# A Corpus Approach to Mode in Vicentino's Chromatic Madrigals

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## 1 Introduction

Nicola Vicentino (1511–ca. 1575) left a musical and theoretical legacy that is only too tantalizing in both content and quantity. With the publication of his *L'antica musica ridotta alla moderna prattica* (Vicentino [1555] 1996), Vicentino laid out his conception of three distinct genera for musical composition: the diatonic, the chromatic, and the enharmonic. The last of these genera presented a five-fold division of the tone, and in doing so Vicentino built upon a tradition that dated back at least to the early fourteenth century with Marchetto's manifold division of the tone first considered in his own *Lucidarium*. But as astonishing as Vicentino's thirty-one–tone division of the octave is, any present-day excitement for this innovation is short-lived; only one complete work exclusively illustrating this enharmonic genus survives, and any other examples exist only in fragmentary form (and often of only a few measures). Any other music—if, indeed, it ever existed at all—has been lost to time.

▶ And yet, in spite of Vicentino's innovations—or perhaps indirectly *because* of them—his music has never quite reached the status of that by Monteverdi, di Lasso, or Victoria (to name but a few). Vicentino is very much a Bruckner to Monteverdi's Mahler, or perhaps a Humperdinck to Victoria's Wagner. But perhaps this is an unfair comparison, because Vicentino might be viewed as more of a theorist than a composer. But even still: Vicentino has never quite reached the level of, say, Artusi or Adorno. Why might this be so?

▶ I do not think the "job" of music analysis, however one defines either of these terms, is to determine the validity of such subjective statements as these. Nevertheless, analysis

can be a vehicle with which to objectively compare and contrast different repertoires. ▶ In what ways are Vicentino's compositions different from those of his fellow Italian greats? ▶ Are there patterns that we may glean from these differences? ▶ What implications might these findings have for analysis, performance, and even composition? ▶ And how might computer-aided musicology help with these findings? These are questions that analysis can answer, and thus these are the questions I hope to address in this paper.

# 2 Methodology

▶ If Vicentino's enharmonic exemplars never found their way into the twenty-first century, ▶ we can be thankful that a modest collection of compositions in the ▶ chromatic genus has. Typical studies of Vicentino's compositional output, therefore, tend to focus not on the limited music in the enharmonic genus, but rather on the relatively more abundant chromatic output. For the present purposes, I will focus on two such collections: ▶ the compositions present in his 1555 *L'antica musica*, both fragmentary and complete, and ▶ the twelve entries in his fifth book of five-voice madrigals dating from 1572.

With this corpus defined, I will merge the sixteenth and twenty-first centuries by making use of recent advances in computer-aided musicology to quickly, efficiently, and accurately identify larger patterns in this repertoire. For the purposes of this project, ▶ I will employ the `music21` toolkit developed and maintained by Michael Scott Cuthbert. With its ability to quickly extract data from entire corpora of music, I consider Vicentino's treatment of mode from a standpoint of ▶ pitch-class articulations. Using an extensive ▶ Monteverdi corpus already present in the `music21` library and a self-supplied corpus of Vicentino madrigals, the toolkit provides a listing of how many times each pitch class is articulated in a given work or excerpt. These data can then be used as the opening step in a new direction towards understanding Vicentino's treatment of mode and how it may differ from his contemporaries.

# 3 Analysis

## 3.1 Congruent Finals

▶ As an exercise in calibration, we can first consider a four-voice example written entirely in the diatonic genus that appears in Book III, Chapter 26 of *L'antica musica*. ▶ The pitch-class

