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The Interaction of Mode and Psalmody in Glarean's Circle

Abstract

After summarizing Heinrich Glarean's twelve modes, Johannes Mattheson explained in his *Neu-Eröffnete Orchestre* (1713) that modern Italian composers used a different set of four major and four minor keys. The origin of these eight keys is complicated by modal systems in the sixteenth and seventeenth centuries and the ways theorists reconciled those systems with Gregorian psalmody. This article aims to untangle what Harold Powers (1998) called "confusions in the interface" between modal theory with Gregorian psalmody by illuminating how Glarean and his immediate predecessors resolved contradictions in these systems in the sixteenth century. Section One outlines the relationship between psalmody and early modal systems in the ninth to eleventh centuries. Section Two traces how the interface between psalmody and mode changed in three early sixteenth-century treatises written by Glarean's predecessors, Nicolaus Wollick and Johannes Cochlaeus. Section Three explores how Glarean recognized and accounted for these changes in his *Isagoge in musicen* (1516), *Dodecachordon* (1547), and *Musicae epitome* (1557). Section Four highlights how an improved understanding of the interaction between mode and psalmody in the sixteenth century influences how we understand similar tensions in the seventeenth century.

Keywords

Mode, Psalmody, Heinrich Glarean, Nicolaus Wollick, Johannes Cochlaeus

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The Interaction of Mode and Psalmody in Glarean's Circle[1]

Thomas William Posen

INTRODUCTION

After summarizing Heinrich Glarean's twelve modes, Johannes Mattheson remarked in his *Neu-Eröffnete Orchestre* of 1713 that "the Italians and modern composers are accustomed to differentiate their keys [*modulationes*] in another way."[2] He then listed the four major and four minor keys shown in the left-hand column of Table 1. Scholars have long debated the origin of these eight keys. In his seminal book, *Between Modes and Keys* (1989),[3] Joel Lester linked the predecessors of these eight keys to modes by proposing a connection from Mattheson through seventeenth-century compendia by German theorists back to Adriano Banchieri's early seventeenth-century "church keys"[4] and ultimately Glarean's

1 This paper is an expanded and revised version of two conference papers, "The Symbiotic Evolution of Mode and Psalm Tones," given at the 2018 international *Modes, Church Tones, Tonality: Tonal Spaces, c. 1550–c. 1720* conference in Ferrara, Italy, and "From Mode to Mattheson's Major and Minor Keys: The Contributions of Johannes Cochlaeus, Heinrich Glarean, and Joannes Litavicus" presented at the American Musicological Society (2019) in Columbus, Ohio and at the Medieval and Renaissance Music Conference (2019) in Basel, Switzerland. I thank Peter Schubert and Julie Cumming for their generous advice on earlier parts of this project. I also thank Stefano Mengozzi, Nathan Martin, Evan Campbell, Laurence Willis, and the anonymous reviewers of this journal for their comments, suggestions, and scholarly debate. Finally, I extend my gratitude to Alessandra Ignesti and Tobias Tschiedl for helping me with certain translations where noted.

2 "Die Italianer und heutigen Componisten gebrauchen sich einer noch andern Art ihre modulationes zu unterscheiden"; Johann Mattheson, *Das Neu-Eröffnete Orchestre* (Hamburg: B. Schiller, 1713), 60.

3 Joel Lester, *Between Modes and Keys*, Harmonologia Series 3 (Stuyvesant, NY: Pendragon Press, 1989).

4 I adopt the term "church keys" (*Kirchentöne*) from Lester, *Between Modes and Keys*, 77–82. Recent references to the seventeenth-century church keys have employed a variety of terms including "pitch-key modes," Walter Atcherson, "Key and Mode in Seventeenth-Century Music Theory Books," *Journal of Music Theory* 17/2 (1973), 216–22, https://doi.org/10.2307/843342, and "psalm-tone keys," Harold S. Powers, "From Psalmody to Tonality," in Cristle Collins Judd (ed.), *Tonal Structures in Early Music* (New York: Garland, 1998, https://doi.org/10.4324/9781315054032-16), 275–340. The seventeenth-century "church keys" are distinct from the "ecclesiastical modes," or what Charles Atkinson calls the "church modes"; see Charles M. Atkinson, *The Critical Nexus: Tone-System, Mode, and Notation in Early Medieval Music*, AMS Studies in Music (Oxford; New York: Oxford University Press, 2009, https://doi.org/10.1093/acprof:oso/9780195148886.001.0001), 202–33.

sixteenth-century modes (middle column of Table 1).[5] About a decade later (1998), Harold Powers challenged Lester's modal narrative in his influential article "From Psalmody to Tonality,"[6] arguing instead that the origin of Mattheson's keys lay in psalmody—specifically, in a set of eight melodies used for singing psalm tones—rather than the modes.[7] More precisely, Powers traced Mattheson's eight keys to Banchieri's early seventeenth-century church keys as Joel Lester did, but instead of proposing that the church keys developed from modes, Powers argued that they originated in the Italian theorist's "psalm-tone tonalities"—a concept that Powers invented that abstracts the "tonalities" of Banchieri's altered psalm tones in terms of their tonal types, thus eschewing the term "mode."[8] The rightmost column of Table 1 lists the final and key signature of Powers's psalm-tone tonalities.

Table 1: Mattheson's Keys, Lester's Eight Modes, and Powers's Psalm-Tone Tonalities

Mattheson's Keys	**Lester's Eight Modes**	**Powers's "Psalm-Tone Tonalities" (from Banchieri)**
D minor	D Dorian	D
G minor	G Dorian	G (with ♭ signature)
A minor	A Phrygian (no signature)	A
E minor	E Phrygian	E
C major	C Ionian	C
F major	F Ionian	F (with ♭ signature)
D major	D Mixolydian	D (with ♭ signature)
G major	G Mixolydian	G

5 Lester explains that "Banchieri offers no explanation of the origin of these church keys, nor of their relation to either the traditional modes or the psalm tones. But various comments make it clear that the church keys arise from common modal transpositions. For several of the church keys, Banchieri explains the level of transposition for the convenience of singers or instrumentalists. Thus the transposition of Dorian to a one-flat signature explains tones 1 and 2. The same transposition of Phrygian results in tones 4 and 5, but the ordering is reversed, and there is no flat in the signature of the A mode. In this way, there is no need for Glarean's Aeolian as an added mode. Lydian was often changed to Ionian; here tone 5 is Ionian, tone 6 its transposition. Tone 8 is Mixolydian; tone 7 the ambitus of Hypomixolydian, but with D as its final"; Lester, *Between Modes and Keys*, 79. Regarding the divergence of Banchieri's seventh church key, Lester proposes that "At some point later in the seventeenth century the seventh mode was changed from D with one flat in the signature to D with one sharp in the signature, probably either to differentiate it more clearly from the first mode, or to present a true transposition of Mixolydian"; ibid., 80.

6 Powers, "From Psalmody to Tonality."

7 Powers, "From Psalmody to Tonality," 280. Powers contends: "Though Mattheson himself had no notion of the connections, it is indeed the case that his first set of eight [major and minor keys] evolved, as a system, from an octonary set—but it was not the set of eight Gregorian modes but rather the corresponding set of eight Gregorian psalm tones."

8 Powers's tonal types include three components: final, signature, and ambitus. For Powers's tonal types in Banchieri's Duos, see Powers, "From Psalmody to Tonality," 290, Table 3B.

If Lester's evolutionary progression from mode to key oversimplified the narrative, then Powers drew too firm a line between mode and psalmody, despite their symbiotic relationship since the time of Charlemagne in the early ninth century. Ultimately, the origins of the seventeenth-century church keys and Mattheson's eight keys are complicated by the changing and developing modal systems in the sixteenth and seventeenth centuries and the varying ways that theorists and musicians reconciled these systems with psalmody. Indeed, Powers acknowledged but did not address these difficulties in a footnote to his psalmody-focused origin story, writing that "The dissemination from mid-sixteenth century onward of dodecachordal modal theory, alongside the continuing octonary modal system of chant theory and the tonalities of the associated psalm tones as well, made for confusions in the interface of theory and practice in the seventeenth century too complex to sort out here."[9]

This article aims to untangle some of the "confusions in the interface" that Powers described between dodecachordal and octonary modal theories with psalmody by illuminating how Glarean and his immediate predecessors reconciled these systems in the sixteenth century. An improved comprehension of this changing interface in Glarean's circle advances our insight into the continued tensions between mode and psalmody in the seventeenth century as well, which in turn influences how we understand the development of the church keys and thus the path(s) to Mattheson's major and minor keys. The purview of this article remains the sixteenth century, however.

The principal findings in this article are as follows. Not long after the Church adopted the *oktōēchos* (eight modes) to coordinate Gregorian antiphonal psalmody, some of the liturgical plainchant psalmody formulas were altered (Glarean would say "corrupted").[10] This alteration caused their melodic intervals to differ from those defined by the eleventh-century octonary set of species-defined modes with which they were originally linked (Table 2, left column). Glarean's predecessors, Nicolaus Wollick and Johannes Cochlaeus, sought to address these discrepancies between the modes and the altered psalmody formulas by modifying or redefining certain modes, but these changes introduced several inconsistencies.

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9 "From Psalmody to Tonality," 340.

10 Glarean uses the German term *gefälscht*; Heinrich Glarean and Joannes Litavicus Vuonneger, *Uß Glareani Musick ein Ußzug [Musicae epitome ex Glareani Dodecachordo]*, German (Basel: Henricum Petri, 1557), 92–93. The idea of singers "corrupting" chants is a common theme in treatises before Glarean. For example, Pseudo-Odo in his *Enchiridion musices* (ca. 935, also known as the *Dialogus de musica*) writes: "When you were earnestly and diligently inquiring whether our doctrines would be of value for all melodies [...] I investigated the Antiphoner of the blessed Gregory, in which I found that nearly all things were regularly set down. A few things, corrupted by unskilled singers, were corrected, both on the evidence of other singers and by the authority of the rules"; William Oliver Strunk (ed.), *Source Readings in Music History: From Classical Antiquity through the Romantic Era*, 1st ed. (New York: Norton, 1950), 104. Later in the treatise, after detailing the interval species of the eight species-modes, Pseudo-Odo remarks that melodies that "violate these rules [...] are the work of presumptuous and corrupt singers"; ibid., 115.

Table 2: 11th-Century Species-Modes, Glarean's Transposition or Modal Replacement, and Mattheson's 8 Keys (Numbers within parentheses refer to Glarean's mode numbers.)

11th-Century Species-Modes	**Glarean's Transposition or Modal Replacement**	**Mattheson's 8 Keys**
(1) D Dorian	(1) D Dorian (not changed)	D minor
(2) D Hypodorian	up P4, (2) G Hypodorian	G minor
(3) E Phrygian	(10) A Hypoaeolian	A minor
(4) E Hypophrygian	(10) A Hypoaeolian with final on E	E minor
(5) F Lydian	(11) C Ionian	C Major
(6) F Hypolydian	(12) F Hypoionian	F Major
(7) G Mixolydian	down P4, (7) D Mixolydian	D Major
(8) G Hypomixolydian	(8) G Hypomixolydian (not changed)	G Major

Glarean recognized and resolved the inconsistencies between mode and (altered) psalmody in three steps: 1) by establishing four new modes (the Ionian and Aeolian modes and their plagal variants); 2) by redefining his predecessors' altered modes as transpositions of these new modes; and 3) by reassigning the (altered) antiphons and psalm-tone melodies to these modes (the modes shown in Table 2, middle column). Glarean thereby identified a new set of eight species-defined modes, which were a subset of the twelve modes he described. This eight-mode subset re-established the connection between species-defined modes and psalmody by once again linking the melodic interval patterns shared by the species-defined modes with their eight corresponding (altered) psalmody formulas.

