughout both movements of his *Symphony*. But Webern's *Symphony* differs from Dunstaple's motet in that the *Symphony* is not controlled by a single, all-encompassing structure. Instead, Webern employs canon throughout and employs it in any number of different ways. The first movement consists of four double canons by inversion (the two in the central B section can also be thought of as four-part canons), while the second movement Theme and Variations contains nine discrete sections, each containing a different type of canon (though the nine sections can be grouped according to general categories of double canons by inversion and two-voice cancrizans canons). The *Symphony* thus has a measure of the piecemeal, tailored approach of Machaut's *Messe* or Isaac's *Johannis Baptistae* mass proper, in both of which numerous varied smaller discrete sections occur. In both the three sections of the first movement and the nine sections of the second, Webern is intent on maximizing the amount of variety he can derive from the use of similar processes. The first movement progresses from a sustained, placid environment (A) to a crescendoing, more rhythmically active yet still quiet B section, before concluding with more rhythmic activity and much louder dynamics in the A' section, the music

dissipating to solo string instruments in a kind of quiet coda (though we hear the overall structure as a binary one due to the repeats: A, A again, then BA', then BA' again). The second movement proceeds through highly varied textures at a rapid rate, Webern pushing to create completely contrasting sounds out of seemingly similar canonic methods and out of a single 12-tone row. Ultimately it is as if Webern sought the degree of variety seen in the alternating use of chant, non-canonic polyphony, and canon in Isaac's mass-proper cycles while maintaining the use of canon by inversion, palindrome, and of the 12-tone row as a common element throughout, these building blocks perhaps taking the constant, generative role occupied by sacred chant in Machaut, Dunstaple, and Isaac.

2. Webern's *Concerto*, Opus 24, third movement.

Webern next employed a form of strict canon in the third movement of his Opus 24 *Concerto*, where he in fact uses rhythmic canon (strict rhythmic imitation only) rather than canon (where both pitches and rhythm are strictly imitated). The energetic and loud third movement constitutes a sort of theme and variations in five sections, with *poco ritardando* indications to designate the end of each section. In this movement Webern uses strict rhythmic imitation in the theme (mm. 1-13) and in the third variation (mm. 41-55). The musical material in both sections is based on two rhythmic motives, which in their initial forms are:



As Webern did in most of the Opus 21 *Symphony*, the contrapuntal lines are pointillistically orchestrated among the ensemble. In the “theme” section, the *comes* is two beats (four quarter notes) behind the *dux*; in the third variation, the *comes* is seven quarters behind. Rhythmic imitation occurs in other parts of the third movement, but the distance between *dux* and *comes*

elsewhere does not stay the same for any length of time; it is only in the opening measures and in the third variation of the third movement that there is extended strict rhythmic imitation.

The use of strict rhythmic imitation here without strict pitch imitation is a result of Webern's different approach to his use of the 12-tone row. While in Opus 21 the row forms are treated as contrapuntal lines with one row form used for a given *dux* and a different row form used for a given *comes*, in the third movement of Opus 24 Webern will have both *dux* and *comes* take notes from the same row form. For instance, at measure 41, at the start of the third variation, the P6 row starts in the horn, moves to the trombone, and then to the piano: these nine notes constitute the *dux*'s first statement:

The image shows a musical score for measures 40-44 of Webern's Opus 24, third movement. The score includes staves for Klavier (Kl.), Horn (Hr.), Trombone (Trp.), Bassoon (Pos.), Clarinet (Gge.), and Piano (Klav.). Measure 40 is marked 'poco rit. - - wieder etwas mäßiger'. The Horn part starts with 'mit Dmpf. dux' and 'P6 sf'. The Trombone part has 'comes' and 'end P6'. The Piano part has 'I5' and 'end I5'. The Clarinet part has 'P10'. Dynamics include sf and ff. Arrows indicate the movement of the P6 row from Horn to Trombone to Piano.

The last three notes of the row, however (F#-G-Eb), are the first notes of the *comes* in the horn and trombone. There is thus an overlapping of row pitches across *dux* and *comes*, and as a result, the strict imitation is of rhythm only and not of pitch. A degree of pitch imitation is present due to the redundant nature of the structure of the 12-tone row, but this imitation is not strict or

consistent. For instance, at the start of the third variation, the *comes* initially presents a transposed inversion of the first three notes of the *dux* (m. 43-44). But the pitch imitation is inconsistent, with the type of imitation constantly changing even within a given passage. Webern's strict rhythmic imitation in the two sections of the third movement conflicts with the twelve-tone row structure in a fashion reminiscent of the way the isorhythmic structures in Machaut's *Messe* and Dunstaple's *Dies dignus decorari* conflicted with the chant being used. Here the division of *dux* and *comes* and the division of row forms is not aligned, resulting in a kind of elision of the structural units of the parameters of texture, rhythm, and pitch. Webern is presenting the 12-tone row in a successive, monophonic or homophonic fashion, while the rhythmic imitation suggests two-voice counterpoint; there is a separation of the parameter of rhythm from pitch that recalls more the isorhythm of Machaut and Dunstaple than the canons of Isaac. This tendency towards an independent rhythmic structure becomes more pronounced in Webern's works from Opus 24 on, and has affinities with the rhythmic techniques of Messiaen, Boulez, Stockhausen, and Stravinsky in the 1940s and 1950s.¹⁰⁸

The lack of pitch imitation in the third movement of Opus 24, the pointillistic orchestration, and the use of the same instruments for *dux* and *comes* in the third variation undermine the sense of one voice imitating another. Yet there is a simplicity of material and texture here not present in Opus 21. Webern inserts lengthy rests in the rhythmic counterpoint such that one voice rests while the other plays, and his use of just two primary rhythmic figures results in a seemingly more straightforward aural experience. His use of identical segmentation of the line from an orchestrational point of view, along with near-strict timbral imitation, further contributes to contrapuntal clarity. The ultimate effect, however, is more antiphonal — one

¹⁰⁸ See, e.g., Messiaen's use of isorhythm in *Quatuor pour la fin du temps*; the rhythmic series of Boulez's *Structures Ia*; the permutations of durations in Stockhausen's *Kreuzspiel*; and Stravinsky's use of isorhythm in *Canticum Sacrum* (see *infra*).

voice echoing another — than polyphonic, because of the use of rests in the texture and the way the two rhythmic voices take turns speaking. In this sense, we get no more audible counterpoint here than we do in Opus 21. There, Webern stifled any audible sense of polyphony by using large melodic leaps, simple, sustained rhythms, rests, and pointillistic orchestration; here, the two voices alternate with little or no overlap and the effect is no more polyphonic. The use of alternation of imitating elements rather than simultaneous overlapping of lines is another respect in which Webern is closer here to Machaut and Dunstaple, where the isorhythmic schemes lead to consecutive reiteration of a rhythmic pattern, than to Isaac, where contrapuntal lines are constantly overlapping with one another.

Webern's use of rhythmic canon in the third movement of Opus 24, however, is decidedly closer to Isaac from a structural point of view. Webern is not using a single rhythmic process to govern the totality of the piece or movement; instead, as with Opus 21 he uses a variety of approaches even within the individual movement. Differing from Opus 21 is the much more selective use of strict canon; here it only appears sporadically within the third movement, and only with strict imitation of rhythm. But the use of strict rhythmic imitation occurs within a broader context of freer rhythmic imitation in the rest of the third movement, as well as of the use of two rhythmic motives as a means of unifying the movement. Webern's rhythm-centered approach in the third movement has parallels in the first two movements, where he also relies on aurally identifiable rhythmic motives for structure. For instance, in the first movement, which formally can be thought of as a combination of non-tonal sonata form and ritornello form,¹⁰⁹ the first theme/ritornello features a series of three-note rhythmic motives using different duration values (mm. 1-3) that is immediately repeated in reverse (mm. 4-5). The return of this rhythmic structure makes the recurrence of the ritornello audible, despite the changes in pitch content and

¹⁰⁹ See Bailey's formal discussion of this movement in *The Twelve-Note Music*, 179-189.

orchestration in subsequent appearances. In the second movement Webern outlines his ABA' ternary structure primarily by increased use of *ritardando* and *calando* indications in the middle section (mm. 29-45), again essentially relying on rhythmic changes to outline his structure. Thus the strict rhythmic imitation in the theme and third variation of the third movement, as well as the use of two rhythmic motives throughout the movement, shares with the rest of the piece a focus on rhythm as an independent parameter, one capable of delineating structure and musical syntax. The use of strict imitation in the third movement can be seen as one end of a continuum, much as Isaac's selective use of strict canon in his *Johannis Baptistae* mass proper was the far end of a continuum of imitation used in the mass as a whole. Even as Webern veers in Opus 24 away from the unity of pitch and rhythm that marks Isaac's mass proper (and Webern's own Opus 21), his varied structural approach in the Opus 24 *Concerto* moves even closer than Opus 21 to Isaac's highly varied combination of textures within a work.

3. *Das Augenlicht*, Opus 26.

Webern's Opus 26, the cantata for chorus and orchestra *Das Augenlicht*, continues the interest in rhythmic structures independent of pitch structures seen in the Opus 24 *Concerto*, as well as the more selective approach to strict rhythmic process seen there. *Das Augenlicht* sets to music a poem by Webern's close friend Hildegard Jone, and the structure of Webern's music reflect that text. The text divides up into an ABA' ternary structure, and Webern's music reflects that structure. The first eight lines of the poem describe the light and joy that come into and out of the eye when it is open; the next six lines are darker in tone, describing a rush of tears in a closed eye; in the final four lines, the text describes the re-opening of the eye, with a return to light and optimism. Webern makes use of strict process very selectively in this piece, with the instruments engaging in a freer sort of rhythmic imitation, while the chorus alternates between

polyphonic imitation, homophony, and monophonic passages by individual voice parts. The first A section of the poem corresponds with primarily polyphonic textures in the voices, a slow tempo, and mostly quiet dynamics (mm. 1-58); the middle B section, beginning at measure 58 with the tempo change to *sehr fließend* (“very flowing”) and a loud instrumental interlude, contains primarily homophonic and monophonic vocal writing (mm. 58-93); and the final A’ section, separated by a fermata rest at the end of measure 93 from the B section, sees a return to polyphonic vocal writing (mm. 94-113):¹¹⁰

Section	mm.	Tempo	Dynamic	Primary Texture	Text
A	1-58	Slow	Quiet	Polyphonic (strict rhythmic imitation)	Light and joy flow through open eyes
B	58-93	Very flowing; then slow (m. 72 on)	Loud; then quiet (m. 72 on)	Homophonic or monophonic	Eyelids close and tears flow beneath lids
A’	94-113	Slow	Quiet	Polyphonic (strict rhythmic imitation)	Eyes re-open and wonders swim up

Within this larger structure, in addition to the freer rhythmic imitation in two voices by the orchestra (where the distance between *dux* and *comes* varies and the presence of rhythmic imitation is rarely aurally perceptible), the voices at times engage in strict rhythmic imitation. At times there is strict pitch imitation as well in the chorus, but the kind of strict rhythmic imitation without strict pitch imitation that was present in Opus 24 is again present here: the pitch imitation is freer and corresponds little with the rhythmic imitation. In the first section of the piece (A), the primary technique is strict rhythmic imitation in two voices with cancrizans pitch imitation. The cancrizans pitch imitation is of pitch classes only; Webern freely varies the contour of the lines. We see this combination of two-part strict rhythmic imitation and

¹¹⁰ The listed attributes are sectional tendencies; there is variety within sections as well.

cancrizans relationship between pitch rows at measures 8-19 and 37-41; at measures 47-58, Webern turns to mostly strict rhythmic imitation in four parts, with only loose and inconsistent pitch imitation. Webern's approach to row distribution at measures 47-58 involves spreading row content among multiple polyphonic lines, similar to the approach he took in the third movement of the Opus 24 *Concerto*. The middle section of the piece features almost exclusively homophonic and monophonic writing, though Webern introduces two-part canon at the fourth for a brief moment just prior to the end of the section on the words "die tagerworbnen" ("all won by daylight") (mm. 89-91). In the final A' section, we see the return of mostly strict rhythmic imitation in two parts, with pitch imitation not quite as strict and changing in its nature among rectus, inverted, and cancrizans forms (though at mm. 101-103, Webern includes a brief instance of strict pitch class imitation by inversion with only very loose rhythmic imitation). The cantata ends with a quiet homophonic statement in the chorus (mm. 111-113).

Webern in *Das Augenlicht* continues the separation and tension between rhythmic structure and pitch structure that was seen to a lesser extent in the Opus 24 *Concerto*, even as he also reinforces the intelligibility of his strict rhythmic processes through the use of texture and other parameters. As in the theme and third variation of the third movement of Opus 24, the 12-tone structure in *Das Augenlicht* is largely divorced from the rhythmic structures. Webern here has made the serial structure a mostly occult, abstract one, even as (in the chorus) he brings simple rhythmic imitation to the surface. While the strict rhythmic imitation in the voices is straightforward and also involves textual imitation and a delineation of lines according to vocal part, the dodecaphonic structure is more obscure, though discernable with close examination. The cancrizans pitch imitation in the opening section at measures 8-19 and 37-41 conflicts in principle with the straightforward rhythmic imitation and presents obstacles to aural recognition

by its very nature. The lack of contour imitation makes the process even more difficult to identify. At measures 47-58, where there is simple, easily identifiable rhythmic imitation among the four voice parts but pitch imitation is sporadic and inconsistent as a result of the distribution of individual row-forms across multiple parts, the conflict between the rhythmic and pitch structures is even starker. This pattern continues in the third section of the work (A'), where Webern is mostly consistent in his use of easily identifiable rhythmic imitation even as he switches frequently among different types of pitch imitation.