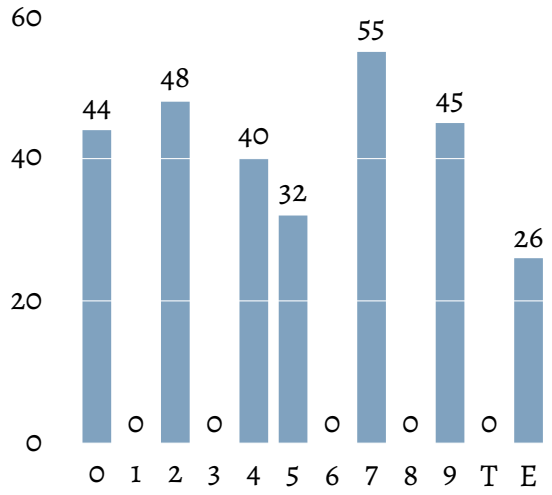


FIGURE 1: Pitch-class histogram for Vicentino's untitled diatonic madrigal with congruent G final

histogram for this madrigal, given in ▶ Figure 1, is hardly surprising: written strictly in the diatonic genus, in the Mixolydian mode, and with a G final, the madrigal results in a histogram that shows values of zero for C♯, D♯, F♯, G♯, and A♯.[1] Note, however, that the final G is articulated more than any other pitch class in the work; I thus refer to this as a "congruent" final to show that the work's final is also the most-articulated pitch class.[2] Furthermore, the diapente D is the second most-articulated pitch class, further clarifying the congruence between the histogram and the madrigal's mode of G Mixolydian.

But for pedagogical clarity we should perhaps expect that this example, apparently composed exclusively for his treatise, would create a histogram fully in line with its modal final. ▶ Figure 2, ▶ meanwhile, shows the pitch-class histogram for a work composed outside of the world of *L'antica musica*: "Non s'incolpi la voglia," the second entry in Vicentino's fifth book of madrigals. Once again we see a clearly congruent final aligning with the madrigal's G-Dorian environment. Despite the use of both raised and lowered $\hat{6}$ in this mode, however, note the relative avoidance of E♭, evidence of the madrigal's recurrent moves towards C major to harmonize the final G.

1. The *ficta* F♯s often inserted into modern scores of this madrigal are incorrect. Their two appearances, both sandwiched between two neighboring Gs, create consecutive melodic intervals of a half step, an interval not present in Vicentino's diatonic genus; it only appears in his latter two genera.

2. Not only do I consider the final to be congruent with the histogram, I consider the histogram to be congruent with the final. I see no reason to limit this relationship to only one direction.

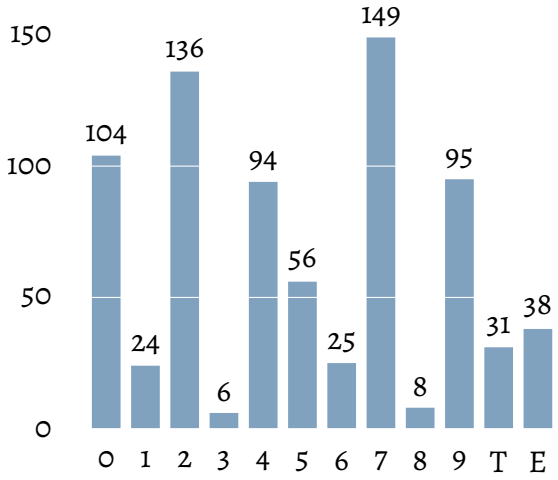


FIGURE 2: Pitch-class histogram for Vicentino's "Non s'incolpi la voglia," Book V, with congruent G final

## 3.2 Looking West to Mantua

▶ Having calibrated our methodology in some Vicentino works, we can broaden our horizons to better understand some generic norms of the sixteenth-century style. Thus, by way of showing a kind of universality of this approach, we can turn westwards to Mantua (with a quick jump forward thirty years) and to Monteverdi, busy at work on his fourth and fifth books of madrigals (published in 1603 and 1605, respectively).

▶ Figure 3 presents the pitch-class histogram for the opening madrigal of Book IV, the celebrated "Ah, dolente partita!" The congruent A final clearly outnumbers the remaining eleven pitch classes, and the diapente E is firmly in second place. Furthermore, the overwhelmingly clear lack of F♯s, and thus the inability to convincingly cadence on E, provides further evidence (as if it were needed) that the madrigal is firmly in A Aeolian, with interior cadences often pushing towards D, the fourth most-articulated pitch class of the madrigal.[3] In contradistinction to Vicentino's "Non s'incolpi la voglia," we see Monteverdi's clear emphasis on the lowered $\hat{6}$, helping cement the mode of Aeolian.