The scale patterns of Glarean's new eight-mode subset closely match the scale-patterns of Mattheson's eight commonly used keys (Table 2, right column). The connection between the two scalar collections is more circuitous than Table 2 suggests, however, because tensions in the interface between psalmody and mode persisted in the seventeenth century, and seventeenth-century theorists interpreted the relationship between the psalmody formulas and modes in a variety of ways. In addition, composers treated the psalm-tone formulas—including some that had been altered or transposed (with or without the corresponding key-signature changes)—as *cantus fermi* in polyphonic compositions. This practice sometimes produced pieces that projected different modal characteristics than the modes to which these psalm tones were originally assigned. Thus, given the extent of the tensions in the interface between mode and psalmody, it is beyond the scope of this article to detail the path to Banchieri's seventeenth-century church keys or Mattheson's keys thereafter. Nevertheless, an improved understanding of the evolving interface between mode and psalmody in the sixteenth century—the focus of this article—may advance our comprehension of these later developments.

This article unfolds in four sections. Section One outlines the relationship between psalmody and early modal systems beginning in the ninth century and coins two terms—*repercussio*-modes and species-modes[11]—to simplify the narrative and differentiate two subtly different strands of modal thinking. Section Two traces how the interface between psalmody and mode begins to change in three early sixteenth-century treatises written by Wollick and Cochlaeus. In brief, Wollick and Cochlaeus modify some of the modes to better align their intervallic patterns with the altered psalmody formulas' melodic patterns, but these changes introduce some inconsistencies. Section Three highlights how Glarean observes in his *Isagoge in musicen*[12] the inconsistencies his predecessors introduced, and then demonstrates how he remedies these discrepancies in his *Dodecachordon*[13]—especially in Chapter 15, "Concerning the use of modes in choir singing" [*De modorum usu in cantantium*][14]—and *Musicae epitome* (1557), a work that he completed with his stepson Johannes Wonnegger Litavicus.[15] Finally, Section Four summarizes how Glarean's eight-mode subset propagated into Zarlino's *Istitutioni harmoniche* (1558)[16] and later treatises.

1. THE RELATIONSHIP BETWEEN PSALMODY AND MODE

1.1. *Repercussio*-modes

Centuries before Glarean's modal innovations, modal theory was closely tied to psalmody in ways that affected the modes. Thus, to better understand why Glarean and his predecessors sought to reconcile mode with psalmody in the sixteenth century, let us consider the relationship and conflict that began to emerge in the eleventh century between modes and Gregorian psalmody formulas.[17]

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11 My terms *repercussio*-mode and species-mode differ in several ways from Bernhard Meier's "western ecclesiastical modal system" and the "pseudo classical modes," Bernhard Meier, *The Modes of Classical Vocal Polyphony: Described According to the Sources, with Revisions by the Author*, trans. Ellen Beebe (New York: Broude Bros, 1988), 43–46, and from Franz Wiering's differentiation between *internal* and *external* views of the modes, which relate to his *modus* (also in the pseudo-classical tradition) and *tonus* (in the *omnis cantus* definition) distinctions, Frans Wiering, *The Language of the Modes: Studies in the History of Polyphonic Modality* (New York: Routledge, 2001), 69–101.

12 Heinrich Glarean, *Isagoge in musicen* (Basel: Froben, 1516).

13 Heinrich Glarean, *Dodecachordon* (Basel: Heinrich Petri, 1547).

14 Heinrich Glarean, *Dodecachordon Volume 1*, trans. Clement A. Miller, vol. 1 (n.p.: American Institute of Musicology, 1965), 74; Glarean, *Dodecachordon*, 35.

15 *Musicae epitome* was published simultaneously in Latin and German; Heinrich Glarean and Joannes Litavicus Vuonneger, *Musicae epitome ex Glareani Dodecachordo*, 1st ed. (Basel: Henricum Petri, 1557); Glarean and Litavicus Vuonneger, *Uß Glareani Musick ein Ußzug [Musicae epitome ex Glareani Dodecachordo]*.

16 Gioseffo Zarlino, *Le istitutioni harmoniche*, 1st ed. (Venice: the author, 1558).

17 Although a full explanation that details the origin of these plainchant formulas and their relationship to early modal systems is beyond the scope of this article, a cursory overview will help us understand why Glarean modified the original octonary set.

The origin of the eightfold set of psalmody formulas coincides with the Carolingian reform of the Christian church in the ninth century, which led to the church's adoption and further integration of the eight *ēchoi,* or modes, which are often called the *oktōēchos* ("eight modes"). These modes were adopted and further refined in large part to coordinate antiphonal Gregorian plainchant.[18]

In the early *oktōēchos* modal system, finals were set on the notes equivalent to D, E, F, and G based on the interval patterns surrounding each note. These interval patterns were discussed in multiple ways: e.g., "qualities" in *Musica enchiriadis,* Hermannus's tetrachords, Hucbald's modal affinities or *socialitas,* and Guido's *modi vocum,* among others.[19] The four early modes were further split into authentic and plagal versions for "high and low melodies,"[20] thereby creating eight modes.

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18 I reference Gregorian antiphonal plainchant because it differed from Ambrosian plainchant: the former adopted the *oktōēchos* eight-mode system, whereas the latter did not. In Gregorian psalmody, the reciting notes are systematically chosen such that the reciting tones of each of the eight psalm tones correspond with a set of eight modes. In Ambrosian manuscripts, by contrast, the same recitation tone is used for chants with different finals and different melodic characteristics; see "The Connection between Psalm Tone and Mode," in Christian Troelsgård et al., "Psalm," in *Grove Music Online* (Oxford Music Online, 2001), https://doi.org/10.1093/gmo/9781561592630.article.48161. On this topic, Keith Falconer proposes that "before the introduction of the Octoechos, the Gregorian and Ambrosian rites may well have resembled each other more closely in their psalmody"; Keith Falconer, "The Modes before the Modes: Antiphon and Differentia in Western Chant," in Kenneth Levy and Peter Jeffery (eds.), *The Study of Medieval Chant: Paths and Bridges, East and West: In Honor of Kenneth Levy* (Woodbridge, Suffolk; Rochester, NY: Boydell Press, 2001), 143. See also Matthew R. J. Nace, "The Alia musica and the Carolingian Conception of Mode" (Ph.D. diss., Western University, 2020), 216–17, https://ir.lib.uwo.ca/etd/7538.

19 Atkinson, *The Critical Nexus*, 117, explains that "the four primary pitches (protus, deuterus, tritus, tetartus) and the character they impart on the melodies built on them become the primary tonal determinant for the *ēchoi*." Similarly, the author of the tenth-century *Dialogus de musica* contends that one may perceive the "differences and common characteristics" of the modes by recognizing the specific interval patterns around each note ("sound"); Strunk, *Source Readings in Music History*, 115–16. On modal affinities and Guido's *modi vocum*, see David E. Cohen, "Notes, Scales, and Modes in the Earlier Middle Ages," in Thomas Christensen (ed.), *The Cambridge History of Western Music Theory*, 1st ed. (Cambridge; New York: Cambridge University Press, 2002, https://doi.org/10.1017/chol9780521623711.013), 346–51. The four modal finals (D, E, F, and G) were likely chosen because they each have a note a fifth above with the same distribution of whole and half steps around the note. In the anonymous ninth-century *Musica enchiriadis*, the author explains that "Every musical tone has a tone of identical quality a fifth away on either side, tones that share another quality a third away on either side, and whatever [quality] a tone has at the second on one side will be at the fourth on the other," and later that "it is inevitable that tones a fifth apart are always of the same type"; Claude V. Palisca (ed.), *Musica Enchiriadis and Scolica Enchiriadis*, trans. Raymond Erickson (Yale University Press, 1995, https://doi.org/10.1093/gmo/9781561592630.article.19405), 5, 19. The late ninth- and early tenth-century French theorist Hucbald similarly observes that "the notes a fifth above each of these four finals respectively are joined with them in such a bond of similarity that one will generally find that melodies can close on these notes a fifth above without offending either one's judgment or ear. They remain entirely within the same mode or trope, as though according to some principle"; Hucbald, "Hucbald," in Claude V. Palisca (ed.), *Hucbald, Guido, and John on Music: Three Medieval Treatises*, trans. Warren Babb (New Haven; London: Yale University Press, 1978), 39; see also Cohen, "Notes, Scales, and Modes in the Earlier Middle Ages," 322. In a footnote, Bernhard Meier, *The Modes of Classical Vocal Polyphony*, 39, emphasizes that "the tonal *qualities*, not the *pitches* d–g themselves, are the essential things, particularly with respect to polyphonic music."

20 On the relationship of the authentic and plagal distinctions to high and low "melodies," see Pseudo-Odo's explanation in the *Dialogus de musica*; Strunk, *Source Readings in Music History*, 115.

As the early modal system developed in tandem with antiphonal Gregorian psalmody in the ninth and tenth centuries, a set of reciting tones—also known as the tenor, *tuba*, or the note of *repercussa* (resounded note)[21]—was established, one for each of the eight modes.[22] Initially, authentic modes had their reciting notes set a fifth above the final, and plagal modes had their reciting notes set a third above that same final.[23] Sometime between 930 and 1000 C. E., however, the reciting notes placed on the notes equivalent to G and B were moved to A and C, respectively (Table 3).[24] As Daniel Saulnier explains, the intervals between the modal finals and the tenor or reciting pitch and the placement of half-steps and whole-steps between these intervals defined the eight early modes.[25] These modes were referred to by number (1–8) or the Byzantine names *Protus*, *Deuterus*, *Tritus*, and *Tetrardus* with authentic and plagal versions.

By the eleventh century, the modes defined by the interval between the final and tenor (reciting pitch) of the psalm-tone and the scalar pattern within that interval stabilized into a recognizable system for classifying the mode of plainchant melodies. Theorists such as Guido of Arezzo integrated the psalm-tone tenors into their explanations for how one should recognize the eight modes and thus established the notion of modal *repercussa* (repeated notes).[26] This practice cemented the relationship between the modal finals and the repeated reciting notes (*repercussa*) as one of the early modal system's defining characteristics.

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21 The word *repercussa* is an inflection of the Latin *repercussus*, the perfect passive particle inflection of *repercutiō*, "to resound." The note was also known as the *dominante* in sixteenth-century French sources; Meier, *The Modes of Classical Vocal Polyphony*, 40–41. See also Leeman L. Perkins, "Modal Strategies in Okeghem's Missa Cuiusvis Toni," in Christopher Hatch and David W. Bernstein (eds.), *Music Theory and the Exploration of the Past* (Chicago: University of Chicago Press, 1993), 63.

22 For theories on the evolution of this process based on early chant sources, see Daniel Saulnier, *Gregorian Chant: A Guide*, trans. Edward Schaefer (La Froidfontaine, France: Solesmes, 2010), especially 36–54. See also (in French) Daniel Saulnier, "Les Modes Du Plain-Chant: Nova et Vetera" (habilitation diss., Université François-Rabelais de Tours, 2015); Jean Claire, "L'evolution modale dans les répertoires liturgiques occidentales I," *Revue grégorienne* 40 (1962), 196–211; Jean Claire, "L'evolution modale dans les répertoires liturgiques occidentales II," *Revue grégorienne* 40 (1962), 229–45; Jean Claire, "La psalmodie responsoriale antique," *Revue grégorienne* 41 (1963), 8–29; Jean Claire, "L'évolution modale dans les récitatifs liturgiques," *Revue grégorienne* 41 (1963), 127–51.

23 For more on this process, see Willi Apel, *Gregorian Chant* (Bloomington, IN; London: Indiana University Press, 1958), 210–11.

24 Apel, *Gregorian Chant*, 210–22; see also "Reciting Notes" in Troelsgård et al., "Psalm." Saulnier, *Les Modes Du Plain-Chant*, 103, clarifies that "The phenomenon is omnipresent in the north of Europe beginning from the year 1000. The recitations on *si* [B] and *mi* [G] of the deuterus [*repercussio*-mode 3 and 4] can be seen to be replaced with *do* [C] and *fa* [A]." ("La phénomène est omnipresent dans le nord de l'Europe à partir de l'an 1000. Les recitations sur *si* et *mi* du deuterus se voient remplacées par *do* et *fa*.") Psalm tone 3's recitation on B can be seen in the *Commemoratio brevis* of the end of the ninth century, but later sources show the reciting tone on C; see "Intonations" in Troelsgård et al., "Psalm."