While there is tension between the rhythmic process and the pitch structure, Webern makes other parameters support the strict rhythmic imitation. He spaces the voices out and uses simple, clear textures to ensure the intelligibility of the rhythmic imitation. The two opening choral passages, at measures 8-19, employ only two voice parts at a time, with the *comes* in both cases (at mm. 8 and 14) starting one half-note beat after the *dux*. The registral separation (soprano-tenor and bass-alto) also helps ensure the aural perceptibility of the imitation. When Webern finally introduces four-part imitation towards the end of the opening section at measure 47, the voices enter one at a time in a staggered fashion not unlike Isaac's approach in the four-part "Amice Christi Johannes" canon at the end of the *Johannis Baptistae* sequence. The two-part canons at measures 96-100 and 104-110 similarly have textural transparency: we hear a two-part texture, with the orchestra's pointillistic, homorhythmic pitches interfering little with the listener's perception of a simple choral texture. We thus hear for the first time in Webern's serial work music that texturally resembles the polyphonic vocal counterpoint of Isaac, Josquin, and their contemporaries. It is certainly no coincidence that Webern's turn to this more transparent imitative texture is in a choral setting of a text with religious implications ("Das eines Menschen

Innerstes zum Himmel ward”¹¹¹). To an extent he here self-consciously echoes the sacred choral music of the Renaissance “Netherlanders” as well as the cantatas of J.S. Bach.

Other ways in which Webern reinforces the strict rhythmic structure are in his approach to orchestration and to Hildegard Jone’s text. In *Das Augenlicht* the contrapuntal lines that form the imitative rhythmic structure mostly align with individual voice parts. Thus, for example, in the canon at measure 8, the *dux* line remains in the soprano and the *comes* remains in the tenor. In some instances, such as in the two-part imitation at 37-41 and at 104-110, Webern moves the *dux* or *comes* line to a different voice part within a passage, but these transfers provide little interference with our perception of the presence of two lines. This is a radical departure from the canons of Opus 21, where Webern frequently employed highly pointillistic orchestration that bounced the contrapuntal lines quickly between contrasting instruments. The timbral and registral differentiation between the four voice parts here also prevents the kind of registral and timbral duplication that decisively camouflaged the presence of imitation in the first variation of the Opus 21 second movement and in the horn “lines” of the second and sixth variations. Webern in fact employs pointillistic orchestration with the instruments in *Das Augenlicht*, in some cases, such as at measures 96-100 and 105-108, having them proceed nearly homorhythmically with the voices as they sing.¹¹² But the instrumental parts here interfere little with the listener’s perception of two lines in the chorus.

Webern’s approach to the text of Jone’s poem also is very much aligned with his use of rhythmic process. On a larger scale, Webern reflects the overall tripartite structure of the poem

¹¹¹ Jone’s text in this work, though, is decidedly less explicitly Christian than certain passages in the texts for Webern’s second *Cantata*, Opus 31 (see *infra*).

¹¹² These passages anticipate Webern’s approach in the last movement of Opus 31, where the orchestra pointillistically doubles choral pitches. The difference in *Das Augenlicht* is that the orchestra here has its own separate pitches, contours, and phrasing, and is not wholly dependent on the choral lines as it is in the sixth movement of Opus 31.

by employing rhythmic imitation in the first and third sections, while using primarily homophony and monophony in the contrasting middle section. On the more local level, the segments of strict rhythmic imitation usually occur in a manner consistent with textual phrase structure, with textural changes usually occurring between rather than during text phrases. The imitation of text by the voices also reinforces the effect of the rhythmic imitation. Webern even uses rhythmic imitation for text-painting purposes, introducing a four-voice imitative texture for the first time at 47 when the text is describing the wonder of “so many stars” (“soviel Sternen”).

With respect to its structural role within the full composition, Webern’s carefully-tailored approach to the use of strict rhythmic imitation in *Das Augenlicht* is most akin to Isaac’s approach in the *Johannis Baptistae* mass proper. The choral passages in *Das Augenlicht* are a varied mixture of strict rhythmic imitation in various formats (with instances of both two-part and four-part textures, along with the use of cancrizans, inversion, and non-imitative pitch schemes), four-part homophonic writing, single-part monophony, and combinations of these textures. The instruments in the piece adopt yet another approach, employing rhythmic imitation more freely and sporadically, with the distance between *dux* and *comes* changing and a more pointillistic orchestration reminiscent of that in the *Opus 24 Concerto* or parts of the *Symphony*. Webern uses the polyphony versus homophony/monophony distinction to help structure his work, but this approach is not monolithic, with gradations and variety even within those larger categories. The mostly polyphonic first A section actually contains an ABA’ within it, as measures 1-19 and 37-58 are polyphonic and 20-36 are homophonic and monophonic. Meanwhile, the primarily homophonic and monophonic central section beginning at measure 58, with the text describing the tear-filled closed eye, contains a brief passage of two-voice strict imitation at measures 89-91 that foreshadows the return of polyphony in the A’ section starting

at 94. The third section (A') is again primarily polyphonic but ends with hushed a capella homophony at measure 111. Webern's structure in *Das Augenlicht* associates imitative polyphony with openness and optimism, and correlates four-part homophony with darkness and solemnity. The single-part monophonic passages, for their part, tend towards loud, strident declarations. Ultimately, the text here seems to dictate the presence or absence and type of strict process, Webern variously employing strict rhythmic process, segments without rhythmic process, and in-between situations where the process is very loose. Variety of approach is thus a basic element of Webern's strategy.

4. Webern's second *Cantata*, Opus 31, sixth movement.

In Webern's final completed work, the Opus 31 cantata for chorus, soloists, and orchestra (completed 1943), only the concluding sixth movement is strictly canonic. Rhythmic imitation is a basic structural element throughout the work, but in the first five movements the imitation is loose, with frequent deviations from a strict approach. Webern's sketches indicate that in all movements but the first he began with strict rhythmic imitation, but in the second through fifth movements he made so many alterations to the original rhythmic plan that the result bears only a loose connection with the original strict framework.¹¹³ Webern's employment of strict and audible rhythmic imitation in the choral sixth movement is reminiscent of his approach in *Das Augenlicht*, where the use of a chorus singing an ambiguously religious text also led Webern to employ rhythmic imitation in a clearly audible manner. The texts in Opus 31 are more clearly Christian in nature, but in both instances he alludes in his approach to the tradition of sacred choral polyphony stretching back through Bach and the Renaissance "Netherlanders."

The sixth movement of the *Cantata* ("Gelockert aus dem Schoße," or "Loosed from the womb") comprises a double canon by inversion among the four voice parts, with strict rhythmic

¹¹³ Bailey, *The Twelve-Note Music*, 119-120.

imitation throughout but with the pitch imitation of pitch classes only (contours are often changed). Each voice after the first (the Tenor) is separated by three half-note beats from the previous one, and the voices imitate the changing time-signatures in the Tenor *dux* as well as its rhythms (thereby resulting in simultaneous different time signatures in the four parts). This polyphonic structure of a double canon by inversion with the same rhythms for all parts resembles that of the first and third sections of the first movement of the Opus 21 *Symphony*, though the aural effect here is quite different.¹¹⁴ Within this double canon by inversion, the Tenor is *dux* one and the Bass (last to enter) is *comes* one, and the Alto part is *dux* two and the Soprano is *comes* two.¹¹⁵ In addition to the inverse relationships between Tenor-Bass and Alto-Soprano, Webern also has rendered the movement a double cancrizans canon with respect to pitch classes only, with the Alto's pitches being a near-retrograde of the Tenor's, and the Bass's a near-retrograde of the Soprano. The cancrizans relationship, unlike the cancrizans canon in the sequence of Isaac's *Johannis Baptistae* mass proper, does not apply to rhythm. The cancrizans pitch relationships between Tenor-Alto and Soprano-Bass are exact in terms of pitch-class except that each voice part has a pitch repetition not present in its cancrizans partner (compare, e.g., Tenor mm. 4-5 and Alto mm. 17-18). Each voice part makes use of three row forms (with one- or three-note elisions between all successive row forms), with the Soprano and Tenor using P and RI forms, and the Alto and Bass using only R and I forms. In order of entry:

¹¹⁴ Another connection between this movement and the first movement of the *Symphony* is the use of a prominent ascending major sixth going from A to F-sharp. In the Opus 21 first movement these are the first notes of the piece, at measures 1-2 in the second horn. In the second *Cantata*, these are the last notes of the piece, as the texture clears and the basses (doubled by the cellos) sing an ascending major sixth from A to F-sharp (mm. 23-24).

¹¹⁵ Looking at the initial musical layout, it is not immediately clear which voices are *duces* and which are *comites*, given that all four parts use the same rhythms and the pitch classes of each come from the same row. Webern, however, made it clear that he considered the inversion pairs to be bass-tenor and alto-soprano (9/4/42 letter to Willi Reich in Webern, *Path*, 63-64), and the music ultimately reflects these pairings in that the tenors and basses use different tone-row elisions than the altos and sopranos (see *infra*).

Tenor	P8	RI10	RI4
Alto	I4	I10	R8
Sopr.	P0	P6	RI8
Bass	I8	R6	R0 ¹¹⁶

The individual row forms remain within single voice parts, but Webern also has the orchestra double each note sung by the chorus, with an allocation of notes among the orchestral sections that is at times highly pointillistic and at others less so. The orchestra exclusively serves a doubling function here: every note the instruments play appears simultaneously in the choral parts, and all the notes in the choral parts are doubled by some instrument or section. The words are again from a poem by Hildegard Jone, and the setting is strophic, with identical music for each of the five-line stanzas of Jone's Christmas-themed poem.¹¹⁷

In this sixth movement, Webern's approach to the use of the 12-tone row conflicts with his approach to rhythm and other musical parameters. It bears some resemblance to his treatment of the row in the third movement of Opus 24 and in *Das Augenlicht*. In all three instances, rhythmic process is brought to the musical surface while Webern takes more liberties with the 12-tone row and renders its structure more opaque. Despite the strict relationship of inversion here between Tenor and Bass on the one hand and Alto and Soprano on the other, the nature of this relationship is largely hidden to the listener because of Webern's frequent shifting of the register and contour of notes in the *comes* voices — the pitch imitation is of pitch classes only. And his elision of row forms undermines their identity and introduces a less systematic element to the process, with the length of the elisions not a constant (alternating between one and three). Webern in the sixth movement of Opus 31 frequently has a row end and a new one begin

¹¹⁶ See Bailey's row distribution charts at *The Twelve-Note Music*, 408-409, for details of the elisions, though note that her table for the Alto part incorrectly lists R5 as the Alto's third row form rather than the correct R8, and fails to show that there is a three-note elision between the I10 and R8 rows in this part.

¹¹⁷ Jone's poem was originally one stanza, which Webern set on its own. Six months after he had completed the piece, Webern asked Jone to write two additional stanzas to allow for the strophic repetition present in the final form of the work. Moldenhauer and Moldenhauer, *Anton von Webern*, 585. Each movement of Opus 31 draws from a different Jone poem (not originally collected together), some more explicitly sacred than others, with Webern joining the different poems into a single work.

within a rhythmic and textual phrase — as for instance in the Soprano voice at the end of the first phrase. The first row (P0) ends with the C-natural in measure 10, with the next row (P6) beginning on the same C-natural. This ending and new beginning falls in the middle of a word — “Frühlingsraum” — and phrase, the new row beginning on C with “-lings-”. For Webern, as for Schoenberg, the 12-tone row was never intended to be heard as an audible melody or theme in itself, but Webern’s approach here contrasts sharply with the way the conclusions of row forms coincide with sectional boundaries in the second movement of Opus 21.¹¹⁸ The disjunction between row-form structure and rhythmic structure in the sixth movement of Opus 31 is in certain respects reminiscent of the similar tension between chant structure and isorhythmic structure in Machaut and Dunstaple. Another aspect of the pitch organization that Webern makes opaque is the two cancrizans relationships between Tenor and Alto on the one hand and Soprano and Bass on the other. In addition to the lack of contour or octave imitation in these relationships, Webern renders the reversed passage long enough (the length of three elided row forms, the time taken to sing through the five lines of each of Jone’s stanzas) that the listener cannot be expected to recognize the alto’s final pitches as the reverse of the tenor’s opening ones. Thus, while the brevity and simplicity of the cancrizans relationship in the seventh verse of Isaac’s *Johannis Baptistae* mass proper (“Et agni vellere”) rendered it potentially audible, there is no such possibility here.