Of course, not all histograms are quite so clear; consider Monteverdi's ▶ "Anima mia, perdona." A look at this madrigal's pitch-class histogram ▶ suggests a clear final of D; a perusal of the remaining pitch classes suggests emphases on E, F, G, A, B♭, and C, suggesting D Aeolian. But this is the first madrigal considered here of a plagal mode; "Anima mia" is

3. Not shown in the histogram, of course, is Monteverdi's clever A-versus-D ending brought on by the double-agent C♯.

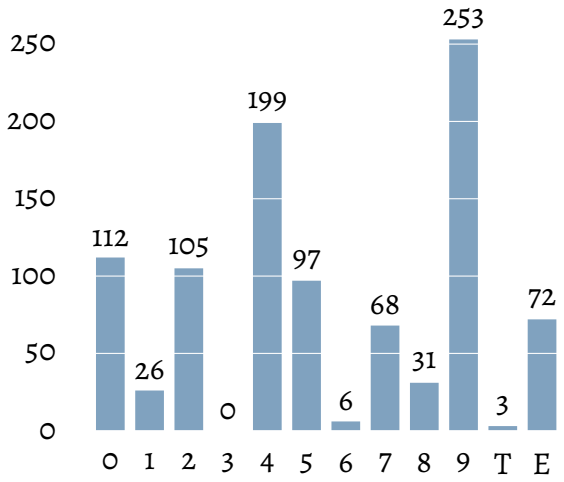


FIGURE 3: Pitch-class histogram for Monteverdi's "Ah, dolente partita!," Book IV, with congruent A final

not in D Aeolian, but rather in G Hypodorian, a fact perhaps not immediately clear from the histogram.

Why is the final, for the first time, not the most-articulated pitch class? This is easy enough to rationalize with a simple musical example: the scale. In an authentic mode, the scale is book-ended by its final (e.g., G, . . . , G), and thus a pitch-class histogram of a simple ascending authentic scale would have twice as many occurrences of the final as of every remaining pitch class. Yet in a plagal mode, the scale is not book-ended by its final, but rather by a secondary pitch class determined by the specific mode. As such, a plagal-mode scale's pitch-class histogram does not show twice as many finals, but rather twice as many occurrences of this secondary pitch class (e.g., D, . . . , D). I consider a histogram of this nature to be "ambitus-congruent" to distinguish it from earlier "congruent" models. Note that this ambitus congruence applies only to plagal modes; congruent authentic modes assume equivalence between the final and ambitus boundaries and thus also assume ambitus congruence. Furthermore, although my findings suggest that plagal modes are typically ambitus-congruent, I believe they could also manifest congruent histograms. Authentic modes, however, are only labeled as congruent, even if that congruence, as discussed, also includes an inherent ambitus congruence.[4]

4. (Phew.)

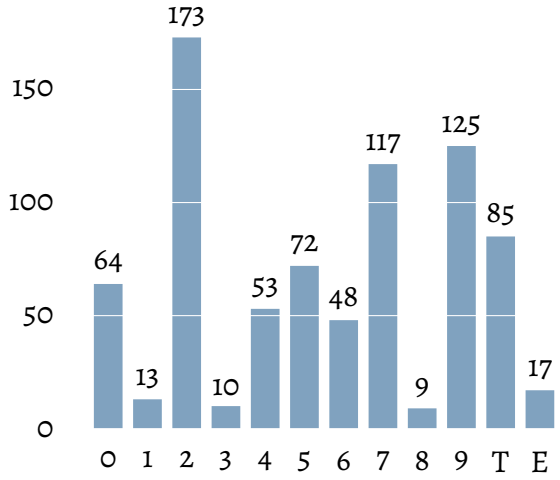


FIGURE 4: Pitch-class histogram for Monteverdi's "Anima mia, perdona," Book IV, with ambitus-congruent G final