25 Saulnier, *Gregorian Chant: A Guide*, 49.

26 "Thus in plagal modes," Guido explains, "it is least permissible to rise either in beginning or endings of phrases to the fifth degree [above the final], although one may very rarely rise to the fourth [degree]. In authentic modes, however, except the deuterus, it is most unsuitable to rise in these beginnings and endings of phrases to the sixth degree. Yet those of the plagal of the protus and the plagal of the tritus go as high as the third, and those of the plagal of the deuterus and the plagal of the tetrardus go as high as the fourth. [...] The above-mentioned rules are observed very particularly in antiphons and responsories, whose chants should be based on the customary rules so that they will join well with

Table 3: Saulnier's[27] "Official Table of the Ochtoechos" with the *tenor* of mode 3 updated from "b" to "c" ca. 930–1000 C.E.

		Tenor of the Psalm		
		Plagal Modes		Authentic Modes
Mode Name	**Antiphon Final**	**3rd Above**	**4th Above**	**5th Above**
Protus	D	f (2nd mode)		a (1st mode)
Deuterus	E		a (4th mode)	b, later c (3rd mode)
Tritus	F	a (6th mode)		c (5th mode)
Tetrardus	G		c (8th mode)	d (7th mode)

In the early sixteenth century, authors listed the modal finals and the *repercussa* used in liturgical plainchant as "intervals of repercussion" for each of the eight modes, or what Bernhard Meier calls the *repercussio* interval (note that *repercussio* refers to an interval and *repercussa* a pitch).[28] In treatises, these repercussion intervals were written as a set of intervals in musical notation, as shown in Figure 1,[29] and/or in prose as a solfege mnemonic.[30] (In the musical notation, notes without a stem represent the modal final and stemmed notes indicate the reciting note or *repercussa* above that final.) Although the *repercussio* intervals are only depicted as two written notes, theorists were cognizant of the scalar patterns between and around these notes (i.e., the distribution of half and whole steps).

For simplicity, I refer to the modes defined by the *repercussio* interval, and thus the scalar patterns within that interval, as *repercussio*-modes.[31] These modes helped mediate the practice of Gregorian antiphonal psalmody, as discussed next.

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the psalms and verses"; Guido, "Guido of Arezzo's *Micrologus*," in Claude V. Palisca (ed.), *Hucbald, Guido, and John on Music: Three Medieval Treatises*, trans. Warren Babb (New Haven; London: Yale University Press, 1978), 68–69. Observe that Guido allows the authentic deuterus (mode 3) to rise to the sixth, which reflects the *repercussio* interval of E to C. Charles Atkinson suggests that the unknown author of the *Vivell Anonymous* recapitulates Guido and further clarifies that the *neumae*—"a diminutive vocalization designed to introduce (or to prepare) the singing of a chant in some one of the eight modes," Oliver Strunk, "Intonations and Signatures of the Byzantine Modes," *The Musical Quarterly* XXXI/3 (1945), 339–55, https://doi.org/10.1093/mq/XXXI.3.339, or "paradigms used in the teaching and studying of psalm-intonations," Eric Werner, "The Psalmodic Formula *NEANNOE* and Its Origin," *The Musical Quarterly* XXVIII/1 (1942), 95, https://doi.org/10.1093/mq/XXVIII.1.93—and the tenor or reciting tone of the psalm tone "work in conjunction with each other in defining the starting pitches and distinctions of chants in each mode"; Atkinson, *The Critical Nexus*, 225–26.

27 Saulnier, *Gregorian Chant: A Guide*, 48.

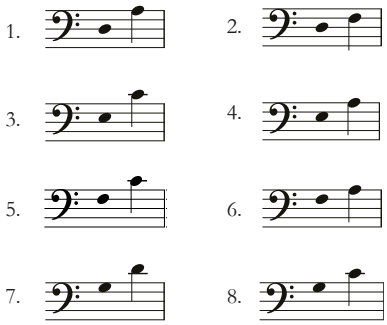
28 Meier, *The Modes of Classical Vocal Polyphony*, 39–41.

29 This figure largely corresponds to Saulnier's "Official table of the Ochtoechos," but with *repercussio*-mode 3's reciting tone placed on C instead of B to reflect the common practice after 1000 C.E.; see Saulnier, *Gregorian Chant: A Guide*, 48.

30 E.g., the mnemonic "Pri(mus) re-la, Se(curidus) re-fa, Ter(tius) mi-fa (per sextam), Quart(us) mi-la, Quint(us) fa-fa (per quintam), Sext(us) fa-la, Sept(imus) ut-sol, Oct(avus) ut-fa"; Meier, *The Modes of Classical Vocal Polyphony*, 40.

31 Bernhard Meier refers to this modal system as the "western ecclesiastical modal system," Meier, *The Modes of Classical Vocal Polyphony*, 36–43, and Harold Powers refers to it as "Guidonian"; Harold S. Powers, "Is Mode Real? Pietro Aron, the Octenary System, and Polyphony," *Basler Jahrbuch Für Historische Musikpraxis*, 1992, 17. I adopt new terminology

Figure 1: *Repercussio*-modes ca. 1000 (Stemless notes represent the modal final and stemmed notes the pitch of the reciting note of psalm tones, canticle tones, introits, etc.)



1.2. Psalm-tone formulas and principal *differentiae*

Following this cursory overview of the *repercussio*-modes, I now briefly summarize the structure of the eight psalm-tone formulas (Figure 2) as they relate to Gregorian *antiphonal psalmody*. For reasons that will become evident later in this article, it is crucial to understand the principles of antiphonal psalmody to follow the developing interface between psalmody and mode in Glarean's circle. In brief, the psalm tones developed in tandem with the *repercussio*-mode system outlined above.[32]

A psalm tone is a melodic formula used for chanting the psalms and canticles of the Christian church. The principal feature of a psalm tone is its *tenor* or reciting tone, which, as Matthew Nace describes, is "repeated as necessary to accommodate the varying lengths of the psalms so that the many hundreds of psalm verses do not require a similar number of independent melodies."[33] Figure 3 presents three of Glarean's fifth psalm-tone melodies: the minor (*Dixit Dominus* psalm) and major (the *Magnificat* and *Benedictus* canticles) formulas with their principal *differentia*,[34] plus the Introit (the clef shows the position of

to avoid confusion with the subtle differences between these terms and to reference sixteenth-century terminology more directly.

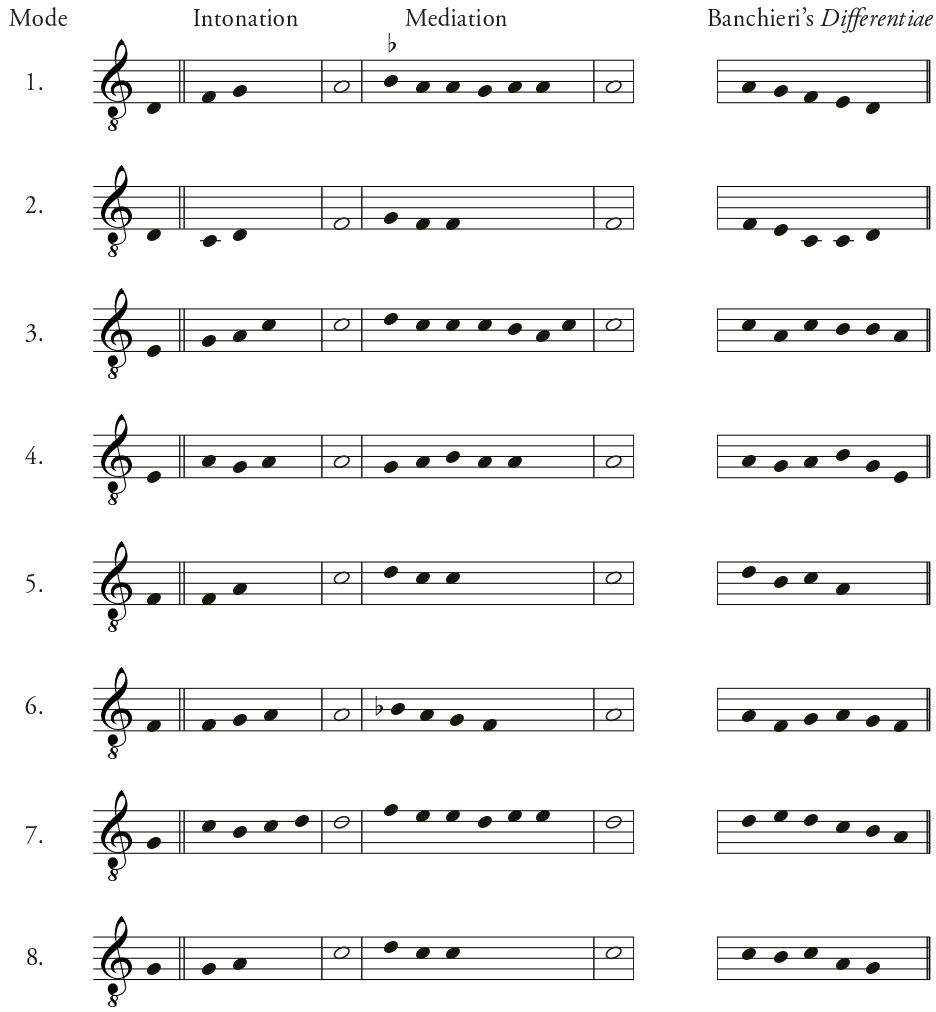
32 While much of the Frankish liturgical repertory may have been in place when the octonary modal system was adopted (see Powers, "Is Mode Real?," 17), this does not imply that the psalm tones were designed independently of the modes. On the contrary, the eight Gregorian psalm tones were developed alongside the modal system to facilitate antiphonal psalmody. We know, for example, that Ambrosian psalmody does not have a systematic set of reciting notes for each mode because the Ambrosian church did not adopt the *oktōēchos* system (see footnote 18). Thus, although Powers (in "From Psalmody to Tonality") argues for a psalmody-focused path to Mattheson's major and minor keys, we must invoke the role of mode *ipso facto*. See "The Connection Between Psalm Tone and Mode" in Troelsgård et al., "Psalm."

33 Nace, "The Alia musica and the Carolingian Conception of Mode," 211.

34 Glarean's use of the words "major" and "minor" for the psalm intonations does not relate to major or minor triads or keys but rather the type of melodic formula. The major psalm-tone formulas (exemplified by the *Magnificat* and *Benedictus* canticles) include the initial intonation gesture for every verse, whereas the minor formulas do not (i.e.,

C4). Compare them to the schematic fifth psalm-tone formula shown in Figure 2. Each of Glarean's fifth psalmody formulas clearly expresses the repeating reciting tone, C4.

Figure 2: The Eight Psalm-tone Formulas (The first note is the antiphon final; hollow note-heads represent the psalm-tone reciting notes or *repercussa*.)[35]

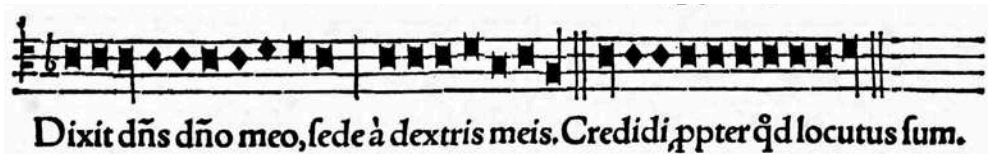


they begin directly on the reciting tone after the first verse). Glarean's *differentiae* for the minor and major psalm-tone formulas also differ slightly.

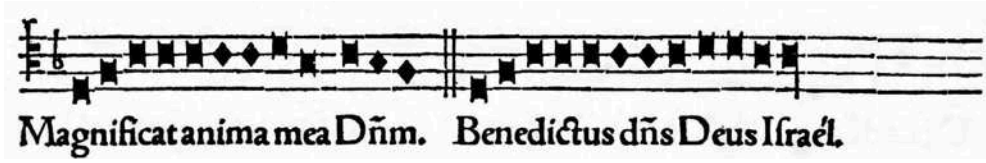
35 These psalm tones follow Adriano Banchieri's psalm tones listed in his *Cartella musicale* of 1614, page 71, which, except for the sixth, match earlier versions such as those found in the *Commemoratio brevis* (ninth-century tonary) and the Vatican versions listed in Troelsgård et al., "Psalm."