In contrast with his approach to pitch structure, to a certain extent Webern uses musical parameters other than pitch to reinforce the strict rhythmic scheme and bring it to the musical surface. Foremost among these other parameters is texture: the voices enter one at a time, each separated by three beats, allowing enough transparency to ensure that the strict imitation can be

¹¹⁸ For example, there one row form is used in each contrapuntal line in the Theme, with the end of that row form coinciding with the end of the Theme.

aurally identified. The presence of rests within the lines further contributes to a textural clarity very distinct from the approach in, for instance, the first variation of the second movement of the *Symphony*, Opus 21. The textual imitation (each voice part echoing the same words) reinforces the rhythmic imitation by being completely aligned with it, so that repeated rhythms correspond with repeated words. The rhythmic phrases also are generally structured so as to align with the structure of the text, though the strophic repetition of music results in a few instances of words being split by rests (see, for example, m. 21 in verse 3, where “Urgewalten” is split after “Ur-“ by two half-note rests). Webern’s maintenance of the contrapuntal rhythmic lines within single voice parts consistently reinforces the perceptibility of the contrapuntal imitative scheme, the registral and timbral identities of the four voice parts as in *Das Augenlicht* making the rhythmic imitation more audible. Even the orchestrational doubling, while it periodically shifts a given line from one instrument or section to another, is generally far less pointillistic than that in the preponderance of variations in the second movement of the *Symphony*: the opening Tenor phrase and poem line, for instance, is doubled in its entirety by the violas (mm. 1-4).

Despite Webern’s reinforcement of his strict rhythmic process with other parameters, the aural effect in the sixth movement of Opus 31 is still one of only a generalized impression of imitation because of the repetitiveness of the rhythms. Webern employs changing time signatures and polymeter in the four vocal lines, but aurally a sense of triple meter predominates. Webern achieves this effect by making pervasive use of the figure  throughout the movement. This figure can take the form of a composite rhythm heard in all parts, such as in the opening of the movement (mm. 1-5), where the use of a short-long pattern in each voice, with each voice entering three half-note beats after the previous one, creates this effect. It also is manifested in individual lines, such as at measures 18-20 in the Tenor (imitated by the other parts). The overall effect is that of a predominantly triple meter with sporadic additions or

subtractions of a beat.¹¹⁹ Thus, rather than creating the aural impression of three voice parts imitating a specific series of rhythms in the Tenor, the movement instead sounds as a series of cascading, sometimes overlapping half-whole figures. The repetitiveness of simple rhythms in an imitative texture here provides yet another parallel with the first movement of Opus 21, and invites comparison as well with the stream of triplet quarters in the fourth variation of the second movement of that work. The rhythmic approach in the sixth movement of Opus 31 decisively separates the strict rhythmic imitation here from that seen in the four-part canon or double canon in the sequence from Isaac's *Johannis Baptistae* mass proper, where the *duces* have sufficient rhythmic variety as to render an impression of a distinct melody being imitated.

The clearly audible use of strict rhythmic imitation in the sixth movement contrasts strongly with the rest of the Opus 31 *Cantata*, where Webern's sketches reveal he began with strict canonic structures and then altered, loosened, and contorted them in the process of creating the final score. Only in the third movement, for three-part women's chorus, soprano soloist, and orchestra ("Schöpfen aus Brunnen"), are there other passages of strict rhythmic imitation that are immediately perceivable as such (see, for example, mm. 25-28 in the strings). Webern structured the cantata as a whole into two larger parts of three movements each, with the third and sixth movements occupying analogous positions in the two larger groupings. In each trio of movements (1-2-3 and 4-5-6), Webern begins with a recitative for soloist and orchestra, continues with an aria for the same forces (he includes the chorus as well in the fifth movement), and concluding with a choral movement. The use of readily audible strict rhythmic process in the third and (especially) the sixth movements fits (as it did in *Das Augenlicht*) with the employment of the chorus, the musical medium most closely associated with the Netherlanders and an essential element of Bach's legacy. The use of a chorus and strict rhythmic imitation in

¹¹⁹ The waltz-like effect is not uncommon in Webern. He was, after all, Viennese.

the third and sixth movements also seems to relate to the more explicitly sacred nature of the texts in these movements as compared with the others; the third and sixth movements, along with the fifth (which also employs the chorus), are the most explicitly Christian texts in the cantata. Webern put together the texts of the cantata from a hodgepodge of Hildegard Jone's published and unpublished poems, and in the sixth movement Jone marvels at the birth of Jesus. This hopeful sixth poem is a kind of response to the darkness of the fifth movement (which focuses on Jesus on the cross), a turn to hope related to the Biblical optimism surrounding Jesus's birth. The use of clearly audible strict rhythmic imitation in the sixth movement, along with the strophic text setting and use of simultaneous differing time signatures, is an invocation of a specifically Christian tradition of choral polyphony.

Within the whole of the cantata, "Gelockert aus dem Schoße" functions as one approach to texture and process among contrasting others, in a manner not unlike Machaut's selective use of isorhythm in his *Messe*¹²⁰ or Isaac's selective use of strict imitation in his *Johannis Baptistae* mass proper. Webern uses clearly audible strict rhythmic process where textually and dramatically appropriate and takes different approaches in other parts of the work, though each movement began with a strictly canonic conception. But the sixth movement also has similarities to the all-encompassing, comprehensively systematic approach in Dunstaple's *Dies dignus decorari*. Webern effectively creates a single, music-generating system that governs the entirety of the movement. The major components of this system are the strict rhythmic imitation of the Tenor line by the other three voice parts; the use of P and RI row forms in the Tenor and Soprano parts and I and R forms in the Alto and Bass; the use of cancrizans pitch-class

¹²⁰ Webern himself compared his second Cantata to a mass, with the concluding sixth movement analogized to an "Agnus Dei," presumably because of its focus on the "Lamb of God," Jesus. See the January 28, 1944, letter to Hildegard Jone in Webern, *Letters*, 52. The analogy to Machaut's use of isorhythmic process in his Agnus Dei thus takes on more weight.

relationships between the Alto and Tenor on the one hand and Soprano and Bass on the other; the strophic repetitions of the same music for each of the three stanzas of Jone's poem; and the systematic doubling of each choral note by an instrument or section of the orchestra. These principles of design constitute a nearly all-encompassing system that, like Dunstaple's *Dies dignus decorari*, is subtle and complex enough to create a compelling musical result rather than a lifeless and predictable scheme. The artistic richness of the movement is also due to Webern's flexible approach to individual elements within the whole, as was the case in the Dunstaple: his tweaking of row elisions and varied orchestration in particular undermine the status of the movement as pure system. The fact that this movement resides as just one of six in a varied whole further gives the impression of a tailored approach to the use of strict system, where it is one compositional option among many.

B. Stravinsky's use of strict rhythmic process in his late works.

Stravinsky's turn to 12-tone serialism and strict rhythmic process in the last 20 years of his compositional career developed out of his immersion during the early 1950s in the music of Webern and in that of much earlier composers like Machaut and Isaac. We see the use of canon and isorhythm in both a serial and non-serial context in the two arguably most important works of his late period, *Canticum Sacrum* and *Agon*. His later *Variations (Aldous Huxley in Memoriam)* (1964) represents a continuation and further development of his interest in isorhythm. Stravinsky's approach to strict rhythmic process in these works owes a great debt to the music of both Webern and the pre-tonal composers Stravinsky studied during this time period, but also evidences idiosyncrasies peculiar to him.

1. *Canticum Sacrum*.

Stravinsky's *Canticum Sacrum* (1955) makes extensive use of both isorhythm and canon even as it also, like Webern's *Symphony*, displays an intense interest in palindromes and near-palindromes. The work was intended for and first performed in Venice's St. Mark's Basilica,¹²¹ and its use of a chorus and of rhythmic processes modeled after early music is to some extent a self-conscious attempt to connect with sacred Christian musical tradition. The palindromes and near-palindromes allude to Machaut and to Webern, but also invoke the symmetrical architecture of the building itself. Stravinsky makes use of three types of strict rhythmic process in the piece: the first and fifth movements are nearly exact retrogrades of one another; the middle movement (the third, *Ad Tres Virtutes Hortationes*), broken up into three sub-sections entitled *Caritas*, *Spes*, and *Fides*, is largely built around isorhythmic repetitions of a duration series; and, finally, Stravinsky uses canon in the *Caritas* and *Fides* sub-movements of the middle third movement. I will address the mechanics of each of these three techniques as used in *Canticum Sacrum* in turn.

The entire five-movement structure of *Canticum Sacrum* is a palindrome, such that the first and fifth movements occupy complementary positions within the structure and are mostly strict musical reversals of one another. The structural palindrome recalls Webern's in the second movement of Opus 21. The pitches and rhythms of the fifth movement ("Illi autem profecti"), though not the text, are a reversal of those of the first movement ("Euntes in mundum"). The primary point of divergence from the mostly strict retrograde process comes at the close of "Illi autem profecti," where Stravinsky introduces a tempo change (*Adagio*) and adds two chords at measures 343-44 to provide the conclusion of the movement and of the work as a whole with a greater sense of finality. This brief coda can also be seen as the structural complement to the

¹²¹ It was commissioned by Alessandro Piovesan on behalf of the Venice Biennale International Festival of Contemporary Music. Stravinsky would ultimately be buried on the cemetery island of San Michele, about a mile from St. Mark's.

opening *Dedicatio* that precedes the first movement of the work. Dynamics and orchestration are largely preserved in the retrograde scheme as a whole, though Stravinsky treats these parameters more freely. Most notably, the quiet sustained notes in the bass trombone and contrabass trombone at the end of the fast choral phrases in the first movement (mm. 16, 30-31) are marked *forte* when they appear at the start of the fast choral phrases in the fifth movement (mm. 321, 335), completely changing their character. Orchestrationally, Stravinsky preserves the division of labor between chorus, brass, and organ for the bulk of the fifth movement, though he makes some changes. Perhaps the most prominent orchestration change comes with the chord that closes “Euntes in mundum” and begins “Illi autem profecti”: in its incarnation at the end of the first movement nearly the entire ensemble contributes, but in its form at the start of the fifth movement the chord is scored for contrabassoon, organ, and strings. Stravinsky does not attempt to retrograde the text of the first movement in the fifth; the two texts are related, however, with both coming from the Vulgate conclusion to the gospel of Mark (text now rejected by Biblical scholars as a much later, spurious addition to Mark’s gospel¹²²). The first is a command from the risen Jesus to “Go . . . preach the gospel” (Mark 16:15¹²³) and the second, a few verses later, states “And they went forth, and preached everywhere . . .”, concluding the gospel as well as Stravinsky’s work (Mark 16:20).

The second strict rhythmic process used by Stravinsky in *Canticum Sacrum*, and the one that has drawn the most critical attention, is isorhythm. All three sub-movements of the central third movement *Ad Tres Virtutes Hortationes* make prominent repeated use of a 12-duration rhythmic series, which initially appears at the start of the *Caritas* sub-movement (m. 94) as:

¹²² Williams, “Literary Approaches,” 24.

¹²³ The text at the start of the score to *Canticum sacrum* incorrectly identifies this verse as Mark 16:7.



The entirety of the third movement is dodecaphonic,¹²⁴ and the 12-duration *talea* appears simultaneously with various row forms, Stravinsky aligning the 12 elements of both the pitch row and the *talea* rather than staggering or eliding them. Stravinsky monophonically presents the *talea* along with a row form in the organ at the start of *Caritas*, *Spes*, and *Fides*, in passages that recall the quiet organ passages (subtly accompanied by bassoons and contrabassoon) in the first and fifth movements. *Caritas* and *Fides* occupy complementary positions in the palindromic structure of the piece as a whole, lying on either side of the central *Spes* sub-movement, and they have similar structures and make similar use of rhythmic process. In both *Caritas* and *Fides* the opening organ *talea* presentation is followed by a section featuring strings of flowing eighth notes (instrumental in *Caritas* and largely choral in *Fides*), then by strict choral canon that makes use of an altered version of the *talea*. *Caritas* features more isorhythm than *Fides*: in the instrumental material prior to the start of the choral canon, the initial organ *talea* presentation is followed by two additional *talea* statements in the trombones, the second of which augments the rhythms previously used by a factor of 1.5 (augmented version at 107-115). *Fides* concludes with a short additional canonic section and final statement of the *talea* in the strings that *Caritas* does not have (mm. 237-249), providing the tripartite movement as a whole with a greater sense of finality.