## 3.3 Back to Ferrara: Non-congruent Finals

► Having seen this histogram approach in action for works by both Vicentino and Monteverdi, we can return to Vicentino to consider his output more fully. The pitch-class histogram of the opening madrigal of his own Book V, "Donna s'io miro," is shown in ► Figure 5. The histogram strongly suggests D Dorian; but the madrigal will ultimately settle on a final of G. The tenor's diapente descent in the final two measures could not be more clear, with the motion from $D_4$ down to $G_3$ interrupted only by an opening upper neighbor (a somewhat curious E♮, not E♭). The use of both B♭ and B♮ is simply an outgrowth of Vicentino toggling between major and minor triads on interior G cadences.[5]

We thus see a radical difference between this histogram and those preceding it. First, the final G is only the second most-articulated pitch class, disqualifying full congruence between the histogram and the final. Furthermore, although the emphasis on D could suggest an ambitus-congruent histogram, recall that ambitus congruence applies only to plagal modes (and thus not to this madrigal, in its authentic G Dorian). We thus have our first example of a non-congruent final: a madrigal whose most-articulated pitch class is neither the final nor the ambitus boundary.

► But the most shocking example of the non-congruent final is found in "Occhi lucenti

5. This is a specific manifestation of a broader stylistic trait: Vicentino's penchant for sliding between major and minor qualities of a single triad. This single-voice half-step motion, illegal in the diatonic genus but allowed in the chromatic, is such a hallmark of his style as to approach cliché.

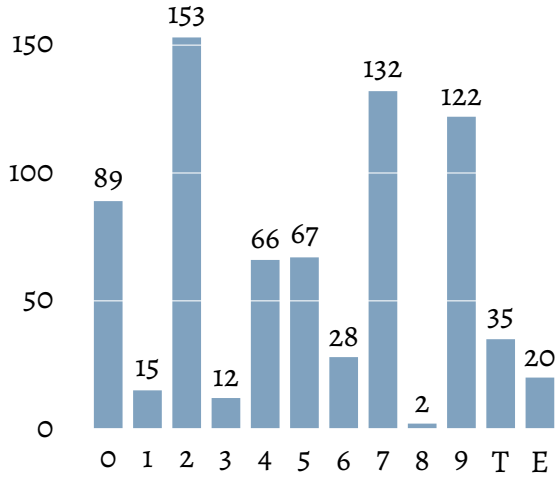


FIGURE 5: Pitch-class histogram for Vicentino's "Donna s'io miro," Book V, with non-congruent G final

e belli," the tenth entry in Vicentino's Book V. As ▶ Figure 6 shows, the final A is only the fourth most-articulated pitch class; G, C, and D are each articulated more than the final, with A just barely measuring 80% of the articulations of G, the most-articulated pitch class. Indeed, it is almost as if Vicentino lost the mode at the end of the work: clear interior cadences on G, C, and D suggest an impending G final. But it is not until the last line of text—"Be always serene, cheerful, and clear"—that the music suddenly veers towards A, cadencing there three times in the final fifteen measures of the eighty-four–measure madrigal. Furthermore, the non-congruence of A may be the less impactful story of this histogram; more important might be the dead heat for primacy between C, D, and G, whose articulation frequencies differ by a maximum of under 3.5%.

▶ We thus have some preliminary data that may begin to elucidate some of the complexities of Vicentino's style. In contrast to someone like Monteverdi, whose pitch-class histograms are consistently congruent and/or ambitus-congruent with the works they model, Vicentino's histograms in the above two instances are clearly non-congruent, and they are non-congruent in varying ways: in "Donna s'io miro," a secondary pitch class has clear primacy over the final, while in "Occhi lucenti e belli" multiple pitch classes have primacy.