Figure 3: Glarean's Fifth Plainchant Formulas

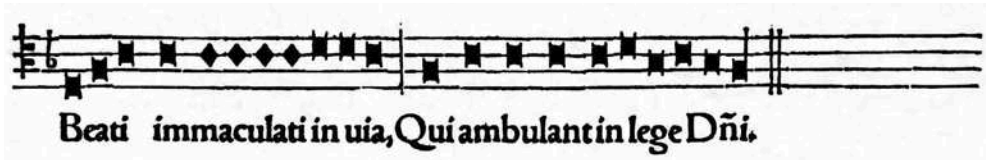
A. Minor Psalm-Tone Formulas



B. Major Psalm-Tone Formulas



C. Introit



In Gregorian antiphonal psalmody, a psalm tone is preceded by and followed by an *antiphon* (i.e., antiphon, psalm tone, antiphon). An antiphon is another short chant, which allows the same psalm texts to be used for different occasions such as seasons, feasts, or rites.[36] The process of connecting antiphons to psalm tones is mediated by the octonary modal system; for example, a mode 5 antiphon is followed by psalm tone 5, which then leads to the same antiphon in mode 5.[37] This mediation is necessary because the eight psalm tones are (mostly) fixed musical formulas that developed symbiotically with the early *repercussio*-mode system when the Gregorian church adopted the *oktōēchos*,[38] but there are many different antiphons that can frame them.

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36 For a more thorough explanation of this system, see Nace, "The Alia musica and the Carolingian Conception of Mode," 211–16.

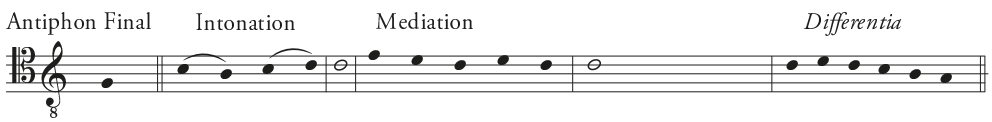
37 For an introduction to antiphonal psalmody, see Apel, *Gregorian Chant*, 185–98; Joseph Dyer, "The Singing of Psalms in the Early-Medieval Office," in Thomas Forrest Kelly (ed.), *Chant and Its Origins* (London: Routledge, 2017, https://doi.org/10.4324/9781315095868). For a twentieth-century overview on singing the psalms and canticles in the Mattins and Evensong in English, see G. H. Palmer, *The Psalms & Canticles at Mattins & Evensong Pointed to the Eight Gregorian Tones from the Sarum Tonale*, New Edition (St. Mary's Convent: Wantage, 1916), i–xxiv.

38 The formulas are not completely "fixed" in practice because the number of times that the reciting note is repeated can vary depending on the psalm text. Tenors can additionally decorate the reciting tone with inflections as neces-

There are two different melodic connections to be made between the antiphon and the psalm tone: (1) from the end of the antiphon, which ends on the modal final, to the psalm-tone reciting note above that final; and (2) from the end of the psalm-tone reciting note to the beginning of the antiphon, which can start on a note other than the specific modal final. Singers smoothed both connections by two means. First, they added an initial intonation (inflection, *initium*) to lead from the end of the antiphon to the psalm-tone reciting note (for the first verse).[39] Second, singers appended an ending formula, called a *differentia* (*EUOUAE* or termination)[40] to transition from the psalm-tone reciting note to the beginning of the antiphon (e.g., see psalm tone 7 in Figure 4).[41] In addition to adding the beginning and ending gestures to the psalm-tone melody for antiphonal psalmody, singers added a neighboring decoration around the reciting note called a "mediation" to mark the end of the first half of the psalm verse before returning to the reciting note to chant or sing the second half of the psalm verse.

To summarize, the essence of a psalm tone is its repeated reciting note. The additional melodic parts of the psalm-tone formulas create melodic links between the psalm tone and the framing antiphon (via the initial intonation and ending *differentia*) or help melodically partition the psalm-tone formula into two halves for the two verses of the psalm text (via the mediation).

Figure 4: Mode 7 Antiphon Final and Psalm Tone 7 with Principal *Differentia* (from Banchieri, *Cartella musicale* of 1614). Hollow notes indicate repeated reciting notes.



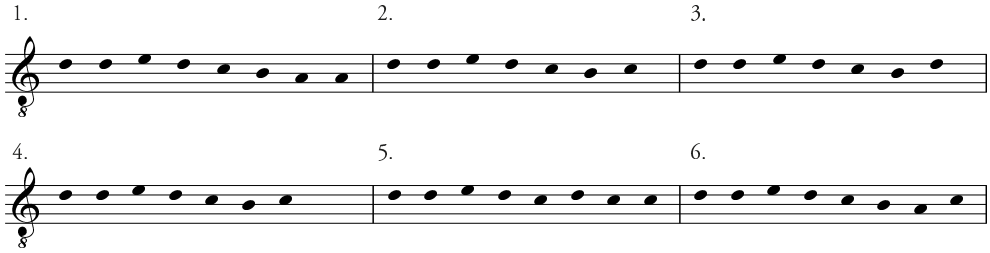
sary. Moreover, the initial intonation gesture is sung for the first verse, but not for all subsequent verses, unless the psalm-tone melody expresses a canticle (e.g., the *Magnificat* or *Benedictus*); see footnote 34.

39 For more on the initial intonation, see Francis Burgess, "Some Notes on the Structure of the Gregorian Tones," *The Musical Times* 57/883 (1916), 408, https://doi.org/10.2307/909034.

40 *EUOUAE* are the vowels in the words *seculorum amen* marking the end of the Doxology or *Gloria Patri* sung at the end of the psalm before the return of the antiphon.

41 Peter Wagner, *Einführung in die gregorianischen Melodien; Ein Handbuch der Choralwissenschaft* (Hildesheim: G. Olms, 1970), 129–30, https://hdl.handle.net/2027/uva.x001374125, calls this linking process the "rule of accommodation" (*Anpassungsgesetz*); that is, as Atkinson, *The Critical Nexus*, 92, summarizes, "when two melodies stand in succession, the first must be accommodated to the second via appropriate treatment of its ending."

Figure 5: Psalm Tone *7 Differentiae* (from the thirteenth-century English antiphoner, GB-WO F.160; PalMus, 1st ser., xii, 1922/R)



Each psalm tone has only one initial intonation gesture because the modal final of the preceding antiphon is fixed: that is, with few exceptions, antiphons end on their modal finals.[42] By contrast, the ending *differentia* is variable because the antiphon that follows the psalm tone can begin with notes other than the final and use different melodic gestures.[43] For example, Figure 5 shows six *differentiae* from a thirteenth-century English antiphoner that can be appended to the end of psalm tone 7 (Figure 4). A cantor would select one *differentia* from the six to smooth the connection from the end of psalm tone 7 to a chosen antiphon based on the antiphon's opening melodic gesture.[44]

The psalm-tone *differentiae* appear to be one source of modal confusion in the sixteenth century that caused tension between mode and psalmody in the seventeenth century. Although the psalm tones were modally designed when the church adopted the *oktōēchos* in the ninth century, the *differentiae* appear to have survived from an earlier practice before the introduction and acceptance of the eight-mode system.[45]

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42 This narrative is slightly more complicated because ninth-century theorists do not uniformly define an antiphon's mode by its ending. On the complexity of the earlier ninth-century system, see Nace, "The Alia musica and the Carolingian Conception of Mode," 212–16.

43 Willi Apel argues that the ends of antiphons on their modal final and initial psalm-tone intonations correspond well. The connection between the end of the psalm tone and the beginning of the antiphon is more complex, however, because it depends on two groups of notes, the psalm-tone *differentia* and the initial passage of the antiphon, not merely the first note of the antiphon; Apel, *Gregorian Chant*, 217–25. For a description of the *differentiae* written by Aurelian of Réôme in his *Musica disciplina* in the ninth century, see Atkinson, *The Critical Nexus*, 98–101.

44 The *differentiae* may also have served as a mnemonic device for remembering antiphons; see Apel, *Gregorian Chant*, 221–25; Rebecca Shaw, "*Differentiae* in the *Cantus Manuscript Database*: Standardization and Musicological Application," in *Proceedings of the 5th International Conference on Digital Libraries for Musicology–DLfM 2018* (5th International Conference, Paris: ACM Press, 2018), 38–46, https://doi.org/10.1145/3273024.3273028. For a study of the correspondence between mode *7 differentiae* and incipits, see Apel, *Gregorian Chant*, 223–25.

45 See "Terminations" in Troelsgård et al., "Psalm"; see also Falconer, "The Modes before the Modes." For a recent discussion of *differentiae* before the adoption of the *oktōēchos*, see Nace, "The Alia musica and the Carolingian Conception of Mode," 214–16.

Glarean viewed *differentiae* to be unsystematic. In a humorous analogy, he explains in his *Isagoge* of 1516 that "There are as many *differentiae* as there are temperamental singers, and whoever desires to write precepts to please them may as well set out to harness foxes and milk he-goats."[46] He further expands upon the issues with *differentiae* and modes in his *Dodecachordon* (emphasis added):

> In fact, a much more troublesome problem is that concerning the *differentiae* of modes, a thing which is superfluous indeed in my judgment. I believe that this has originated either because there was no agreement among the learned and the first writers on this matter concerning the chief formulas, and as a consequence they used *differentiae* for [psalm-tone] formulas, and contrariwise, [psalm-tone] formulas for *differentiae*, or, what is more likely, because of the immoderate exactness of certain men, who, while mediating on the easiness of intoning antiphons [...] have made the matter very much more obscure. It would be tedious to explain in detail how *differentiae* were devised and which *differentia* is most suited to each of the antiphons, a concern of curious, not to say idle, men.[47]

In this statement, Glarean suggests that writers treated the *differentiae* not as melodic linking devices added to the end of psalm-tone formulas to connect to antiphons, but as part of the psalm-tone formulas themselves (i.e., by using "*differentia* for formulas" or "formulas for *differentia*"). This treatment of the *differentia* could introduce a modal problem: if the *differentia* ended with a note that differed from the normally assigned modal final, and if a composer used the psalm tone and an attached *differentia* as a *cantus firmus* for a polyphonic piece without a framing antiphon, then the final note of the psalm-tone *differentia* would cause the piece to end on a different final than its corresponding mode. In addition, further modal discrepancies could result if the psalm-tone *differentia* emphasized different interval patterns (i.e., the distribution of whole and half steps) than the mode it was associated with. In short, it seems that *differentiae* were one of the central elements that complicated the relationship between modal theory and the psalm tones in the sixteenth and seventeenth centuries. We shall return to this issue throughout this article.

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46 Henry Glarean and Frances Berry Turrell, "The 'Isagoge in Musicen' of Henry Glarean," *Journal of Music Theory* 3/1 (1959), 138, https://doi.org/10.2307/843003. Glarean's comments are corroborated by modern scholarship; see Christian Troelsgård et al., "Psalm II. Latin Monophonic Psalmody," in *Grove Music Online* (Oxford Music Online, 2001).

47 Glarean, *Dodecachordon Volume 1*, 1:79.

1.3. Species-modes

Building on this overview of the early *repercussio*-mode system and its relationship to Gregorian antiphonal psalmody, we now turn to another modal system: species-defined modes. At the end of the ninth century, theorists began to further reconcile the ancient Greek harmonic principles with the Byzantine-influenced *repercussio*-modes. Gradually, they started to use species of fifths and fourths (the arrangement of whole steps and half steps within the melodic interval of a fifth or a fourth) to analyze and categorize chant.[48] This practice eventually enticed theorists in the eleventh century to replace or more commonly couple the *repercussio*-mode system with a second modal system based on combinations of species of fifths and fourths.[49]

In this new species-defined modal system, the modal finals persisted on the notes D, E, F, and G, but in place of the *repercussio* interval, authentic modes were defined as having a species of fifth above the modal final and a species of fourth above that fifth; plagal modes were defined as having the same species of fifth above the modal final and the same species of fourth below that final. This configuration results in eight total modes, as shown in Figure 6 (modes 1–8).[50] In the figure, modal finals are placed before the staves as letter names and indicated on the staff with parentheses; species of fifth are indicated with a bracket underneath the staff; and species of fourth are labeled with a bracket above.