The central sub-movement, *Spes*, uses the same *talea* as *Caritas* and *Fides*, but takes a different approach after the monophonic organ introduction. In *Spes*, the *talea* is the structural building block for the entire sub-movement, and there are no gaps between the eight iterations of

¹²⁴ Though P0 is not the first appearance of the row (it first appears as RI7 in mm. 94-99), Tucker's study of Stravinsky's sketches revealed that for him, P0 was: C D F Db Fb Eb Ab F# G A B Bb. Tucker, *Stravinsky and His Sketches*, Vol. 1, 124; Vol. 2, 24 Ex. 5.11. The designations in this essay are based on this P0.

the *talea* that span the sub-movement (though the fourth iteration is incomplete, beginning on the fourth duration of the *talea* at m. 148).¹²⁵ These iterations take place over the course of six sections divided by tempo changes. Three different tempo indications are used, in the order:

$\text{♩}=108, \text{♩}=108, \text{♩}=72, \text{♩}=108, \text{♩}=72, \text{♩}=108$

This creates an antiphony between male soloists in the $\text{♩}=108$ sections and female chorus in the $\text{♩}=72$ sections. The tempo indications correspond with the musical material used, the sections varied slightly on their return: the initial $\text{♩}=108$ section is an instrumental introduction to the sub-movement featuring the first three *talea* iterations; the $\text{♩}=108$ sections feature the tenor and baritone soloists accompanied by low brass; and the $\text{♩}=72$ sections (in a tempo two-thirds that of the initial $\text{♩}=108$ section) feature the female choral parts accompanied by oboes and trombones. The rhythmic unit upon which the isorhythmic pattern is based varies in these sections between a quarter (in $\text{♩}=108$), a dotted eighth (in $\text{♩}=108$), and a quarter (in $\text{♩}=72$). In some occurrences of the *talea* in *Spes*, as in the opening organ solo, the isorhythmic line sounds alone, while in others the *talea* occurs simultaneous with non-isorhythmic material in other parts.

The third strict rhythmic process made use of by Stravinsky in *Canticum Sacrum* is canon, with *Caritas* and *Fides* both containing extended canonic passages. The primary canon in each of these sub-movements features the chorus in combination with selected instruments. Both of these canons make use of 12-tone rows as well as an altered version of the *talea* used isorhythmically in *Ad Tres Virtutes Hortationes*. As such they incorporate elements of both isorhythm and canon. The canon in *Caritas* (mm. 116-129bis) is in three choral voices and an augmented fourth voice allotted to the trumpet and bass trumpet, creating a form of mensuration

¹²⁵ Tucker discusses how the 12-tone row and canonic technique allowed Stravinsky a means of creating and extending musical structure without relying on the tonal apparatus he used in his neoclassical period. Tucker, *Stravinsky and His Sketches*, Vol. 1, 136-37. In *Spes* we can see isorhythm function similarly, in that the *talea* and 12-tone row in a fairly straightforward way generate an entire sub-movement.

canon (though the trumpets in their second row form/*talea* iteration play the *talea* in its unaugmented form). Its text comes from the Vulgate books of Deuteronomy (6:5) and First John (4:7). From a pitch perspective, the alto and tenor parts sing different 12-tone row forms (I2 and P1 respectively), repeat that same row form, then sing the retrograde of that row form; the soprano, last to enter, just sings the P3 row form twice; and the augmented trumpet line plays P0 followed by its retrograde, R0. This use of retrogrades immediately subsequent to P and I forms gives a cancrizans or palindromic aspect to the canon that creates a small-scale analogue to the large-scale palindromic structure of the piece, though the canon does not constitute a literal palindrome in the way that “Euntes in mundum” and “Illi autem profecti” do. The imitation is strict rhythmically, and strict with respect to pitch so far as each voice is singing forms of the same row, but Stravinsky freely alters the octave of pitches — treating the 12-tone row as a series of pitch classes in the way that Webern did in the sixth movement of the Opus 31 *Cantata*. Stravinsky literally repeats this canon with new words once it concludes (using the verse from First John after having used the Deuteronomy verse for its first iteration), also echoing the sixth movement of Webern’s Opus 31 in its literal repetition of a choral canon with a new text.¹²⁶

The corresponding canon in *Fides* (mm. 218-236) is for four choral parts with two independent instrumental lines simultaneously playing row forms in even durations. The rhythm of the voices is again an altered form of the *talea* used throughout the third movement, and the rhythmic imitation among the four canonic voices is again strict. Here, however, all four voice parts begin with R row forms (four different transpositions), with the octave and contour of the

¹²⁶ Stravinsky and Alessandro Piovesan of the commissioning Venice Biennale committee engaged in an extended dispute over the length of *Canticum Sacrum*. Piovesan was expecting a 40-minute piece, but what Stravinsky wrote fell far short of that. Tucker, *Stravinsky and His Sketches*, Vol. 1, 289. Stravinsky originally drafted the *Caritas* canon without the repeat, and it appears that he subsequently added it in order to lengthen the piece and thereby render it more in line with the expectations of Piovesan and the Biennale committee. *Ibid.*, 137, 291. Stravinsky sent the added canon repeat to the engraver just four days after having suggested to Piovesan that *Canticum Sacrum* be performed twice at the premiere concert in order to fill time. *Ibid.*, 290-91.

pitches being freely altered as in the *Caritas* canon. After their initial row forms the voices switch to either P or I forms (the basses, last to enter, conclude after their first row form, R8). This canon in *Fides* is followed by a second brief canonic passage featuring the two trumpets and the organ in three-part imitation. Stravinsky begins the passage by implying a mensuration canon using the *talea* in a 2:3:6 duration ratio, but after a short time diverges from strict application of such a process, with only the organ strictly following the *talea* pattern. The movement concludes with a monophonic statement of the *talea* in the strings (mm. 244-249).

Stravinsky's approach to rhythmic process in *Canticum Sacrum* for the most part differs greatly from Webern's, and has more in common with the much more transparent fashion with which Isaac used canon. In *Canticum Sacrum* there is a transparent one-to-one correspondence of rhythmic structure to pitch structure that contrasts sharply with Webern's approach in *Das Augenlicht* or the Opus 31 *Cantata*, and that is more straightforward and systematic than the relationship between pitch and rhythm in the canons of Opus 21. Stravinsky's coordination of *talea* and 12-tone row also represents an approach to isorhythm that strongly differs from that seen in the isorhythmic works of Machaut or Dunstaple, where a *talea* cuts into and disturbs the pre-existing structure of the chant. Stravinsky's *talea* is 12 durations long and aligns exactly with 12-tone row forms. This 12-on-12 correspondence is the basis for most of the music in the *Caritas-Spes-Fides* triptych. In the non-canonic isorhythmic passages, particularly in *Spes*, Stravinsky strings together a series of these *talea*/row combinations (though changing tempo and the base unit of the duration pattern). In the canonic passages the individual lines consist of similar series of *talea*/row combinations. The tension set up between tenor chant *color* and imposed *talea* in Machaut and Dunstaple is completely absent in the isorhythmic portions of *Canticum Sacrum*; Stravinsky's *talea* doesn't in fact "cut" anything — it instead fits in lock-step with the 12-tone row. Similarly, in Webern's choral canons we never see the degree of

correspondence between row and rhythmic pattern that is present in *Caritas* and *Fides*. Where Webern turned to rhythmic patterns as a structural device in Opus 24 on, the rhythmic structures were typically in tension with the 12-tone row structure. That is not the case in *Canticum Sacrum*.

Stravinsky also employs texture to reinforce and clarify his rhythmic processes rather than obfuscate them. Perhaps the clearest example of this is his monophonic presentation in the organ of his *talea* at the start of each of three sub-movements of the *Ad Tres Virtutes Hortationes*, as well as the reappearance of this material in the strings at the conclusion of *Fides* (mm. 244-249). Presenting the pattern by itself in a single instrument brings it very much to the aural surface of the music, enabling the listener to be introduced to it before it becomes a part of more complex textures.¹²⁷ Stravinsky's subsequent use of the *talea* simultaneous with non-isorhythmic material is akin to Machaut's general isorhythmic practice in his *Messe*, but Stravinsky's previous monophonic introduction of the pattern as well as his clarification of the *talea*-bearing voices through timbral contrast makes the pattern much easier to follow here. Stravinsky's use of a slightly-altered version of the *talea* in the melodies of his canons further brings his use of rhythmic process to the musical surface. In these choral canons in *Caritas* and *Fides* the voices enter one at a time, so the isorhythmic pattern (or rather a slightly altered version of it) is presented in a fashion such that the listener can easily perceive it. Once the canonic texture builds up to the point of four or six voices going at once, the texture becomes complex enough to render individual lines difficult to discern, with the highly reverberant acoustics of St. Mark's further decreasing the clarity of the texture in such passages at the

¹²⁷ Analogy can be made to the start of Stravinsky's *Rite of Spring*, where musical materials are presented one at a time in isolation and then subsequently layered on top of one another.

premiere. In the early stages of the canons, however, the texture is simple enough to allow aural identification of the *talea* as well as of the strict imitation.

Orchestrationally, Stravinsky's choices generally reinforce the isorhythmic concept in a way that contrasts with the approach in Machaut, while bearing some similarity to Dunstaple's approach. In Machaut's *Agnus Dei* the isorhythmic pattern resides primarily in the tenor voice, buried within the four-voice texture. In Dunstaple's *Dies dignus decorari*, on the other hand, all three parts are isorhythmic and the tenor *talea* would likely have been timbrally distinguished from the upper two voices by the use of one or more instruments to perform it. In *Caritas*, *Spes*, and *Fides*, Stravinsky similarly used timbre to enable aural identification of the *talea*.

Stravinsky's use of a distinctive instrument sound or instrument group to carry his *talea* helps make it perceptible even in more complicated textures where there is simultaneous non-isorhythmic material. Stravinsky generally places the *talea* in either a single instrument or a pair of closely related instruments, for instance using the trombones to carry the *talea* in the ♩=108 portions of *Spes* simultaneous with the non-isorhythmic male vocal soloists. He moves the *talea* between contrasting instruments, but he makes significant timbral switches only when one *talea* statement ends and another starts. An example of this comes at the start of *Caritas*, where the first *talea* statement is in the solo organ, and the second is in the bass trombone (mm. 94-106). Switching instruments at the conclusion of *talea* statements in itself reinforces the underlying structure of the rhythmic process, as the endings and beginnings of *talea* statements are thereby highlighted timbrally.

In the choral canons in *Caritas* and *Fides*, we see a similar commitment to orchestrating contrapuntal lines in a fashion such that they *sound* as contrapuntal lines. In both of these canons one vocal part enters and another imitates it. Stravinsky here does not use the kind of pointillistic orchestration or placement of multiple simultaneous canonic lines within a single

instrument that Webern employs in his *Symphony*. Instead, the orchestration in these choral canons — like much else about them, such as the use of cancrizans pitch imitation with straightforward rhythmic imitation, the allocation of different row forms to different voice parts, the optional instrumental doubling of the choral lines, the sacred text, and the literal repetition of the entire canon — mimics the sixth movement of Webern’s second cantata.¹²⁸ In both instances the orchestration reflects in a straightforward manner the underlying strict imitation, as was the case in the strict canons of Isaac’s *Johannis Baptistae* proper.

The palindrome created by the first and fifth movements of *Canticum Sacrum* is in some respects emphasized, while in others it remains obscure to the listener. The placement of the two movements within the larger palindromic structure of the piece (with the first two movements and first sub-movement of *Ad Tres Virtutes Hortationes*, *Caritas*, having analogues in *Fides* and the final two movements) reinforces the process of reversal that takes place in the two movements: the sequence of movements after the central *Spes* sub-movement is a kind of reversal of the first half of the piece, so making “*Illi autem profecti*” a near-literal reversal of “*Euntes in mundum*” is an extension of the overall formal principle. And though the texts used in the two movements are hardly literal reversals of one another, the palindrome relationship can be thought of as loosely reflected in the forward-looking vs. backwards-looking perspectives of the two relevant verses. The first (“*Euntes in mundum*”) is an instruction to future action — “Go ye into all the world and preach the gospel to every creature” — while the second (“*Illi autem profecti*”) — “And they went forth, and preached everywhere . . .” report on what occurred in the past. These aspects help reinforce the retrograde musical process that occurs in “*Illi autem profecti*.”

¹²⁸ According to Robert Craft, in an earlier draft Stravinsky even gave differing simultaneous time signatures to the different choral voice parts in the same way that Webern’s sixth movement does. Craft, “A Concert for St. Mark,” 42. In no other instance in Stravinsky’s works does a passage seem so clearly derived from a Webern work.

A number of factors, however, obscure the process being used in the two movements. The movements are plainly and audibly closely connected, but the extent to which the cancrizans process is made apparent to the listener is debatable. The cancrizans relationship generally, as we have seen in Isaac's cancrizans verse ("Et agni vellere") and in Webern's works, is one that places nearly impossible demands on the listener to identify aurally, with the length of the passage being reversed a significant factor in its perceptibility. Here, not only is the passage much longer than that in, say, "Et agni vellere," but there is a significant lapse of time with much intervening music between the first and fifth movements of *Canticum Sacrum*. These factors make aural identification of the reversal in the performance of the entire work a major challenge; the relationship becomes more of an abstract one, providing a structural scaffolding for the composer and fodder for close score analysis. While there is a loose forwards-backwards relationship between the texts used, this relationship is not at all comparable to the literal reversal of pitches and rhythms in "Illi autem profecti." A textual reversal of that sort would require words to be literally sung backwards. The rhythms that Stravinsky uses in the two movements also tend to interfere with the communication of the cancrizans structural process, as he makes extensive use of repeated note values both in the slow organ sections and in the fast sections with chorus and brass. The slow organ and bassoon sections, such as that at measures 17-25, feature quarter-note distances between attacks, and thus sound similar forwards and backwards. Similarly, in the fast sections (such as at mm. 10-16) the repeated choral quarter notes as well as the repeated 16th notes in the brass make a similar impression in both "Euntes in mundum" and "Illi autem profecti." The result is that the two movements sound like they use closely related material, without the cancrizans aspect being particularly apparent.¹²⁹ Finally, the dynamic

¹²⁹ Robert Craft wrote that the rhythms in the first and fifth movements "work . . . fluently both ways" and lack "the mechanical ugliness of most retrograde rhythms." Craft, "A Concert for St. Mark," 44. Presumably it was Stravinsky's use of repeated notes that led Craft to this opinion.

changes and tempo change Stravinsky makes to the retrograde of the original in “Illi autem profecti” undermine our sense that we are hearing a retrograde of the opening movement. The quiet low brass notes that were left to sustain at the end of the fast sections in the first movement (such as at m. 16) gain a completely different character in the fifth movement when they are placed at the start of the fast sections and are played forte (compare mm. 335-336). The final closing dramatic tempo slow-down at the end of “Illi autem profecti” also represents a decisive change from a straight reversal of the opening movement, thereby interfering with the perceptibility of a reversal. Stravinsky’s approach to rhythmic process in these two movements thus contrasts with the way that he brings process to the musical surface in the central *Caritas-Spes-Fides* triptych. This opacity of process does not interfere with the aesthetic success of the two movements, but represents a contrasting approach.