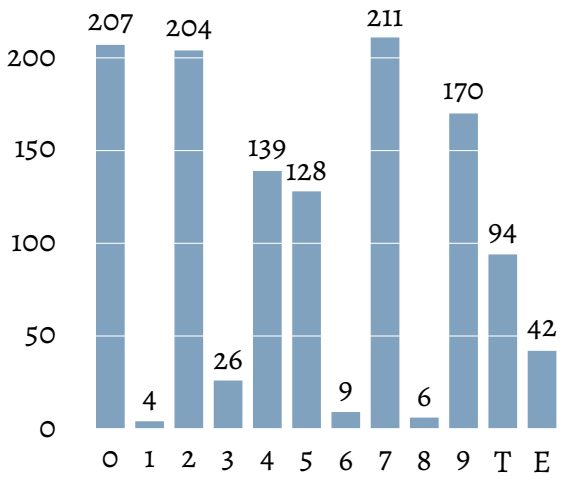


FIGURE 6: Pitch-class histogram for Vicentino's "Occhi lucenti e belli," Book V, with non-congruent A final

## 3.4 Levels of Congruence

► But such issues of (non-)congruence in Vicentino's output are not always so black-and-white. The third madrigal of Book V is modeled by the histogram in ► Figure 7. Although the model is in fact congruent with the G-Dorian mode of this madrigal, it is an exceptionally low level of congruence; D, which appears precisely one fewer time than the G final, risks overthrowing G as the modal center. This histogram thus shows a high level of non-congruence with this madrigal's G final, adding further nuance to these data.

► The histogram in ► Figure 8, for "Non pur quell' una bella ignuda mano," accurately portrays the mode: with outstanding articulation values for D, E, F, G, A, B, and C, the histogram is congruent with the madrigal's D-Dorian center. But as in the prior example with its two competing pitch classes, Figure 8 could be viewed as having *three* pitch classes—D, G, and A—fighting for supremacy. Despite its technical congruence with the D final (D only appearing three more times than G), there is again a high level of non-congruence for this madrigal.

But perhaps the most striking of Vicentino's complete compositions is ► "Hierusalem," a chromatic madrigal presented in Chapter 55 of *L'antica musica*. Of all of his completed works, ► "Hierusalem" is without question the most inexplicable: the absolute lack of interior cadences hurts any sense of a modal center, as does the circle-of-fifths motion in mm. 12–17 that traverses from G all the way to E♭.[6] And to top off the madrigal, it ends with an

6. According to my preliminary findings, E♭ is Vicentino's least-used pitch class throughout his output.

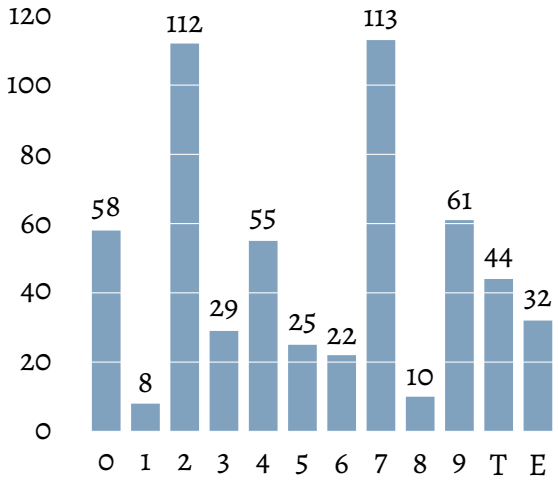


FIGURE 7: Pitch-class histogram for Vicentino's "Poi ch'el mio largo pianto," Book V with congruent G final

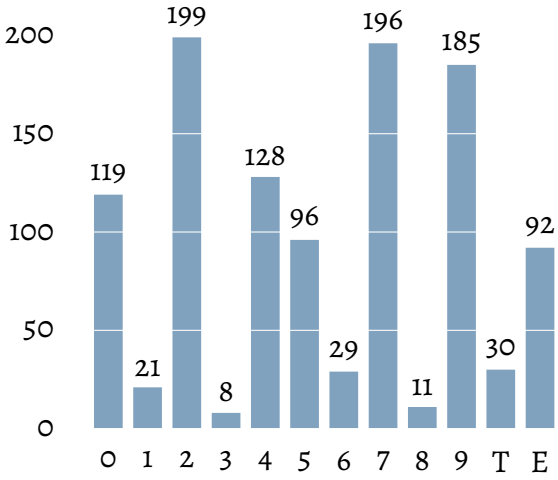


FIGURE 8: Pitch-class histogram for Vicentino's "Non pur quell' una bella ignuda mano," Book V, with congruent D final