In his *Dodecachordon* of 1547, Glarean added the authentic and plagal Aeolian and Ionian modes (shown at the bottom of Figure 6, modes 9–12). There are thus two sets of species-defined modes: the original octonary (8-mode) set developed in the eleventh century, and Glarean's dodecachordal (12-mode) set from the mid-sixteenth century. I generally refer to species-defined modes by the Greek names that Glarean ascribes to them and ref-

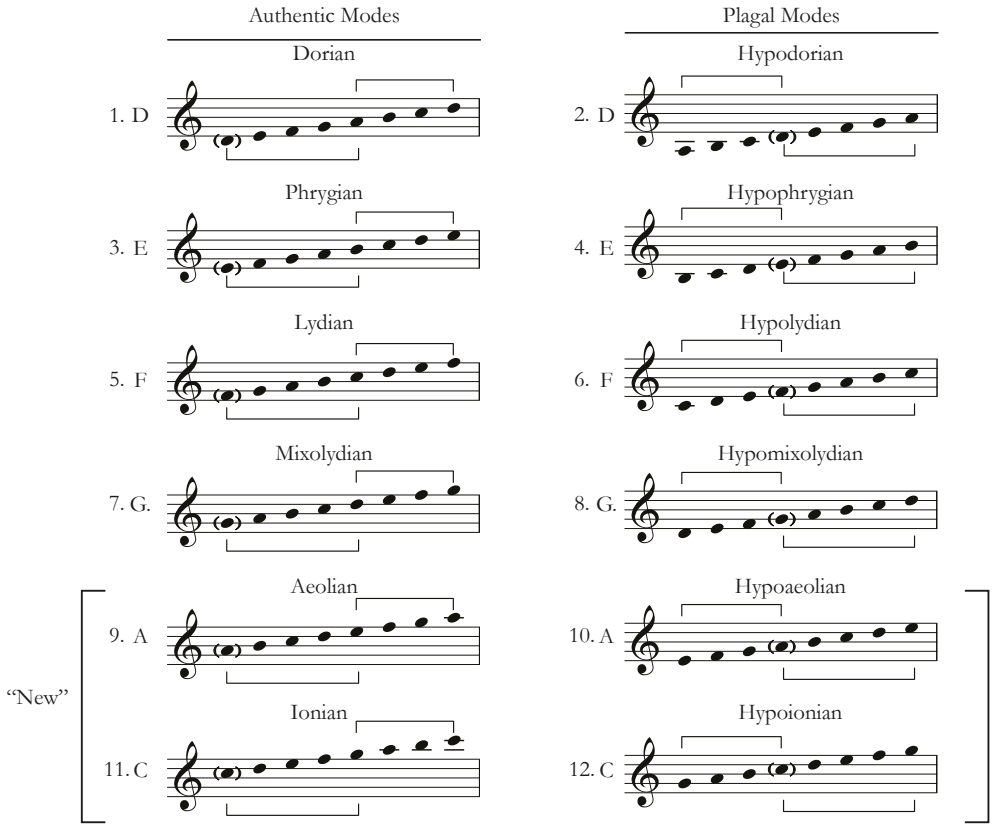
48 The earliest analysis of chant in terms of species of fifths and fourths can be found in the late ninth century *Alia musica*; see Atkinson, *The Critical Nexus*, 196–201. For more on *Alia musica* and Carolingian ideas of mode, see Nace, "The Alia musica and the Carolingian Conception of Mode."

49 The earliest manifestation of modal species theory (using species of fourth and fifth) has been attributed to the ninth- or tenth-century treatise *Cita et vera divisio monochordi* (GS I, 312–314), which has been credited by Martin Gerbert to a certain "Bernelinus"; see Jane Warburton, "Questions of Attribution and Chronology in Three Medieval Texts on Species Theory," *Music Theory Spectrum* 22/2 (2000), 225, https://doi.org/10.2307/745961, and Atkinson, *The Critical Nexus*, 202–33. For another account of the Southern German school's species-based developments in three stages, see Cohen, "Notes, Scales, and Modes in the Earlier Middle Ages," 351–54. For more on the development of species-based theory in the Middle Ages, see Calvin M. Bower, "The Transmission of Ancient Music Theory into the Middle Ages," 147–164 in Thomas Christensen (ed.), *The Cambridge History of Western Music Theory*, https://doi.org/10.1017/CHOL9780521623711.007.

50 These modes correspond with Psuedo-Berno's modification of Berno of Reichenau's modes in his *Prologus in tonarium* from the first half of the eleventh century. On the modification of Berno of Reichenau's modes by a certain "Pseudo-Berno," see Atkinson, *The Critical Nexus*, 204–11. It is likely that Glarean consulted these specific modes, as he writes that the monastery situated between Freiburg im Breisgau, Rottweil, and Villingen had a codex that contained the treatises of "Divus Severinus, [...] Guido d'Arezzo, Berno, Wilhelm, Otto, Bishop Theogerus, and John, later Pope John XXII"; Glarean, *Dodecachordon Volume 1*, 1:40.

erence his modal number in parenthesis to simplify the prose: e.g., Lydian (5) corresponds to his species-mode 5.

Figure 6: Eight Species-modes (c. 1050) with Glarean's (1547) New Species-modes (Lower brackets outline species of fifth, upper brackets outline species of fourth, and notes in parenthesis indicate modal finals.)

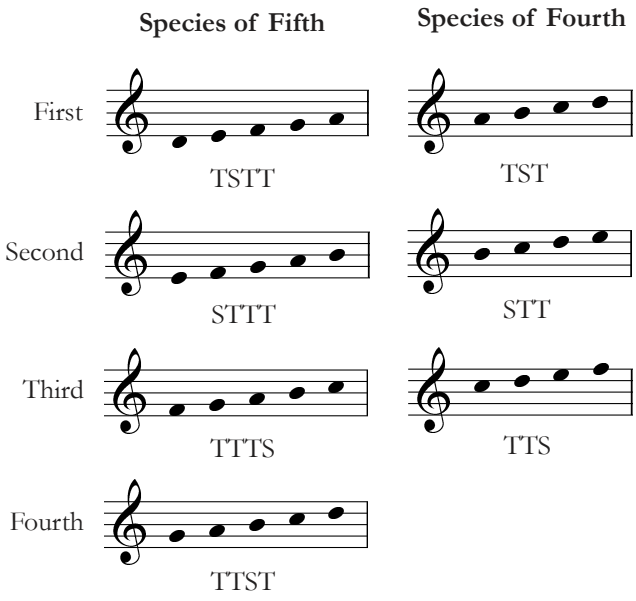


To distinguish species-defined modes from *repercussio*-based ones, I will call modes defined by species of fifth and fourth "species-modes."[51] These modes are defined by the combinations of four unique species of fifth (where T = whole tone and S = semitone: TSTT, STTT, TTTS, TTST) and three species of fourth (TST, STT, TTS; see Figure 7). The authentic Dorian (1) mode, for example, is composed of a first-species fifth (i.e., D to A, TSTT), and a first-species fourth (i.e., A to D, TST). The plagal Hypodorian (2) mode has the same first species of fifth (i.e., D up to A), but a first species of fourth below the modal

51 Meier, *The Modes of Classical Vocal Polyphony*, 43–46, refers to these modes as the "pseudo classical modes." Note that I use the term "species-modes" to refer solely to modes defined by species of fifth and fourth, not species of octave.

final (D down to A), and so forth. We will discover how Glarean reassociates some altered Gregorian psalmody formulas with a new eight-mode subset of the twelve species-modes in section three of this article.

Figure 7: Species of Fifth and Fourth



2. THE DEVELOPING INTERFACE BETWEEN PSALMODY AND MODE IN THE TREATISES OF NICOLAUS WOLLICK AND JOHANNES COCHLAEUS

Now that we have elaborated a background on psalmody, *repercussio*-modes, and species-modes, we can begin to trace how the interface between psalmody and these two modal systems changes in the early sixteenth century. For clarity, we will start with the developing relationship between *repercussio*- and species-modes 5 and 6 with their associated fifth and sixth Gregorian plainchant formulas in the treatises written by Glarean's immediate predecessors, Nicolaus Wollick and Johannes Cochlaeus.[52] In essence,

52 For more on the relationship of these theorists to each other and to the University of Cologne, see Karl G. Fellerer, "*Die Kölner musiktheoretische Schule des 16. Jahrhunderts*," in Josef Robijns (ed.), *Renaissance-Muziek 1400-1600 Donum Natalicium René Bernard Lenaerts* (Leuven: Katholieke Universiteit Seminarie voor Muziekwetenschap, 1969). Fellerer writes that "Schanppecher and Wollick had a strong influence on the Cologne music theorists. Schanppecher had a direct relationship with Cochlaeus, Bogentantz, and Glarean, all who belonged to the same program." ("Schanppecher und Wollick haben auf die Kölner Musiktheoretiker stark eingewirkt. Vorallem scheinen direkte Beziehungen Schan-

our story will focus on whether changing B to B♭ alters the modal assignment.[53] Wollick and Cochlaeus cite liturgical plainchant formulas with B♭, but reconcile the modal ramifications of this accidental in different ways. Wollick modifies the fifth and sixth *repercussio*-modes by adding a B♭, likely to account for the B♭ in plainchant formulas, whereas Cochlaeus alters the fifth and sixth species-modes by adding a B♭. Neither author codifies the theoretical ramifications of these changes, however; this task would fall on Glarean, as discussed in the next section. Before we examine Glarean's innovations, however, let us turn to his earlier University of Cologne predecessor, Nicolaus Wollick.

2.1. Nicolas Wollick's *Opus aureum musicae* (1505)

After enrolling at the University of Cologne in 1498 and graduating with a Master of Arts in 1501, Nicolas Wollick (ca. 1480–1541) published his first musical treatise, *Opus aureum musicae* (1501) in Cologne (henceforth, *Opus aureum*).[54] In this treatise, Wollick presents the species-mode system and the *repercussio*-modes on the same page (Figure 8; Figure 9 transcribes Wollick's *repercussio*-modes). The separate and different diagrams may suggest that Wollick viewed the species-modes (shown in a table) as an abstract theoretical construct,

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ppechers zu Cochläus, Bogentantz, und Glarean bestanden zu haben, die alle der gleichen Montanerburse angehörten.") Ibid., 123–24.

53 Although this study focuses on how sixteenth-century theorists dealt with this problem, theorists began to discuss this issue almost immediately after the adoption of the eight modes in the ninth century. Early theorists refer to B♭ with Greek terminology. In the Greek Greater Perfect System (GPS) and the Lesser Perfect System (LPS), "synemmenon" refers to the tetrachord that contains B♭ and "diazeugmenon" to the tetrachord that contains B♮. For more on the Greek GPS and LPS, see Andrew Barker, "Introduction," in Andrew Barker (ed.), *Greek Musical Writings* (Cambridge: Cambridge University Press, 1989), 11–13. The ninth-century theorist Hucbald notes, for example, that "While examples of the tetrachord of the synemmenon are often encountered in all the modes, or tones, they can be seen especially in the authentic and plagal tritus [Lydian modes] so ubiquitously that in these scarcely any melody is found without a mixture of the tetrachords of the synemmenon and the diazeugmenon"; Hucbald, "Hucbald," 31. In the twelfth century, Guido of Arezzo similarly describes how the mode can change ("transform") with the addition of a B♭, which sometimes caused "confusion"; Guido, "Guido of Arezzo's *Micrologus*," 64. In the fourteenth century, Marchetto explains why one should use B♭s in mode 5 and 6 monophonic chants to avoid tritones; Marchetto of Padua and Jan W. Herlinger, *The Lucidarium of Marchetto of Padua* (Chicago: University of Chicago Press, 1985), 455. In the fifteenth century, Tinctoris describes why flats are employed in polyphonic music to avoid harmonic tritones; Johannes Tinctoris, *Concerning the Nature and Propriety of Tones (De natura et proprietate tonorum*, 1476), trans. Albert Seay, 2nd ed., vol. 2, no. 2 of Colorado College Music Press Translations (Colorado Springs: Colorado College Music Press, 1976), 10–11.