Stravinsky uses rhythmic process to create a form for the entirety of *Canticum Sacrum* in a way not seen in either the early music works or the Webern pieces discussed previously in this essay. The sense of a structural palindrome in the work depends largely on where exactly Stravinsky uses rhythmic process and the type that he uses. The first and fifth movements feature a series of rhythms and pitches presented forwards then backwards; the second and fourth movements feature the tenor and baritone soloists respectively in music that does not rely on strict rhythmic process (though Stravinsky includes a choral fugato at mm. 274-280 of “Brevis Motus Cantilena,” the fourth movement); and the third movement triptych features isorhythm and strict canon. The central section of the entire work, *Spes*, fittingly makes the most concentrated and consistent use of isorhythm, as it is constructed on a series of eight consecutive *talea* statements and row forms that undergird an alternation between the male soloists and the female choral sections. The *Dedicatio* that begins *Canticum Sacrum* to some degree stands outside the structural palindrome, but by featuring a duet between the tenor and baritone soloists

foreshadows the tenor-baritone duets in *Spes* (thus giving even the central structural member a counterpart). Stravinsky's avoidance of strict rhythmic process in the movements featuring soloists — the second and fourth — perhaps reflects an association of solo singing with rhythmic freedom, an association that goes back as far as Gregorian chant and that was later reflected in the monody of the early Baroque. By the same token, Stravinsky relies on strict rhythmic process in the choral and instrumental portions of the work: the first and fifth movements, as well as most of the central third-movement triptych. These associations hold even within given movements, with the fourth movement featuring a choral fugato inside a movement that otherwise does not make use of rhythmic process. The association of choral singing with clearly audible strict rhythmic process we saw in Webern as well. As was the case in *Das Augenlicht* and the second *Cantata*, its use in *Canticum Sacrum* invokes the Renaissance tradition of sacred choral polyphony.

Stravinsky's selective use of rhythmic process among more rhythmically free material as well as his use of a variety of different types of rhythmic process can be likened to the approaches in Machaut's *Messe* or Isaac's *Johannis Baptistae* mass proper, but his assembly of truly divergent techniques into a structurally coherent whole distinguishes it. Like Machaut in his *Messe* and Isaac in his *Johannis Baptistae* mass-proper cycle, Stravinsky in *Canticum Sacrum* uses strict rhythmic process selectively, employing it where it fits and using either rhythmically free music or process of a significantly less strict nature in other portions of the work. In *Canticum Sacrum*, however, the selective use of rhythmic process as well as the selective employment of 12-tone serialism in the central three movements ("Surge, aquilo," *Ad Tres Virtutes Hortationes*, and *Brevis Motus Cantilenae*) help form a palindromic structure that seems to imitate the architectural structure of Venice's St. Mark's Basilica. The contrast between the types of strict rhythmic process employed by Stravinsky in this work also

distinguishes it even from such a work as Isaac's *Johannis Baptistae* mass proper, which explored double canon, four-part canon, and cancrizans canon in addition to more freely imitative textures. Stravinsky combines into a single work the use of a (nearly) strict palindrome in movements one and five that recalls the tenor voice in Machaut's *Ma fin est mon commencement*,¹³⁰ isorhythm, canon that makes use of a slightly altered version of the isorhythmic *talea*, and even mensuration canon. In doing so he combines assorted processes from multiple eras, giving the work a historical smorgasbord kind of quality that recalls other Stravinsky works like *The Rake's Progress* and *Agon* in its accumulation of techniques with strong and specific historical associations. This panoply of rhythmic process types coexists with the variety of pitch-related approaches in the piece, ranging from tonality to modality to strict twelve-tone serialism. Stravinsky's great achievement in *Canticum Sacrum* is to unite these varieties of processes and approaches, both rhythmic and melodic/harmonic, into a coherent whole.

2. *Agon*.

Stravinsky's *Agon* was finished subsequent to the completion of *Canticum Sacrum*, but he began *Agon* first. He commenced work on *Agon* in late 1953, it was interrupted by *In Memoriam Dylan Thomas* (1954) and *Canticum Sacrum* (1955), and then Stravinsky turned back to it and completed it in 1957. Because *Agon* and *Canticum Sacrum* were written nearly contemporaneously, it is not surprising that they have in common a combination of 12-tone technique and tonality as well as use of multiple forms of rhythmic process. Both works are divided into a numerologically significant collection of distinct sections (*Agon* with 12 movements, not counting the *Prelude* and *Interludes*, which matches the 12 dancers performing in the ballet as well as the 12 pitch classes in the tone rows Stravinsky employs at certain points

¹³⁰ Elder, "The Late Choral Works," 65, makes this comparison.

in the piece), and make use of a variety of melodic/harmonic and rhythmic approaches with distinct historical associations. *Agon* is divided into four sets of three movements, with the four larger divisions separated by a *Prelude* or *Interlude*: I, II: *First Pas-de-Trois*, III: *Second Pas-de-Trois*, and IV. In the work Stravinsky uses isorhythm, strict canon (in three separate movements), mensuration canon, and fugato with a mensuration canon element (less strict in its use of process but forming a significant structural connection with the prior uses of canon). Much of *Agon*, especially the two central *Pas-de-Trois* sections, is based on the 1952 Joan Wildeblood edition of Francois de Lauze's 1623 *Apologie de la danse*.¹³¹

Stravinsky's use of isorhythm in *Agon* is much less pervasive than his approach in *Canticum Sacrum*, and is found in a single movement, *Saraband-Step* (II(i), beginning at m. 146). The movement in question — the first movement of the second larger section of the work — bears more resemblance to the “Euntes in mundum”-“Illi autem profecti” pairing in *Canticum Sacrum* than the pervasive use of the 12-duration *talea* in the third movement triptych of that piece. In this movement, Stravinsky presents a violin solo with accompaniment in the first half of the movement, then in the second half of the movement repeats the rhythms of the first half while inverting the melodic and harmonic intervals used and selectively changing the orchestration. This movement is the first in *Agon* based on one of the Renaissance dance forms about which Stravinsky had read in the Wildeblood edition, but Stravinsky's plan for it echoes the Baroque binary form seen most notably in numerous Bach instrumental movements. In addition to the two-part rectus-inversion division, Stravinsky echoes the tonal scheme of the Baroque binary: he begins the movement with a B-flat major chord (m. 146), ends the first half of the movement on an F-major chord with an added G, then in the second half concludes again

¹³¹ Joseph, *Stravinsky's Ballets*, goes into detail on the extent to which Stravinsky mined the edition of the *Apologie* to create *Agon*'s dance forms, melodies, and rhythms (172-80).

with B-flat major with an added seventh. The technique of inversion used in the second half of the movement is not a literal inversion of the pitches of the first half, but instead is a not entirely systematic combination of transposition, the inversion of harmonic and melodic intervals, and the exchange of material from the violin to the other instruments and vice versa. The movement is isorhythmic in that the rhythms stay the same in the two halves of the movement (with the exception of a cadential add-on at the conclusion of the second half, mm. 162-63), while the pitches and orchestration change.

Stravinsky makes use of strict canonic imitation on several occasions in *Agon*. His use of canon in the work derives in part from his reading of the Wildeblood de Lauze edition, but also from Stravinsky's interest at the time in pre-tonal techniques and the practices of the Second Viennese School. The first appearance of canon comes in the movement succeeding the isorhythmic saraband, the *Gailliarde* (II(ii), starting at m. 164). The harp and mandolin¹³² (with other instruments at times selectively doubling) act as *dux* and *comes* in a series of four canons in this movement, with the harp as the *dux* in the first two of these and the mandolin taking that role in the second two. The first, second, and fourth of these canons make use of the same musical material: the first and second are identical and employ rectus imitation, while in the fourth (mm. 180-182) the *comes* harp inverts the mandolin's line (with some tonal half-step adjustments). In the third canon (mm. 171-176) mildly contrasting musical material is used with rectus imitation of the mandolin by the harp; this canon is repeated literally as a result of the indication at 178. In the first two canons, the *comes* enters a perfect fifth below the *dux*; in the second two, the *comes*

¹³² Stravinsky's use of a mandolin as a component of the piece's instrumental ensemble was perhaps in part inspired by the guitar in Boulez's *Le marteau sans maître*. Stravinsky attended the U.S. premiere of the work in March 1957 at a Monday Evening Concert and found Boulez's piece "admirable." Henken, "*Le Marteau*." He added the mandolin part very late in the compositional process of *Agon*, the part being "recently introduced" as of May 8, 1957. Tucker, *Stravinsky and His Sketches*, Vol. 1, 284. Walsh states that Stravinsky "certainly" had heard *Marteau* even earlier than the U.S. premiere from a recording given to Craft in November 1956. Walsh, *The Second Exile*, 358. Webern's early *Five Pieces for Orchestra* Opus 10 (1913) makes use of a mandolin as well as a guitar.

begins a perfect fourth below. The rhythmic distance between the two parts is three quarter notes in the first, second, and fourth canons, and is two quarters in the third canon. In distinct contrast with the canons of *Canticum Sacrum*, these canons are not 12-tone serial, and instead feature a limited collection of pitches with a largely C Lydian flavor and tonal implications.

The second use of strict canon in *Agon* comes in the first movement of the *Second Pas-De-Trois*, the *Bransle Simple* (III(i), starting at m. 278). The canons here follow the *Coda* concluding the *First Pas-de-Trois* and an *Interlude*. The *Coda* (II(iii)) features the first full 12-tone row in *Agon*, Stravinsky thereby introducing an element that assumes greater prominence later in the piece. In the *Bransle Simple* two trumpets engage in a fanfare-like canon at the unison in a passage reminiscent of other notable brass fanfares in *Agon* in the first and last movements and in the *Prelude/Interlude* ritornellos. One trumpet follows two quarter-note beats behind the other with identical music for seven measures (through m. 285). After a contrasting section, Stravinsky then repeats this canonic fanfare verbatim but with new accompaniment from the bass clarinet and harp. These canons feature significantly more chromaticism than the harp/mandolin canons in the *Gailliarde*, and, while not 12-tone, are in fact serial. They employ six-note row forms related to the first trumpet's first six pitch classes at 278: D E F G F# B.¹³³

In the first movement of the fourth and final larger section of the work, *Pas-de-Deux* (IV(i)), Stravinsky again employs strict canonic imitation. These three passages (at mm. 463-472, 473-483, and 484-490) appear following the shockingly eerie (and serial but not 12-tone¹³⁴) *Adagio* starting this movement and, though themselves serial, comprise a less chromatic and at

¹³³ See Tucker, *Stravinsky and His Sketches*, Vol. 1, 141-156, for a detailed discussion of Stravinsky's serial processes in this movement.

¹³⁴ Stravinsky makes use of a serial tetrachord in the *Adagio*, combining versions of it to at one point (bars 452-62) to formulate a 13-note unit. Though the *Adagio* sounds 12-tone serial and begins with the presentation of a 12-note row at mm. 411-13, it does not in fact rely on a consistent 12-tone series. Tucker, *Stravinsky and His Sketches*, Vol. 1, 182-83.

times cheerful interlude between the more anguished sections surrounding them. The music at measures 463 to 490 forms an ABA' structure. The two A sections, "Più mosso" at measure 463 and "L'istesso tempo" at 484, are intended for a solo male dancer, with the intervening B section allocated to a female solo dancer. In both A passages the *dux* is three horns hocketing a single line, while the *comes* piano imitates three beats behind and a perfect fourth down. These sections recall the earlier canons in *Agon* in their use of limited pitch material, employing a serial four-tone rather than 12-tone row (P0 is the series C# B D# E#, the first four pitch classes used by the horns at m. 463; the four pitches belong to the same whole-tone scale).¹³⁵ Stravinsky makes use of various row forms in the two A sections; while both passages begin similarly, their use of contrasting row forms results in different pitches appearing after the initial gestures. The repeated minor sevenths here are a variation of the major sevenths that are so prominent in the astringent opening of the movement (see, for example, mm. 418-420). The return of the horn/piano canon (A', starting at m. 484) changes not just the row forms used in the first A but also elements of orchestration and rhythm. In the intervening B section, for solo female dancer (mm. 473-483), Stravinsky creates a mensuration canon for three flutes, with the top two flutes playing the *dux* line in unison, and the *comes* in the third flute starting nine eighth notes behind the original line, a perfect fifth above it, and with rhythmic durations augmented by a factor of two. The strict imitation, accompanied by repeating chords in the strings, lasts until the final bar of the section, 483, which features a transitional crescendo back to the horn/piano material. The use of mensuration canon here recalls Stravinsky's use of it in *Canticum Sacrum* in the *Caritas* choral canon and in the short closing near-canon in *Fides* using two trumpets and organ (mm. 237-243).