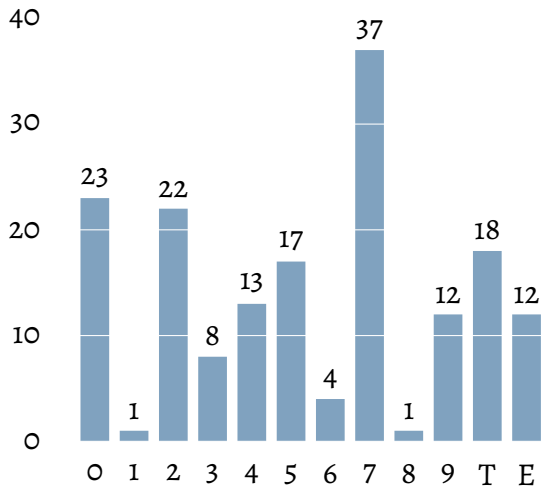


FIGURE 9: Pitch-class histogram for Vicentino's chromatic madrigal "Hierusalem"

ambiguous cadential gesture: is this plagal motion to B, or a half cadence in E?

▶ But what makes this all so astonishing is the pitch-class histogram ▶ (see Figure 9), which rather clearly shows G as the most-articulated pitch class. Indeed, our two cadential options—one in E, and one in B—are both outshined not only by this G, but also by C, D, B♭ (!), and F. Perhaps astonishingly, the final B is not even in the top half of the most-articulated pitch classes; rather, it is in a two-way tie for seventh with A, both pitch classes being only one articulation behind E, our other cadential option, which lies in sixth place. Once again, we are confronted with the reality that Vicentino's treatment of mode is remarkably different from Monteverdi; whereas Monteverdi's madrigals are typically congruent with their pitch-class histograms, we cannot ignore Vicentino's tendency to compose madrigals whose finals are non-congruent with their pitch-class histograms.

## 3.5 Limitations of the Approach

▶ I see at least three main limitations of this approach. ▶ First, the `music21` data-collection process calculates *articulations* of each pitch class, not the total duration. In extreme circumstances, then, a string of sixteen consecutive sixteenth-note articulations of C would massively out-power the single articulation of a whole-note D, despite the two environments lasting the same duration. Although this is a legitimate concern, the relative lack of any such repeated articulations in the corpus suggests the data are not be unduly skewed. Furthermore, such skewing would become less and less of a concern the longer the excerpt

under study; the more data points present in a work, the less these repeated articulations would skew the data.

Second, ► the data gathered are pitch classes in the most literal sense: both G♯ and A♭ correspond to a pitch-class value of 8, and thus there is no distinction among enharmonics in this approach. Once again, this is a legitimate concern; but given the repertoire under consideration and the goals of the study, a more nuanced awareness of enharmonicism is not necessary for the present.

Finally, the most obvious limitation is that ► mode is simply not determined by frequency of articulation, but rather by a background matrix of interior cadences and primary and secondary regions. Nevertheless, I hope the above data, and the findings inherent in them, will convince the skeptic of their value in light of this all-too-apparent limitation.

# 4 Future Work

► One could extend this approach in several meaningful ways. In light of the three limitations just outlined, perhaps the most obvious future work could address these issues directly. ► First, one could ► adjust the `music21` algorithm to calculate not pitch-class articulations but rather pitch-class durations throughout a given madrigal. Such a study of pitch duration could be especially enlightening for the pitch-class histogram of Vicentino's "Dolce mio ben." With articulation values of 40, 41, 40, and 42 for C, D, F, and A, respectively, duration values may well provide a more accurate histogram of this mixed-genera fragment.