54 Wollick published the *Opus aureum musicae* in several editions (1501, 1504, 1505, 1508, and 1509). I cite exclusively from the 1505 edition of his *Opus aureum*; Nicolaus Wollick and Melchior Schanppecher, *Opus aureum: Musicae castigatissimu[m] de Gregoriana et figuratiu atq[ue] contrapu[n]cto simplici percom[m]ode tractans om[n]ib[us] cantu oblectanctibus vtile et necessarium e diuersis excerptum* (Cologne: Heinrich Quentel [Erben], 1505), https://www.loc.gov/item/48031724. For more information on Wollick's treatises and his tenure at the University of Cologne, see Fellerer, "*Die Kölner Musiktheoretische Schule Des 16. Jahrhunderts*," 121–24. Parts three and four of the *Opus aureum musicae* were written by Wollick's teacher, Melchoir Schanppecher; Klaus Wolfgang Niemöller, "Wollick [Wolquier, Volcyr], Nicolaus," in *Grove Music Online* (Oxford University Press, 2001), https://doi.org/10.1093/gmo/9781561592630.article.30521. This article exclusively discusses Wollick's contributions to the treatise.

and the *repercussio*-modes (shown in musical notation) as more of a practical tool for mediating Gregorian antiphonal psalmody.

Figure 8: Nicolaus Wollick's Species-modes and *Repercussio*-modes in his *Opus aureum* (1505)

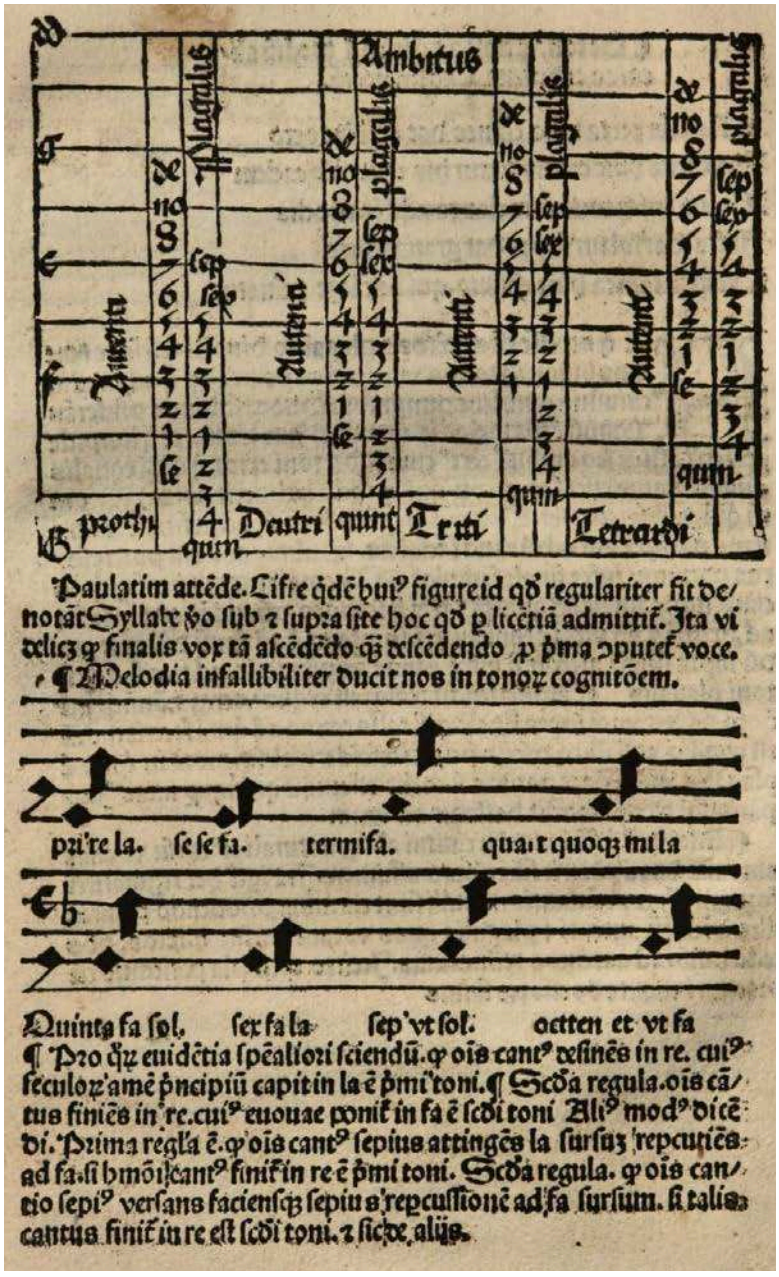
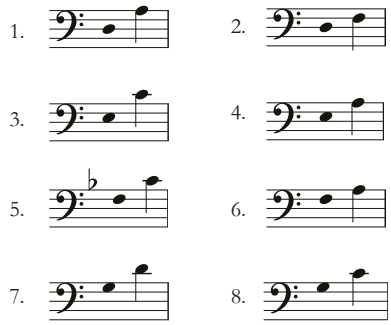


Figure 9: Transcription of Nicolaus Wollick's *Repercussio*-mode Intervals from his *Opus aureum* (1505)



In the pages that follow, Wollick writes example *melodia*[55] for each of the eight modes and then lists the Gregorian plainchant formulas for each mode. As he does not refer to the species-modes in these sections, it is evident that he associates the Gregorian plainchant formulas with the *repercussio*-modes. Observe, for instance, that Wollick adds a signature B♭ to the repercussion interval of *repercussio*-mode 5 (Figure 9) and to all the accompanying fifth psalmody formulas (the principal *differentia* and the major psalm-tone formulas, i.e., the *Magnificat* and *Benedictus* canticles, are shown in Figure 10), but he does not add a B♭ to the fifth species-mode in the species-mode diagram (Figure 8). He similarly alters the *repercussio*-mode 6 formulas with an accidental B♭ (the principal *differentia* and major psalm-tone formulas are shown in Figure 11), but does not also alter species-mode 6 with a B♭ to account for this change. Evidently, neither a signature flat nor an accidental flat changed the species-mode for Wollick. The interval patterns expressed by Wollick's two modal systems are thus inconsistent, and the interaction between the species-mode system and psalmody formulas is not evident.

55 The *melodia* are melodies that demonstrate the intervallic characteristics of a mode. For an explanation of the *melodia* by Johannes Cochlaeus, see Johannes Cochlaeus and Clement A. Miller, *Tetrachordum musices: Introduction, Translation, and Transcription* (Dallas: American Institute of Musicology, 1970), 50–51.

Figure 10: Wollick, *Opus aureum*, Fifth Principal *Differentia* and Major Psalm-Tone Formulas

A. *Differentia*

B. Major Psalm-Tone Formulas (*Magnificat* and *Benedictus* Canticles)

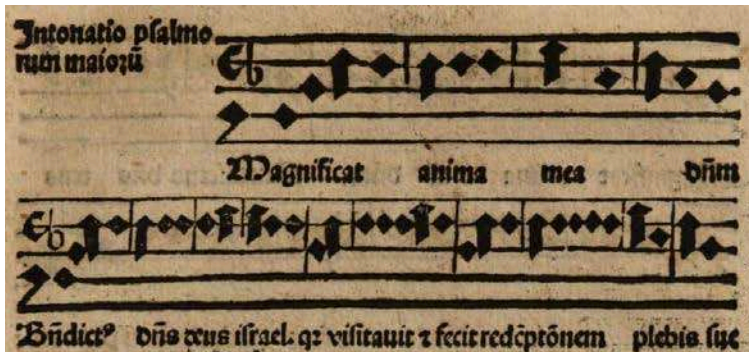
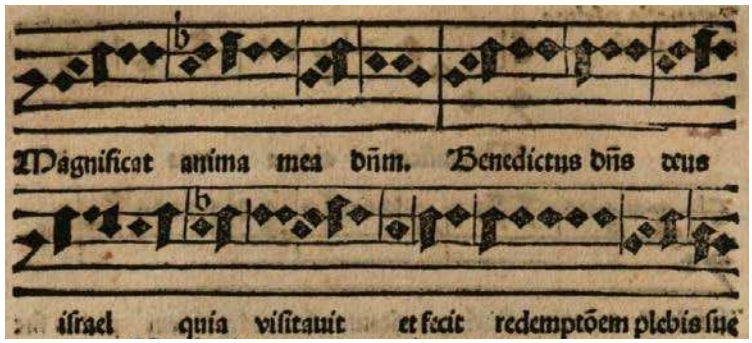


Figure 11: Wollick, *Opus aureum*, Sixth Principal *Differentia* and Major Psalm-Tone Formulas

A. Principal *Differentia*

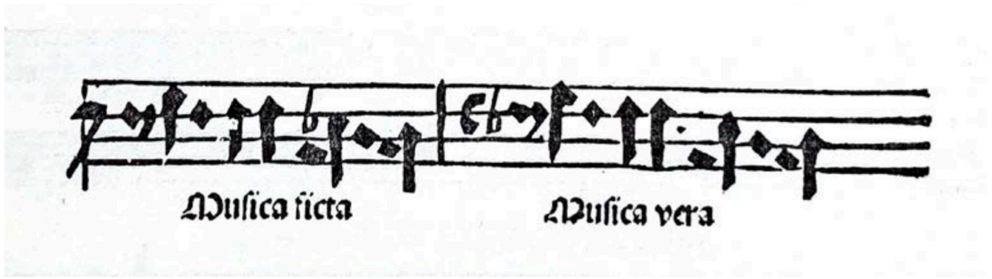
B. Major Psalm-Tone Formulas (*Magnificat* and *Benedictus* Canticles)



2.2. Johannes Cochlaeus's *Tetrachordum musices* (1511)

The inconsistencies expressed in Wollick's *Opus aureum* between the *repercussio*- and species-modes set the stage for several advancements that would be made by his immediate successor, Johannes Cochlaeus (1479–1552).[56] In his *Tetrachordum musices* (1511),[57] written six years after Wollick's first treatise, Cochlaeus changes the interface between psalmody and the species-modes in four ways. First, Cochlaeus includes a chapter on "*Musica Ficta* or False Tones" (*De vocibus fictis seu musica ficta*) that clarifies how "the same song transposed a fifth produces *musica ficta*" (Figure 12). This chapter illuminates the role of B♭ in transposition: when a melody is transposed by a fifth, it should have a flat added.[58] But some inconsistencies remain: although Cochlaeus's new chapter demonstrates his improved understanding of transposition, this advancement does not extend further into his species-based modal theory; once again, this development would be left to his student Glarean.

Figure 12: Cochlaeus, *Tetrachordum musices*, *Musica Ficta*[59]



Cochleaus's second alteration to Wollick's presentation is more significant: he discards the abstract tabular depiction of the species-modes and the *repercussio*-mode intervals found in Wollick's treatise (refer to the top of Figure 8) and writes a set of ascending (for authen-

56 After studying in Nuremberg, Cochlaeus, then 25 years old, enrolled at the University of Cologne in 1504. Shortly thereafter, in 1506, Cochlaeus began teaching Glarean. Cochlaeus graduated with a baccalaureate and Master of Arts in 1507 with the publication of his first treatise, *Musica: Decastichon. D. Jo. Wendelstein in musicam exhortantorium* (Cologne, Germany, 1507), henceforth, *Musica*. This treatise was based largely on Wollick's *Opus aureum*. Three years later, Cochlaeus returned to Nuremburg, where he was appointed rector of the St. Lorenz school; there, he enlarged and revised a version of his prior *Musica* intended for his students. This revised work was later published as a new treatise, *Tetrachordum musices* (Nuremberg: Stuchs, 1511). For further information on the influence of *Opus aureum* on Cochlaeus's work, see Cochlaeus and Miller, *Tetrachordum musices: Introduction, Translation, and Transcription*, 3–6.

57 In this study, I cite exclusively from the translated version, Cochlaeus and Miller, *Tetrachordum musices: Introduction, Translation, and Transcription*.