¹³⁵ See *ibid.*, 218-220, for a detailed examination of Stravinsky's use of a four-tone row here.

A final instance of rhythmic process occurs at the start of the last movement of *Agon*, *Four Trios* (mm. 539-552). This 12-tone fugato in the strings, recalling the 12-tone choral fugato in the *Brevis Motus Cantilena* movement of *Canticum Sacrum* (mm. 274-280) and the 12-tone string fugato in the second half of the later *Variations (Aldous Huxley in Memoriam)* (mm. 101-117), is not as strict in its use of rhythmic process as the instances of canon in *Agon*. But it is strict in parts, and merits mention because of its formal connections with the previous canons in the piece and its brief attempt at strict mensuration canon. Here, as in a fugue, a subject is presented and then imitated, with each imitating voice diverging from the *dux* once the subject has been stated. The subject initially enters with a vigorous *fortissimo* line in the violins and violas, with the violas then joining the cellos for the answer a perfect fifth below the original nine quarter-note beats later. Once the second voice has finished the subject (slightly modified rhythmically), the third voice enters in the cellos and basses a perfect 11th beneath the original subject entry (m. 545). In measures 547 and 548 two false entries that are inversions of one another appear in the trombones and trumpets respectively; they alter the original subject head but nonetheless resemble it. The subject then at measure 549 returns in the strings in its original transposition, now in *stretto* with an augmented version of the subject in the first trumpet (also in the original transposition). Once this augmented subject entry has finished, at measure 553 Stravinsky brings back the four horns to play a version of the trumpet fanfare that opened the piece (compare mm. 1-6). The horns appear simultaneously with string pizzicati that loosely recall the fugal material that has just completed and more particularly the string pizzicati of the preceding movement, *Four Duos*. This transitional passage (mm. 553-560) leads to the return at 561 of the material from the start of the piece, somewhat altered.

Much as he did in *Canticum Sacrum*, Stravinsky in *Agon* generally makes every effort to reinforce his use of rhythmic process with other parameters, keeping it on the aural musical

surface. His use of straightforward rectus imitation in the harp-mandolin canons in the *Gailliarde* (with the exception of the closing canon by inversion), the *Bransle Simple* (the two trumpets at the unison), the *Pas-de-Deux* (the hocketing horns imitated by the piano), and the *Four Trios* fugato makes his use of pitch and rhythm process transparent. Even in the isorhythmic *Saraband-Step*, Stravinsky reinforces the connection between the two rhythmically identical halves by inverting the first half's intervals and maintaining but exchanging orchestrational roles. Stravinsky also employs texture to make his rhythmic processes more transparent. In both the canons and the *Saraband-Step* Stravinsky keeps the texture simple enough that individual rhythmic patterns are easily perceptible: the canons are all in just two parts, with no or generally unobtrusive accompaniments, while the isorhythmic *Saraband-Step* sets the solo violin against a timbrally distinct xylophone-brass accompaniment. In his canons in *Agon* Stravinsky has the imitative rhythmic line generally use the same or similar timbre as the *dux*, which reinforces the imitative concept, although sometimes making it more difficult to distinguish the *dux* and *comes* once the texture becomes denser. In the mandolin-harp canon in the *Gailliarde* and the flute mensuration canon in the *Pas-de-Deux* the *dux* and *comes* have similar timbres, but the fact that the *comes* sounds a perfect fourth or fifth away in each instance provides registral and tonal separation that allow the individual lines to be distinguished (with the longer durations in the *comes* of the flute mensuration canon also clarifying the texture). Stravinsky in the horn-piano canons in the *Pas-de-Deux* splits the *dux* line between three horns. The hocketing in this case, however, unlike that used by Webern in his pointillistic orchestration of his *Symphony*, does not undermine the integrity of the canonic counterpoint because of the similarity of timbres between the two horns and their collective distinguishableness from the contrasting timbre of the piano.

The structural role of Stravinsky's use of canon and isorhythm in *Agon* is, as in *Canticum Sacrum*, very much tied up with a large-scale plan that incorporates specific historical referents and contrasting technical approaches. While Stravinsky in *Canticum Sacrum* makes use of strict rhythmic process to support his palindromic super-structure that featured 12-tone serialism and isorhythm in its center and quasi-tonal harmony and a literal smaller-scale palindrome at its outer edges, the canon and isorhythm in *Agon* are associated initially with the quasi-Renaissance stylings of the early stages of the piece and ultimately act as a bridge to the tortured serial chromaticism of the *Pas-de-Deux*. Stravinsky in the *Prelude/Interludes* and in most of the first three larger sections of the piece features Renaissance French dance forms, brass fanfares, major and minor triads with slight alterations, and quasi-Renaissance stylings that recall some of the music of Stravinsky's neo-classical period. The harp-mandolin canon of the *Gailliarde*, the trumpet canon of the *Bransle Simple*, and, in a different way, the binary structure of the *Saraband-Step* all very much fit into this larger scheme of historical reference and appropriation.

Ultimately, rhythmic process in *Agon* acts as a bridge from the quasi-tonal, dance-based music of the first half of the piece to the tortured chromatic serialism of the second half of the work, the *Pas-de-Deux* in particular. The three canons of the *Pas-de-Deux* and the string fugato of the *Four Trios* recall the previous uses of rhythmic process in the piece, even as they act as a bridge to the highly chromatic serialism of portions of the final larger section of *Agon* (including the last three movements). The first canon in the *Pas-de-Deux*, between the horns and the piano, comes after the initial atmospheric *Adagio* featuring the solo violin and its major sevenths. The *Adagio* is in some ways a logical result of the previous uses of serial processes in the work as well as a successor to the solo violin focus of the *Saraband-Step*, but it is nonetheless striking in its stark darkening of mood from what has come previously. The horn-piano canon at measure 463 connects with the *Adagio* in its serial use of a related tetrachord as well as in the prominent

use of sevenths, even as the use of canon reminds the listener of the previous, more melodic canons of the *Gailliarde* and the *Bransle Simple*. The immediately following section (*L'istesso tempo* at m. 473), while using very limited pitch material in the canonic flutes, contains repeated chords in the string accompaniment that in their prominent use of a harmonic minor ninth connect with the stark chromaticism of the *Adagio*. The accompaniment thus effectively recontextualizes the use of canon to reflect the more strident, harsher harmonic language of the last large division of *Agon* (section IV). The horn-piano canon then returns for another iteration, leading into the coda to this movement (starting at m. 495). This closing coda is very much a return to the austere, dark world of the *Adagio*, but introduces rhythmic vitality to that world in a vigorous serial counterpoint between strings, brass, and piano. The string fugato of the *Four Trios* finally makes a direct connection between the previous use of imitation and the highly chromatic serial language that predominates in the fourth larger section of the piece, with the subject a 12-tone melody commencing with an ascending minor ninth (m. 539).

Thus Stravinsky in *Agon*, as he did in *Canticum Sacrum*, not only makes use of rhythmic process in a very selective, tailored way that to some extent takes after Isaac and the late serial Webern, but he uses it in order to create and support a sophisticated formal structure that treats historical musical techniques and associations as signifiers that can be rearranged to create something new. Webern in *Das Augenlicht* and in his second *Cantata* uses strict rhythmic process only sparingly: in *Das Augenlicht* he contrasts it with the solo and homophonic choral portions as well as the orchestra's much more free rhythmic imitation, and in the second *Cantata* he precedes his use of strict rhythmic process with the free-sounding "recitatives" and "arias" of movements 1-2 and 4-5. But canonic procedure remained a basic, if hidden, part of Webern's process throughout these works. Though in the final score strict rhythmic canon appears on only a limited basis, canon was pervasive in Webern's approach. In *Agon* and *Canticum Sacrum*, by

contrast, strict canon and isorhythm are some of the ingredients among many in the meal that Stravinsky is preparing. Stravinsky's use of strict rhythmic process is intended to call to mind specific associations in the listener's mind, and he uses it to help fashion his overall narrative. While canon became for Webern a basic, fundamental basis of his composition, Stravinsky remains at a critical distance from it in these works, using it as a signifier that in combination with other signifiers such as 12-tone serialism, Renaissance French dance forms, and mandolin tremolo creates a heterogeneous collage. Isaac's *Johannis Baptistae* proper bears some resemblance to *Agon* with respect to the structural function of rhythmic process in the work as a whole. There, however, imitative polyphony is the basis for nearly the entire work (at least of that set by Isaac) and the strictly imitative passages are extreme extensions of that practice. In *Agon* Stravinsky uses rhythmic process, along with varying harmonic-melodic schemes, orchestrational associations, and varying textures to trace a formal arc from pseudo-Renaissance stylings to the stringent counterpoint of the Second Viennese school, an arc that can be seen either as alluding to the progress of Western music history or the latter part of Stravinsky's own career.

3. *Variations (Aldous Huxley in Memoriam)*.

Stravinsky's *Variations (Aldous Huxley in Memoriam)* (1964), were written approximately a decade after *Canticum Sacrum* and *Agon*. The piece, Stravinsky's last major work other than the *Requiem Canticles* of 1966, again turns to strict rhythmic process within a serial context. The serialism here is fully 12-tone, Stravinsky having abandoned the more flexible row lengths and combinations he employed in the serial portions of *Agon*. The processes employed here include a 12-tone serial string fugato (mm. 101-117) that recalls the dodecaphonic fugatos of *Brevis Motus Cantilenae* in *Canticum Sacrum* and *Agon's Four Trios*. His primary use of strict rhythmic process, however, consists of the three isorhythmic sections

that are evenly spaced over the course of the five-minute work. In each of these three sections for 12 measures Stravinsky has 12 instruments simultaneously play 12 different row forms or rotations of 12-tone row forms. Each instrument also has its own rhythmic pattern (making 12 of those as well), resulting in an extremely dense counterpoint in which individual voices are difficult to distinguish. The textural density of these isorhythmic sections bears some resemblance to the orchestral sound-mass techniques used by other composers in the years immediately preceding the composition of the *Variations*, such as Penderecki's *Threnody to the Victims of Hiroshima* (1960) and Ligeti's *Atmosphères* (1961) (though there are significant differences as well). Stravinsky's passages are isorhythmic in that the same 12 rhythmic patterns are used in each of the three sections, even as the orchestration and pitches change. In the first isorhythmic section (mm. 23-34) Stravinsky uses 12 solo violins playing *poco sul ponticello* and *pianissimo*; in the second (mm. 47-58), 10 solo violas and 2 contrabasses, also playing *poco sul ponticello* and *pianissimo*; and in the third (mm. 118-129), 12 solo wind instruments playing *pianissimo*. The overall trajectory across the three sections is from higher in register to lower as well as from less timbral diversity to more — the third section's use of 12 different wind instruments results in a much less homogenous sound in which particular lines and instruments are much more easily distinguishable. One major difference here from the sound-mass works of Penderecki and Ligeti is that the eighth-note pulse is still heard as a result of its iteration in the individual lines; this is true both in the all-string versions as well as the wind example.

Subsequent to the second isorhythmic passage and immediately preceding the third, at measures 101-117, Stravinsky inserts a 12-tone string fugato that recalls the dodecaphonic fugatos in *Canticum Sacrum*'s fourth movement *Brevis Motus Cantilena* (mm. 274-280) and *Agon*'s *Four Trios* (mm. 539-552). Here a 12-tone subject is presented in the violins, violas, and piano, and is then imitated rhythmically by the violas. While Stravinsky with both subject and

answer uses forms of the same 12-tone row, there is not exact interval imitation because of the use of contrasting row forms as well as different rotations of row forms (Stravinsky begins the subject's P9 and the answer's I8 at different points in the middle of the rows). After the three-measure answer in the second voice, some free counterpoint (a bridge) appears (mm. 107-108). The third voice then enters in the cellos and contrabasses with the rhythmic subject (at m. 109, with pitch classes that are an exact inversion of those of the first subject entry), which jumps to the piano at its conclusion (m. 111). The fugato continues with free counterpoint until reaching a fermata rest (m. 117) that precedes the third isorhythmic section in the winds.