Furthermore, ► one could code the algorithm to distinguish between enharmonic pitches, thereby giving a more nuanced histogram of the pitch-class content. This could be especially enlightening for an understanding of Vicentino's limited enharmonic madrigals and fragments, where one finds not only distinctions between, say, D♭ and C♯, but also between raised and lowered versions of both pitches.

These avenues for further progress, however, are not limited to these approaches. ► Other projects may consider the pitch content of a madrigal as opposed to the pitch-*class* content measured here. This could potentially be especially important for plagal modes, where pitch-class content may show an unintentional emphasis on the octave boundary pitch instead of the final. Similarly, one could consider the histograms of each individual voice and how the voices relate to the histogram of the entire madrigal. This could have interesting implications for mode-bearing voices, and larger studies of multiple corpora over

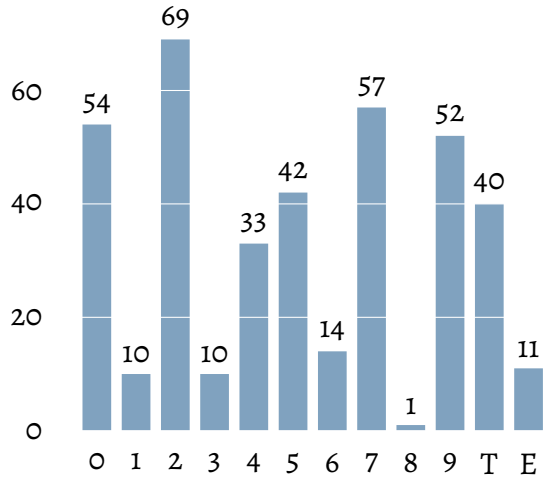


FIGURE 10: Pitch-class histogram for di Lasso's fifth Sibylline Prophecy, "Sibylla Samia," with congruent D final

larger time spans could numerically show how Vicentino's style may have changed following the publication of his treatise, or perhaps the world-at-large's broader compositional shift away from the emphasis on the tenor voice.

But the strength of the `music21` toolkit is its ability to measure ▶ such a wide array of musical data. With this in mind, it could be instructive to consider not the pitch or pitch-class content of Vicentino's output, but the melodic intervals among these pitches. Vicentino's genera, simply put, are sets of limitations on the interval content available to the composer. As such, this interval content could house intriguing patterns for our understanding of Vicentino's style and his compositional approach; it could even shed new light on the debate between Vicentino and Lusitano and the claims made by either individual.

Lastly, ▶ one could pursue any and all of the above approaches in the works of other composers, perhaps especially those influenced by Vicentino's own music and theoretical backdrop. Composers that come immediately to mind are Luzzascho Luzzaschi (ca. 1545–1607), Carlo Gesualdo (1566–1613), and Orlando di Lasso (ca. 1530–1594), and the latter's highly chromatic *Sibylline Prophecies*, a clear descendant of Vicentino's own style, could be especially fertile ground. ▶ As a sampler of such future work, ▶ Figure 10 presents the pitch-class histogram of the fifth of di Lasso's *Prophecies*. At least in this sample size, di Lasso creates a work whose pitch-class histogram is congruent with the work's D final—so like Monteverdi, and so *un*like Vicentino.

# 5 Conclusion

► The above data do not suggest that Vicentino was a lesser composer, ► or that he did not fully understand the modal system in which he wrote.[7] ► However, they do consistently show that Vicentino's histograms are largely non-congruent, and ► preliminary findings suggest that this differs from both Monteverdi and di Lasso. ► But it's important that we recognize this not as a verdict on compositional acumen, but rather as evidence of nuances in style.

► Furthermore, the pitch-class histograms do not suggest that listeners somehow tabulate pitch-class articulations throughout a work to determine its mode. But they can be a first step in differentiating among diverse styles. One can imagine any number of implications for these findings: as inspiration for experimental and cognitive approaches towards understanding mode, as insights for pedagogy and model composition, and even as implications for performance.

7. One could imagine a different timeline in which, in the midst of his debate with Lusitano, an exasperated Vicentino screams "I do know it, I wrote the damn [book]!"