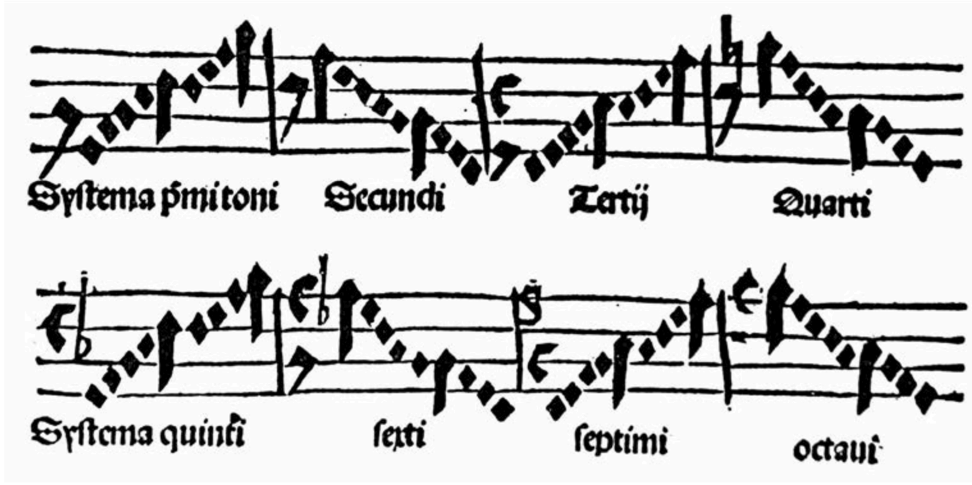
58 Cochlaeus and Miller, *Tetrachordum musices*, 46.

59 Ibid., 46.

tic) and descending (for plagal) octaves in musical notation in their place (Figure 13). In addition, he partitions the octaves into species of fifth and fourth with stemmed notes.[60]

Whereas Wollick presented the species-modes in an abstract table, Cochlaeus writes them in musical notation. And, whereas Wollick added flats to the *repercussio* intervals (Figure 9), Cochlaeus instead adds a signature flat to the fifth and sixth scale patterns (Figure 13, second system, first and second scales). Cochlaeus further emphasizes in his text that, "in the fifth and sixth Tones [modes] *fa* is always sung on the *b* key, while all the other tones [modes] require *mi* on that key."[61] In other words, he declares that the fifth and sixth species-modes now have B♭s. Cochlaeus thus replaces Wollick's altered *repercussio*-modes with altered species-modes.

Figure 13: Cochlaeus, *Tetrachordum musices*, Modal Octaves[62]



Apparently, Cochlaeus no longer considers the addition of signature flats as exceptions or temporary adjustments to the fifth and sixth species-modes, even though the signature flats cause these modes to have fourth species of fifths (TTST) instead of third species of fifths (TTTS). Moreover, he does not explain that his altered fifth and sixth species-modes are transposed modes of a different kind, despite his previous chapter on the distinction

60 The written-out species-octaves are new in Cochlaeus's *Tetrachordum*; they cannot be found in his prior *Musica*. Cochlaeus also lists the repercussion intervals two chapters later in "The Melodia of Tones" as a mnemonic verse, "first, *re la*; second, *re fa*; third, *mi fa*; fourth, *mi la*; fifth, *fa sol*; sixth, *fa la*; seventh, *ut sol*; eighth, *ut fa*"; Cochlaeus and Miller, *Tetrachordum musices*, 50.

61 "Nam quintus et sextus semper canunt fa in b claue. Omnes alii in eadem claue mi deposeunt"; Cochlaeus and Miller, *Tetrachordum musices*, 51.

62 Cochlaeus and Miller, *Tetrachordum musices*, 48.

between *musica ficta* and *musica vera* in transposition. Cochlaeus's changes therefore seem to have been borne of practicality: the octaves altered with signature flats realign the interval patterns of the fifth and sixth species-modes with the similarly altered fifth and sixth psalmody formulas. This change improves the interface between species-modes and the altered psalmody formulas but creates inconsistencies in the definitions of the species-modes.

Cochlaeus's third major change involves how he couples the Gregorian psalmody formulas to each species-mode. Instead of listing each of the formulas separately for each mode as Wollick had done, Cochlaeus lists the formulas together in groups of eight (just as he did in his prior *Musica* treatise). This grouping further clarifies that the altered formulas should be associated with the now written-out, altered species-modes.[63] Note how the flats added to the fifth (Figure 14) and sixth (Figure 15) major psalm-tone formulas (i.e., the *Magnificat* and *Benedictus* canticles) correspond with the flats added to the fifth and sixth species-modes (Figure 13).

Figure 14: Cochlaeus, *Tetrachordum musices*, Fifth Major Psalm-Tone Formulas (*Magnificat* and *Benedictus* Canticles)[64]

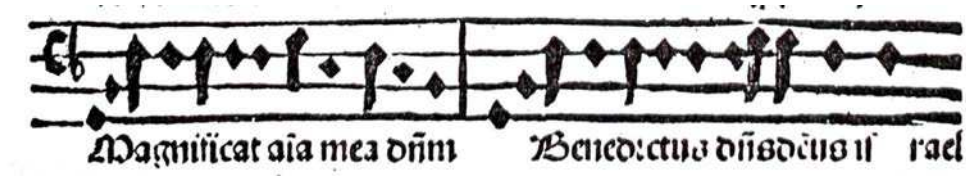
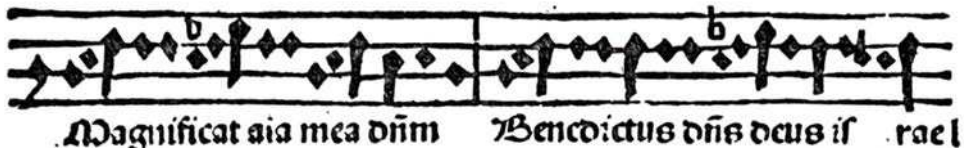


Figure 15: Cochlaeus, *Tetrachordum musices*, Sixth Major Psalm-Tone Formulas (*Magnificat* and *Benedictus* Canticles)[65]

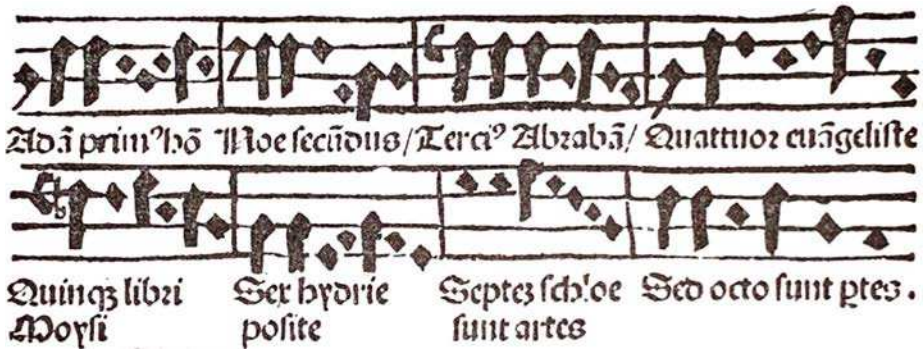


Finally, Cochlaeus's fourth change involves the psalm-tone *differentiae*. Before writing these formulas, Cochlaeus remarks that "it is not necessary to spend a great deal of time

63 Cochlaeus, *Musica*; see his chapter "De Tonis."
64 Cochlaeus and Miller, *Tetrachordum musices*, 56.
65 Ibid., 56.

on them, since they are certainly not the same among all singers, and since they are always indicated at the ends of the antiphons."[66] As the *differentiae* are numerous and typically referenced at the end of antiphons, he decides to list only a "principal" set of eight (Figure 16) that he copied from his prior *Musica* treatise, which he likely selected and reproduced from Wollick's *Opus aureum*.[67] These eight *differentia* are noteworthy because they appear in Glarean's work—moreover, except for the first three, they closely match Banchieri's *differentiae* from his *Cartella musicale* of 1614 (compare the *differentiae* in Figure 16 with those in Figure 2).

Figure 16: Cochlaeus, *Tetrachordum musices*, Principal *Differentiae*[68]



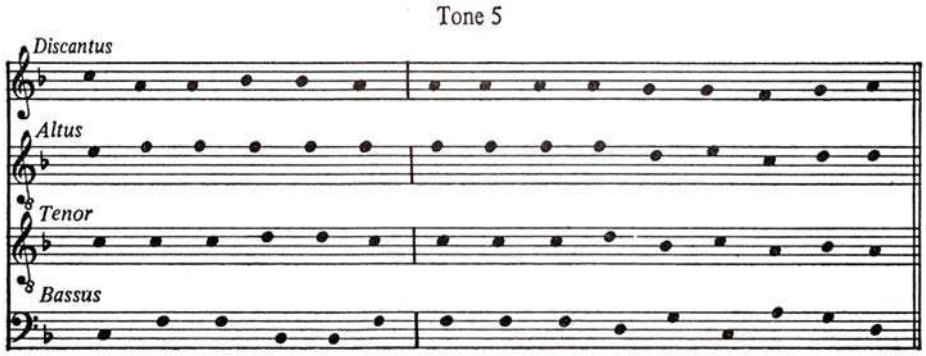
It appears that interval species play a significant role in Cochlaeus's treatise. For example, at the end of his *Tetrachordum musices*, Cochlaeus sets psalm tone 5 (placed in the tenor of Figure 17) in four-voice counterpoint. Notably, he does not include the initial intonation in the tenor formula, but he does include the principal *differentia*, which is why no voice ends on the modal final (F). Although the endings do not correspond with the modal final, each voice uses the interval species associated with his altered species-mode 5: the soprano voice outlines the fourth species of fifth (TTST) from C5 down to F4 (with B♭), the alto covers the third species fourth (TTS) from F5 down to C5, the tenor the provides the fifth psalm tone beginning with the reciting note (C), which includes a B♭, and the bass voice spans B♭2 to A3 with a focus on the modal final F. These interval patterns suggest that Cochlaeus sought to use interval species common to his fifth altered species-mode for his polyphonic setting of the fifth psalm tone.

66 Ibid., 52.

67 Clement A. Miller remarks that "Without exception his [Cochlaeus's] *differentiae* are the same as those in *Opus Aureum*, in which the *differentiae* are shown in a much more detailed manner"; Cochlaeus and Miller, *Tetrachordum musices*, 4.

68 Cochlaeus and Miller, *Tetrachordum musices*, 52.

Figure 17: Cochlaeus, *Tetrachordum musices*, Four-part Psalmody of Psalm Tone 5 Beginning with the Reciting Note in the Tenor[69]



Compared to Wollick's treatise, Cochlaeus's *Tetrachordum musicae* marks a decisive change with an influx of species-based modal theory. As Walter Werbeck explains, for Cochlaeus, "The modes are not only a vehicle for the practice of chant, which are concretized in antiphons or other, single voice hymn pieces, but they are first and foremost—on the basis of their derivation from the ancient modes [*Tonarten*]—abstract scales shaped through fifths, fourths, and octaves."[70]

Several issues persist in Cochlaeus's treatise. Cochlaeus's addition of signature flats to the fifth and sixth modal octaves cause them to correspond with the altered fifth and sixth Gregorian psalmody formulas, but the corresponding species-modes become ill-defined compared to their eleventh-century counterparts. Before we discuss how Glarean addresses these changes, however, let us turn to the next treatise that Wollick wrote after Cochlaeus's *Tetrachordum musicae*, as this work solidifies the notion that theorists were grappling with replacing the *repercussio*-modes with species-modes.