In some sense Stravinsky's use of strict rhythmic process in this work is consistent with his general practice in *Canticum Sacrum* and *Agon* of using other parameters to reinforce the aural recognizability of the process, though there is a degree of opacity to the isorhythmic sections that is perhaps more reminiscent of Webern's early 12-tone works. Stravinsky very much sets off the isorhythmic passages (as well as the fugato) from the rest of the music in the *Variations*, as there are sustained notes or rests at the beginning and end of these passages and the passages are strongly differentiated texturally and orchestrally from most of the rest of the piece. The rest of the piece outside the isorhythmic sections and the fugato is mostly monophonic or two- or three-part counterpoint, orchestrated pointillistically in a manner that recalls Webern's Opus 30 *Variations for Orchestra*, among other works. The primary other points in the piece that recall the texture of the isorhythmic sections are the brief passages in the flutes at 61 and in the brass at 74-77 and 80-82. These passages lie between the second and third larger isorhythmic sections. In their dense counterpoint between timbrally similar instruments, they allude to the longer isorhythmic passages without actually engaging in the same process. Overall, however, the distinctiveness of the texture in the larger isorhythmic passages makes it easy for the listener to recognize the relatedness of these three sections and thus, in some sense,

to recognize the presence of the isorhythmic process. Yet the very density of the texture in these isorhythmic passages prevents the listener from being able to identify little in the way of particular rhythms in particular parts; the effect is rather of a sound mass (with an eighth-note pulse) in which individual lines are indistinguishable, especially in the first two isorhythmic sections. (In the third with the woodwinds, the timbral differences between the instruments make recognition of individual lines easier, though still very much a challenge.) Another comparison might be drawn between the isorhythmic passages and the first variation of the second movement of Webern's *Symphony*, where the four string parts play a double canon by inversion but the texture is so dense that aural recognition of the imitation occurring in individual lines is all but impossible. Stravinsky's isorhythmic method in his *Variations*, because of the density of the counterpoint and the timbral similarity of the instruments, turns out to be as opaque as Webern's use of canon in the second movement of the *Symphony*. The fugato at measures 101 to 117 lacks this opacity: the one-at-a-time introduction of the three voices makes the imitative nature of the texture clear, despite the fact that pitch imitation is not consistent.

Stravinsky's approach to the structural role of the passages in which he uses strict rhythmic process in the *Variations* resembles to some extent his approach in *Canticum Sacrum* and *Agon*, though the diversity of material used within the piece as a whole is here much reduced in comparison with those predecessors. The *Variations* are completely dodecaphonic. Stravinsky in the work makes use of row rotation in order to allow some flexibility in his serial approach, but the exclusive use of 12-tone technique in the work causes its pitch and harmonic language to be much less diverse than in *Canticum Sacrum* or *Agon*, where Stravinsky juggled tonality, modality, free atonality, 12-tone serialism, and serialism using shorter rows. Other than the string fugato, the *Variations* also do not contain the kind of smorgasbord of musical referents that teem within the confines of *Canticum Sacrum* and *Agon*. But, as with those earlier works,

Stravinsky's use of strict rhythmic process in the *Variations* plays a decisive role in its structure, in large part because of its distinctiveness from the rest of the piece. The three isorhythmic sections, in particular, are anchors for the rest of the form, acting as refrains or ritornellos that evolve even as they invoke stasis. They are distinct from the rest of the piece (with the limited exception of the brief flute and brass passages preceding the third iteration) and in their reuse of the same rhythms act as constants, even while the changes in instrumentation and pitches between them allow them to evolve from the relatively homogenous initial passage to the extreme timbral diversity of the final iteration with 12 woodwinds. Stravinsky entitled the work "*Variations*," and there are 12 distinct sections within the piece marked by cadences and fermatas, but the only apparent theme is the row itself; the work does not come across aurally as a theme and variations in any traditional sense. Instead the three isorhythmic sections become the formal backbone of the piece against which everything else is measured; they become the most recognizable sections in a piece of sections. The fugato represents a contrasting and complementary approach in comparison with these isorhythmic sections. The fugato's use of rhythm rather than pitch as the controlling basis for its imitation aligns it with the isorhythmic portions. Both the fugato and the isorhythmic sections employ counterpoint, yet the counterpoint in the isorhythmic sections is much denser. Within the larger diversity of the 12-tone approach of the piece, even though the amount of musical diversity and proliferation of signifiers found in other Stravinsky works is not present, he uses strict rhythmic process as a distinctive element to provide shape for the whole.

Stravinsky's use of isorhythm as a structural basis for the work bears some resemblance to the unifying approach of Machaut in his *Messe* or Dunstaple in his *Dies dignus decorari*, though there are important differences. Similarly to Machaut in the *Messe*, Stravinsky does not employ a single isorhythmic scheme to govern the entire work; instead he uses isorhythm only at

particularly relevant moments, and distinguishes those sections from the rest of the piece through textural means. And, like Dunstaple in *Dies dignus decorari*, he relies on only a single isorhythmic plan and varies the material while maintaining allegiance to that plan. But unlike in either of these earlier works, Stravinsky in the *Variations* uses the isorhythmic sections as a more-or-less constant refrain against which to contrast the rest of the piece. It is as if Machaut had used a single isorhythmic scheme throughout his *Messe* but had interspersed non-isorhythmic material within it, or as if Dunstaple had placed additional non-isorhythmic material between the three primary sections of the work. Stravinsky in the *Variations*, as he was in *Canticum Sacrum* and *Agon*, is interested in creating a compelling larger structure that comprises units of contrasting musical material, and he uses strict rhythmic process as a primary tool in building that form. While in *Canticum Sacrum* the overall palindromic formal plan references the architecture of St. Mark's Basilica, and in *Agon* the 12 divisions of the piece were arranged so as to form a gradual trajectory into highly chromatic and dissonant serialism before a return to tonality at the end, in the *Variations* Stravinsky creates a 12-part structure in which symmetry and balance are provided by the presence of the three isorhythmic passages.

VI. Conclusion

Both Webern and Stravinsky began to make extensive use of strict rhythmic process at essentially the same point in their careers at which they turned to 12-tone serialism. This was not just coincidence. Strict processes like canon, rhythmic canon, and isorhythm could serve as means of structural organization in a musical context in which pitches were otherwise constrained by the 12-tone method. For Webern, who frequently wrote vocal music in both his atonal and dodecaphonic periods, canon helped provide a structural framework for a textless, relatively large-scale work like the *Symphony*. For Stravinsky, particularly in *Canticum Sacrum* and the orchestral *Variations*, isorhythm and canon allowed him to generate extended amounts of

musical material that could maintain structural coherence. The use of strict rhythmic processes may also be seen as a complement to the use of isomelism in the form of the 12-tone row, even as the rise of isorhythm in the fourteenth century can be seen as an answer to the dominance of the pitch controls of sacred chant. In both cases the pitch controls were essentially inherited as inviolable, resulting in a separation of the parameters of pitch and rhythm, and the logical result was the development of rhythmic processes that were independent of the pitch processes.

Despite the hundreds of years separating the medieval and Renaissance uses of rhythmic process from those in the twentieth century, the same compositional issues arose for Webern and Stravinsky as came up in the much earlier works that inspired them. Principal among these is the degree to which the composer either interfered with or reinforced the use of rhythmic process by his manipulation of other musical parameters, ranging from pitch to texture and timbre. The use of isorhythm in Machaut and Dunstaple as a relatively opaque means of organization resembles Webern's hidden reliance on canon. In Isaac and Stravinsky, on the other hand, rhythmic process is generally reinforced by other musical parameters such as texture and timbre in order to make the process apparent to the listener. Another question that spans historical eras is the degree to which rhythmic process is used selectively and alternated with material that does not rely on strict process. Dunstaple's *Dies dignus decorari* represents an extreme in this respect, in its use of a single isorhythmic process to govern an entire (admittedly relatively brief) work. In Webern's *Symphony* he makes use of canon in general and double canon by inversion in particular throughout the work, but each application of rhythmic process contrasts with others. In the additional works I have discussed composers generally adopt a much more selective and tailored approach to the use of strict rhythmic process, using it only where specifically appropriate and freely alternating it with material not governed by process. In Stravinsky's

Canticum Sacrum and *Agon* he uses rhythmic process as a building block to help construct a form out of highly varied musical material.

In Webern's serial works we encounter the use of rhythmic process as an all-encompassing compositional tool, one that in many cases ironically leaves only indirect traces on the surface of the final product of his compositional process. Canon for Webern at times is a highly idiosyncratic metaphor for his compositional process, rather than a technique that bears an audible relationship to canon as used in Isaac or Bach. The question arises as to what extent the use of canon in Webern's compositional process was essential to the sounding results that he generated, or whether its significance is in describing his idiosyncratic compositional methods and in its symbolic value, embodying the ideal of organicism that Webern repeatedly traced back to Goethe's *Urpflanze*. Early in Webern's serial period, pitch and rhythm were largely united in the canons he used, even if his employment of inversions and retrograde pitch relationships and obscuring textural and timbral techniques tended to hide the imitative relationships. As he proceeded, beginning with the Opus 24 *Concerto*, Webern increasingly turned to rhythmic organization independent of his pitch organization; this was in part due to his increasing tendency to take liberties with the 12-tone method. We also see in Webern the association of choral composition with the use of rhythmic imitation in a much more direct and audible way. It is this more direct approach to rhythmic imitation in *Das Augenlicht* and especially in the sixth movement of the Opus 31 Cantata that connected most closely with Stravinsky's practices in his serial period.

For Stravinsky, strict rhythmic process in his serial period was largely a means of signifying particular musical associations. In this respect his use of isorhythm and canon differs not that greatly from his appropriation of Russian folk-tunes for the *Rite of Spring* or his use of da capo aria form in *The Rake's Progress*. As Richard Taruskin has written, "If . . . Stravinsky

was an outsider to all traditions, that status was what enabled him to partake at pleasure whereof he would.”¹³⁶ Stravinsky’s use of canon, rhythmic canon, and fugato in particular act as references to earlier music, sometimes in a very specific way and other times in a more generalized fashion. Stravinsky’s very direct use of isorhythm in the third movement of *Canticum Sacrum* — presenting the *talea* by a monophonic solo organ before placing it underneath varying non-isorhythmic material — bears a minimal relation to actual medieval isorhythmic practice, but in its rhythmic inflexibility and combination with timbral elements helps give the work an indistinct ritualistic, early-music flavor. Isorhythm and canon in *Agon* both allude to pre-tonal (as well as Baroque) practices and act as a link between the quasi-tonal world of the opening of the work and the astringent, sullen serialism of the *Pas-de-Deux*. Stravinsky in *Agon* also uses the serial method itself as a means of connecting the disparate referents in the piece, making use of four-note rows that can function on their own or that can be combined to produce highly chromatic combinations as long as 13 notes in length. With rhythmic process and the serial method as flexible connectors, he is able to relate the cheerful neo-Renaissance dances of the *First Pas-de-Trois* to the neo-Expressionist angst of the *Pas-de-Deux*. At least in *Canticum Sacrum* and *Agon*, the influence of Webern is as much or more a sounding signifier within the music as it is a model for compositional method.¹³⁷ It was only in Stravinsky’s works of the late 1950s and early 1960s that he came to more fully inhabit the influences of Schoenberg and Webern, making his language fully 12-tone and adopting in the *Variations (Aldous Huxley in Memoriam)* a degree of Webern’s pointillistic orchestrational practices. Even there, however, we see Stravinsky using sound-mass-like 12-part isorhythmic

¹³⁶ Taruskin, *Stravinsky and the Russian Traditions*, Vol. 2, 1674-75.

¹³⁷ Phillip Huscher wrote that when Schoenberg died in July 1951, “Suddenly Schoenberg's invention, serialism, became history, and, at the same time, a new subject for Stravinsky's long-running love affair with the past.” Huscher, “Stravinsky-*Septet*.” Once Schoenberg had died, his system (along with the music of the already-deceased Webern) was history and could be used by Stravinsky as a signifier.

passages to create variety and structure within a completely 12-tone work.¹³⁸ The use of rhythmic process remained carefully-tailored to the exigencies of the piece. He took much from both Webern and his early music predecessors, but made their processes his own.

¹³⁸ In his last works, including the *Requiem Canticles*, Stravinsky also developed his own wrinkle to the 12-tone system, relying on hexachordal rotation grids as the basis for harmonies. See Taruskin, *Stravinsky and the Russian Traditions*, Vol. 2, 1653-62.

Bibliography

Bailey, Kathryn. *The Twelve-Note Music of Anton Webern: Old Forms in a New Language*. Cambridge: Cambridge University Press, 1991.

— — —. “Webern, Anton.” *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 10, 2012.

<http://www.oxfordmusiconline.com/subscriber/article/grove/music/29993>.

Bent, Margaret. *Dunstaple*. London: Oxford University Press, 1981.

— — —. “Isorhythm.” *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 9, 2012.

<http://www.oxfordmusiconline.com/subscriber/article/grove/music/13950>.

— — —. “Text Setting in Sacred Music of the Early 15th Century: Evidence and Implications.” In *Musik und Text in der Mehrstimmigkeit des 14. und 15. Jahrhunderts: Vorträge des Gastsymposiums in der Herzog August Bibliothek Wolfenbüttel, 8. bis 12. September 1980*, edited by Ursula Günther and Ludwig Finscher, 291-326. Göttinger Musikwissenschaftliche Arbeiten, vol. 10. Kassel: Bärenreiter, 1984.

— — —. “What is Isorhythm?” In *Quomodo Cantabimus Canticum?: Studies in Honor of Edward H. Roesner*, edited by David Butler Cannata, Gabriela Ilitchi, Rena Charnin Mueller, and John Nádas, 121-43. Middleton, Wisconsin: American Institute of Musicology, 2008.

Brown, Howard Mayer. “Lowinsky, Edward E.” *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 25, 2012.

<http://www.oxfordmusiconline.com/subscriber/article/grove/music/17069>.

Bukofzer, Manfred F. “Speculative Thinking in Mediaeval Music.” *Speculum* 17, no. 2 (April 1942): 165-180. <http://www.jstor.org/stable/2856361>.

Craft, Robert, ed. “Selected Source Material from ‘A Catalogue of Books and Music Inscribed to and/or Autographed and Annotated by Igor Stravinsky.’” Appendix to *Confronting Stravinsky: Man, Musician, and Modernist*, edited by Jann Pasler, 349-57. Berkeley: University of California Press, 1986.

— — —. “Boulez in the Lemon and Limelight.” In *Prejudices in Disguise*, 207-14. New York: Alfred A. Knopf, 1974.

— — —. “A Concert for St. Mark.” *The Score* 18 (December 1956): 35-51.

— — —. “Influence or Assistance?” In *Present Perspectives: Critical Writings*, 246-64. New York: Alfred A. Knopf, 1984. Originally published as “Assisting Stravinsky: On a Misunderstood Collaboration.” *The Atlantic Monthly* (December 1982): 64-74.

— — —. “A Modest Confutation.” Naxos.com, October 2006. Accessed February 14, 2013. http://www.naxos.com/news/default.asp?pn=news&displaymenu=naxos_news&op=254.

— — —. “A Personal Preface.” *The Score* 20 (June 1957): 7-13.

— — —. *Stravinsky: Chronicle of a Friendship*. Revised and expanded ed. Nashville: Vanderbilt University Press, 1994.

— — —. *Stravinsky: Glimpses of a Life*. New York: St. Martin’s Press, 1993.

— — —, ed. *Stravinsky: Selected Correspondence*. 3 vols. New York: Alfred A. Knopf, 1982-85.

Crawford, Dorothy Lamb. *Evenings on and off the Roof: Pioneering Concerts in Los Angeles, 1939-1971*. Berkeley: University of California Press, 1995.

Day, Timothy. *A Century of Recorded Music: Listening to Musical History*. New Haven: Yale University Press, 2000.

DeFord, Ruth I. “Who Devised the Proportional Notation in Isaac’s *Choralis Constantinus*?” In *Heinrich Isaac and Polyphony for the Proper of the Mass in the Late Middle Ages and the Renaissance*, edited by David J. Burn and Stefan Gasch, 167-213. Turnhout, Belgium: Brepols, 2011.

Druskin, Mikhail. *Igor Stravinsky: His Life, Works, and Views*. Translated by Martin Cooper. Cambridge: Cambridge University Press, 1983.

Dunstable, John. *Complete Works*. Edited by Manfred F. Bukofzer. 2d ed., prepared by Margaret Bent, Ian Bent & Brian Trowell. London: Stainer and Bell, 1970.

Earp, Lawrence Marshburn. *Guillaume de Machaut: A Guide to Research*. New York: Garland Publishing, 1995.

Elder, Rusty Dale. “The Late Choral Works of Igor Stravinsky: A Reception History.” MA thesis, University of Missouri-Columbia, 2008. <https://mospace.umsystem.edu/xmlui/bitstream/handle/10355/5625/research.pdf?sequence=3>.

Gennrich, Friedrich, ed. *Guillaume de Machaut: La Messe de Nostre-Dame*. Summa Musicae Medii Aevi I. Darmstadt, 1957.

Gombosi, Otto. “Machaut’s *Messe Notre-Dame*.” *The Musical Quarterly* 36, no. 2 (April 1950): 204-224. <http://www.jstor.org/stable/739816>.

Harrison, Jay S. “Talk with Stravinsky: Composer Discusses His Music.” *New York Herald Tribune*, December 21, 1952.

Henken, John. "Le marteau sans maître." The Los Angeles Philharmonic website. Accessed February 14, 2013. www.laphil.com/philpedia/music/le-marteau-sans-maitre-pierre-boulez.

Hoppin, Richard H. *Medieval Music*. New York: W. W. Norton, 1978.

Huscher, Phillip. "Stravinsky-Septet." Program note for May 15, 1998, performance. Chicago Chamber Musicians website. Accessed February 14, 2013. <http://www.encoreccm.org/pieces/554>.

Isaac, Heinrich. *Choralis Constantinus*. Vol. 2. Edited by Edward R. Lerner. Peer, Belgium: Alamire, 1992.

— — —. *Choralis Constantinus*. Vol. 2. Edited by Anton Webern. *Denkmäler der Tonkunst in Österreich*, vol. 32. Vienna: Artaria, 1909.

Joseph, Charles M. *Stravinsky and Balanchine: A Journey of Invention*. New Haven: Yale University Press, 2002.

— — —. *Stravinsky's Ballets*. New Haven: Yale University Press, 2011.

— — —. *Stravinsky Inside Out*. New Haven: Yale University Press, 2001.

Klemperer, Otto. *Minor Recollections*. Translated by J. Maxwell Brownjohn. London: D. Dobson, 1964.

Leech-Wilkinson, Daniel. *Machaut's Mass: An Introduction*. Oxford: Clarendon Press, 1990.

Levy, Kenneth, John A. Emerson, Jane Bellingham, David Hiley, and Bennett Mitchell Zon. "Plainchant." *Grove Music Online*. *Oxford Music Online*. Oxford University Press. Accessed October 30, 2012. <http://www.oxfordmusiconline.com/subscriber/article/grove/music/40099>.

Lowinsky, Edward E. *Secret Chromatic Art In the Netherlands Motet*. Translated by Carl Buchman. New York: Russell & Russell, 1967. First published 1946 by Columbia University Press.

— — —. *Tonality and Atonality In Sixteenth-Century Music*. Berkeley: University of California Press, 1961.

Ludwig, Friedrich. "Studien über die Geschichte der mehrstimmigen Musik im Mittelalter." *Sammelbande der Internationalen Musikgesellschaft* (February 1904): 177-224.

Mann, Alfred, J. Kenneth Wilson, and Peter Urquhart. "Canon (i)." *Grove Music Online*. *Oxford Music Online*. Oxford University Press. Accessed October 9, 2012. <http://www.oxfordmusiconline.com/subscriber/article/grove/music/04741>.

Moldenhauer, Hans, and Demar Irvine, eds. *Anton von Webern: Perspectives*. Seattle: University of Washington Press, 1966.

Moldenhauer, Hans, and Rosaleen Moldenhauer. *Anton von Webern: A Chronicle of His Life and Work*. London: Victor Gollancz Ltd, 1978.

Murrill, Herbert. "Aspects of Stravinsky." *Music & Letters* 32, no. 2 (April 1951): 118-24. <http://www.jstor.org/stable/729340>.

Musica Spei. "Musica Spei Presents The Isaac Project: Angels and Archangels." Program for June 3-11, 2005 performances. <http://wp.musicaspei.org/Past/AngelsProgram6.pdf>.

Neighbour, O.W. "Schoenberg, Arnold." *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 13, 2012. <http://www.oxfordmusiconline.com/subscriber/article/grove/music/25024>.

Noble, Jeremy. "John Dunstable (d. 1453). A Line of Approach and a Point of Departure." *The Musical Times* 95, no. 1334 (April 1954): 185-187. <http://www.jstor.org/stable/934756>.

Pasler, Jann, ed. *Confronting Stravinsky: Man, Musician, and Modernist*. Berkeley: University of California Press, 1986.

Public Broadcasting Association Presents Igor Stravinsky: The Man and His Music: A Documentary Radio Program Series. Narrated by Jim Svejda. Berkeley: Educational Media Associates, 1977. 14 sound discs.

Randel, Don Michael, ed. *The New Harvard Dictionary of Music*. S.v. "canon." Cambridge, MA: The Belknap Press, 1986.

Reale, Paul. "Los Angeles, 1994: The Next Paris? Surviving a Series of Musical Aftershocks in the City of Angels." Spring 1994. Accessed February 15, 2013. <http://www.minotaurz.com/minotaur/articles/LA94.html>.

Rees, Owen. "Machaut's Mass and Sounding Number." In *Machaut's Music: New Interpretations*, edited by Elizabeth Eva Leach, 95-110. Woodbridge, Suffolk, UK: The Boydell Press, 2003.

Rothenberg, David J. "Isaac's Unfinished Imperial Cycle: A New Hypothesis." In *Heinrich Isaac and Polyphony for the Proper of the Mass in the Late Middle Ages and the Renaissance*, edited by David J. Burn and Stefan Gasch, 125-140. Turnhout, Belgium: Brepols, 2011.

Sanders, Ernest H. "Rota." *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 31, 2012. <http://www.oxfordmusiconline.com/subscriber/article/grove/music/23921>.

— — —. “Talea.” *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 30, 2012.
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/27414>.

Schiff, David. *The Music of Elliott Carter*. 2d ed. Ithaca, N.Y.: Cornell University Press, 1998.

Schiltz, Katelijne. ““Aus einem Hauptgedanken alles Weitere entwickeln!”: Die Kanons in Isaacs *Choralis Constantinus II*.” In *Heinrich Isaac*, edited by Ulrich Tadday, 120-134. *Musik-Konzepte 148/149: Neue Folge*. München: Edition Text + Kritik, 2010.

Smith, Patrick J., and Maureen Buja. “Craft, Robert.” *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 17, 2012.
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/06771>.

Straus, Joseph N. *Stravinsky's Late Music*. New York: Cambridge University Press, 2001.

Stravinsky, Igor. “Foreword.” In *Die Reihe, 2: Anton Webern*, edited by H. Eimert and K. Stockhausen, vii. 2nd rev. English ed. Bryn Mawr: Theodore Presser, 1959.

Stravinsky, Igor, and Robert Craft. *Expositions and Developments*. Berkeley: University of California Press, 1981.

— — —. *Memories and Commentaries*. New York: Doubleday, 1959.

Stravinsky, Vera, and Robert Craft. *Stravinsky in Pictures and Documents*. New York: Simon and Schuster, 1978.

Strohm, Reinhard, and Emma Kempson. “Isaac, Henricus.” *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 10, 2012.
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/51790>.

Taruskin, Richard. *Stravinsky and the Russian Traditions: A Biography of the Works Through Mavra*. Vol. 2. Berkeley: University of California Press, 1996.

Tucker, Susannah. “Stravinsky and his Sketches: The Composing of *Agon* and Other Serial Works of the 1950s.” 2 vols. D.Phil. thesis, University of Oxford, 1992.

Urquhart, Peter. “The Persistence of Exact Canon throughout the Sixteenth Century.” In *Canons and Canonic Techniques, 14th-16th Centuries: Theory, Practice, and Reception History*, edited by Katelijne Schiltz and Bonnie J. Blackburn, 171-196. Leuven: Peeters, 2007.

Walsh, Stephen. *The Music of Stravinsky*. London: Routledge, 1988.

— — —. “Stravinsky, Igor.” *Grove Music Online. Oxford Music Online*. Oxford University Press. Accessed October 9, 2012.
<http://www.oxfordmusiconline.com/subscriber/article/grove/music/52818>.

— — —. *Stravinsky: The Second Exile: France and America, 1934-1971*. Alfred A. Knopf: New York, 2006.

Watkins, Glenn. "The Canon and Stravinsky's Late Style," in *Confronting Stravinsky: Man, Musician, and Modernist*, edited by Jann Pasler, 217-46. Berkeley: University of California Press, 1986.

— — —. *The Gesualdo Hex: Music, Myth, and Memory*. New York: W.W. Norton, 2010.

Weber, Horst. "Zu Strawinskys Machaut-Rezeption." In *Alte Musik als ästhetische Gegenwart: Bach, Händel, Schütz*, edited by Dietrich Berke and Dorothee Hanemann, 317-24. Bericht über den internationalen musikwissenschaftlichen Kongreß Stuttgart 1985, vol. 2. Kassel: Bärenreiter, 1987.

Webern, Anton. *Letters to Hildegard Jone and Josef Humplik*. Edited by Josef Polnauer. Translated by Cornelius Cardew. Bryn Mawr, PA: Theodore Presser, 1967.

— — —. *The Path to the New Music*. Edited by Willi Reich. Translated by Leo Black. Bryn Mawr, PA: Theodore Presser, 1963.

White, Eric Walter. *Stravinsky: The Composer and His Works*. 2nd ed. Berkeley: University of California Press, 1979.

Williams, Joel F. "Literary Approaches to the End of Mark's Gospel." *Journal of the Evangelical Theological Society* 42, no. 1 (March 1999): 21-35.
http://www.etsjets.org/files/JETS-PDFs/42/42-1/42-1-pp021-035_JETS.pdf.

Yates, Peter. "Anton Webern Complete." *The Saturday Review*, May 11, 1957, 39.
<http://www.unz.org/Pub/SaturdayRev-1957may11-00039>.