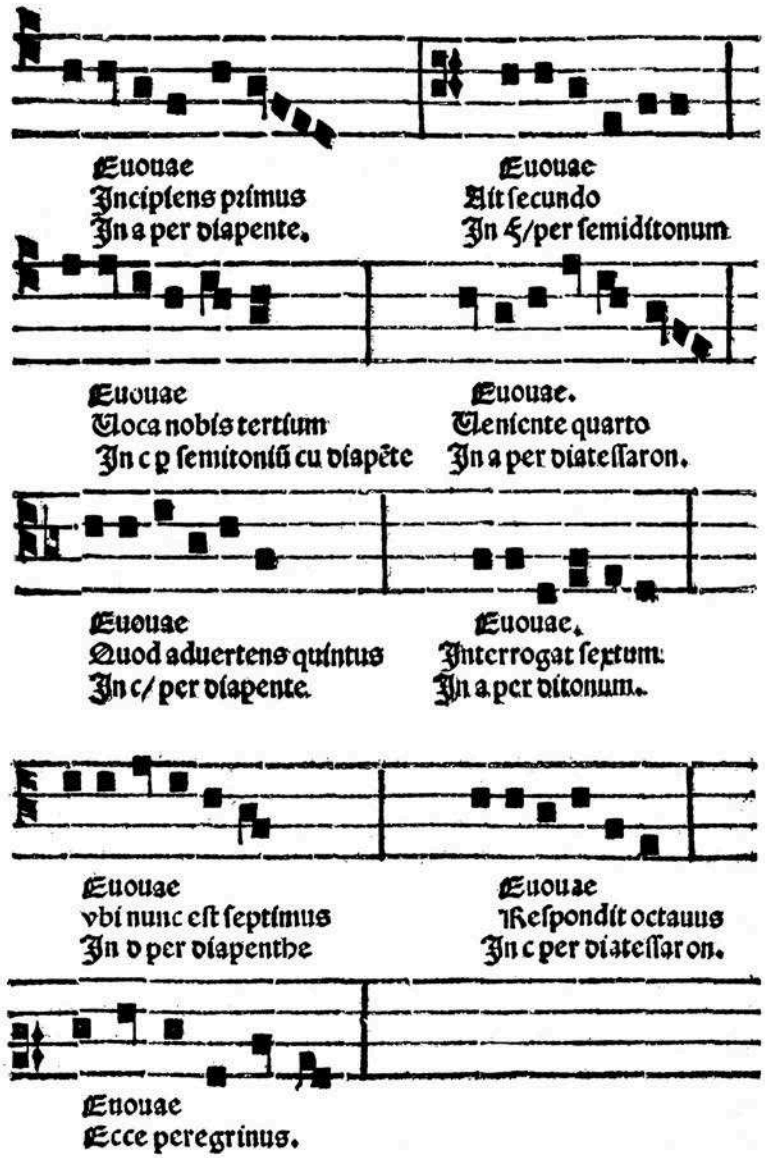
2.3. Nicolaus Wollick's *Enchiridion musices* (1512)

One year after Cochlaeus published his treatise in Nuremberg, Wollick, now teaching in Paris, revised and expanded parts of his *Opus aureum* to form his *Enchiridion musices* of 1512. For our purposes, Wollick changes two important elements. First, he inserts a principal set of eight psalm-tone *differentia* between the abstract table of the species-modes and the *repercussio*-mode intervals, as Cochlaeus had (Figure 18; all but the first, third, and fourth

69 Ibid., 82.

70 "Die Modi sind nicht nur Vehikel für die Gesangspraxis, die sich in Antiphonen oder andern Stucken des einstimmigen Chorals konkretisieren, sondern sie gelten erst einmal—und zwar auf Grund ihrer Herleitung aus den antiken Tonarten—als abstrakte, durch Quinten, Quarten und Oktaven geprägte Skalen"; Walter Werbeck, *Studien zur deutschen Tonartenlehre in der ersten Hälfte des 16. Jahrhunderts* (Kassel; Basel; London; New York: Bärenreiter, 1987), 84.

Figure 18: Nicolas Wollick's Principal *Differentiae* for the Eight Psalm Tones Plus the *Tonus Peregrinus* from *Enchiridion musices* (1512)



differentia closely correspond to Cochlaeus's shown in Figure 16). Second, he devotes a section to each mode in which he defines (in prose) the modes first in terms of their species of fifth and fourth before listing their psalmody formulas. Through these changes, Wollick reassociates the psalmody formulas that he had previously linked to the *repercussio*-modes with the eight species-modes, much like Cochlaeus before him. Yet, as in Cochlaeus's presentation, the theoretical ramifications of these changes remain muddled and the relationship between well-defined species-modes and psalmody is still fraught with inconsistencies.

To understand the issues with Wollick's changes, consider his fifth and sixth species-modes. Wollick defines these modes as having a third-species fifth (TTTS) and a third-species fourth (TTS) in the authentic and plagal configurations, respectively. These species definitions correspond to the original eleventh-century definitions of species-modes 5 and 6 (i.e., the Lydian modes; Figure 6) but conflict with Cochlaeus's altered species-modes 5 and 6, which have signature B♭s and thus fourth-species fifths (TTST; Figure 13). The plainchant formulas that Wollick lists for these species-modes further confuse the issue. For mode 5, he provides the model antiphon formulas with signature flats (the antiphon *neuma* and principal *differentia* are shown in Figure 19),[71] but he writes the psalmody formulas without them (the major psalm-tone formulas or *Magnificant* and *Benedictus* canticles, which includes the principal *differentia*, are shown in Figure 20). Similarly, for species-mode 6, Wollick writes the model antiphon formulas with accidental flats (the antiphon *neuma* and "principal" *differentia* are shown in Figure 21) but lists the psalmody formulas without them (the major psalm-tone formulas or *Magnificant* and *Benedictus* canticles, which includes the principal *differentia*, are shown in Figure 22).[72] Consequently, the fifth and sixth psalmody formulas correspond with the fifth and sixth species-modes, but the model antiphon formulas assigned to these modes do not. These discrepancies clearly demonstrate the problems between modal theory and plainchant practice as it is depicted in these early sixteenth-century treatises.

71 The model antiphons preface a group of liturgical chants within the mode, including the *neuma* and several *Euouae* formulas (*differentiae*). These formulas were not included in Wollick's prior treatise, *Opus aureum*. For more on model antiphons and *neuma*, see David Hiley, *Neuma*, in *Grove Music Online* (Oxford University Press, 2001), https://doi.org/10.1093/gmo/9781561592630.article.19776. The ninth-century author of *Musica enchiriadis* views the "*Noannoeane, Noeagis*, etc., [...] less as meaningful words than as syllables associated with well-formed melody (*modulatio*)"; Palisca, *Musica Enchiriadis and Scolica Enchiriadis*, 12.

72 Curiously, Wollick adds a signature flat to the lesser doxology formula, i.e., the *Gloria Patri*.

Figure 19: Wollick, *Enchiridion musices*, Mode 5 Model Antiphon *Neuma* and Principal *Differentia*

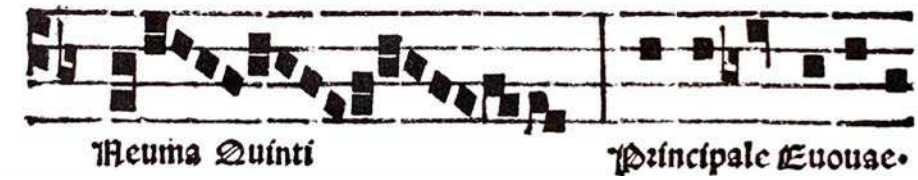


Figure 20: Wollick, *Enchiridion musices*, Mode 5 Major Psalm-Tone Formulas (*Magnificat* and *Benedictus* Canticles)

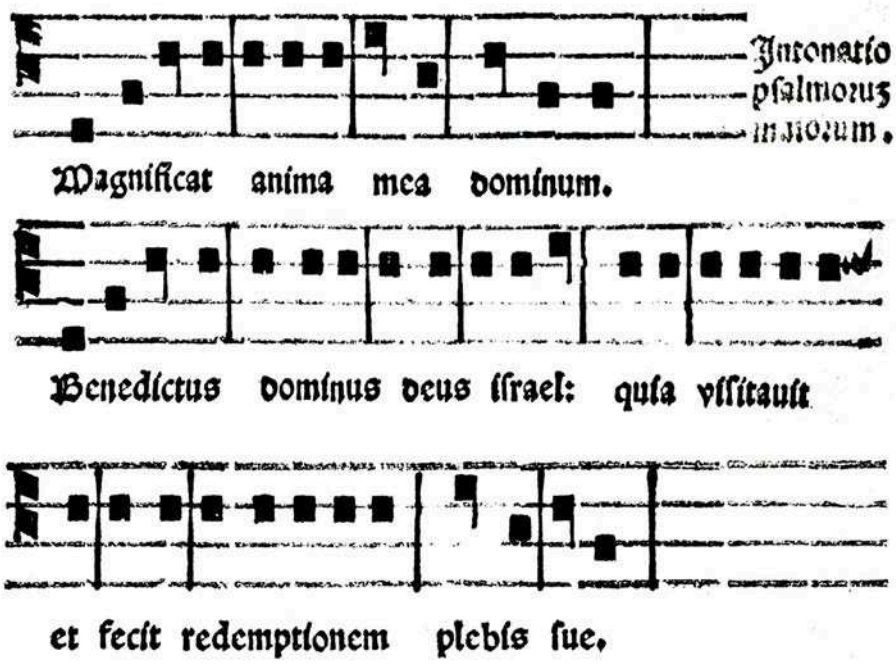


Figure 21: Wollick, *Enchiridion musices*, Mode 6 Model Antiphon *Neuma* and Principal *Differentia*

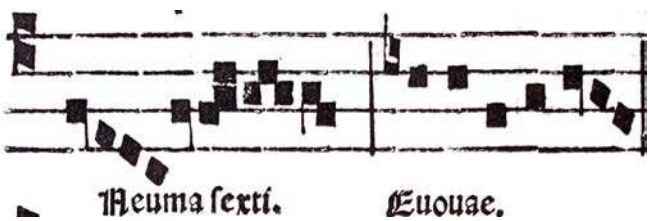
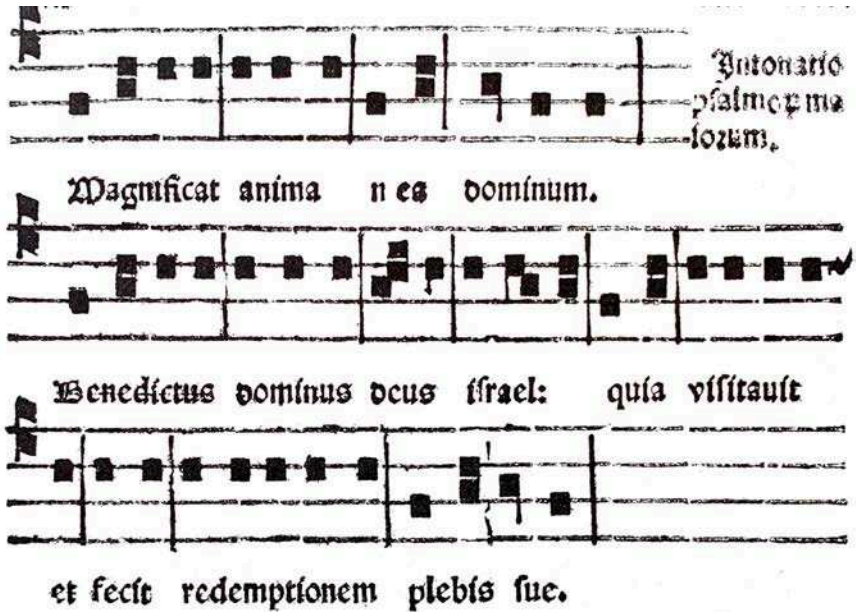


Figure 22: Wollick, *Enchiridion musices*, Mode 6 Major Psalm-Tone Formulas (*Magnificat* and *Benedictus* Canticles)



Thus far, we have witnessed three primary changes to the relationship between an altered set of Gregorian plainchant formulas and the eight *repercussio*- and species-modes: (1) Wollick modified the *repercussio*-modes by adding a B♭ to the fifth repercussion interval, presumably to make them correspond to the flat added to the fifth plainchant formulas; (2) Cochlaeus integrated Wollick's flats into the fifth and sixth written-out species-modes but did not explain the theoretical ramifications of these changes; and (3) in his second treatise, Wollick connected species-based modal theory with the Gregorian plainchant formulas, but he introduced disagreements between *repercussio*- and species-modes along with the antiphon formulas, which were assigned flats, and psalm-tone formulas, which were left without them. The stage is now set for Glarean. In what follows, we will observe how Glarean remedies the inconsistencies found in his predecessors' treatises by tracing the developing relationship between psalmody and mode in three of his treatises: *Isagoge in musicen* (1516), *Dodecachordon* (1547), and *Musicae epitome* (1558).

3. THE INTERACTION OF HEINRICH GLAREAN'S TWELVE MODES WITH PSALMODY AND THE EIGHT SPECIES-MODE SUBSET

In this penultimate section, I highlight how Glarean remedies the theoretical inconsistencies between the altered Gregorian plainchant formulas and the species-defined modes that persisted in his predecessors' treatises. In brief, Glarean replaces the altered "fifth" and "sixth" modes (the Lydian and Hypolydian with signature flats)[73] with transposed Ionian (11) and Hypoionian (12) modes and begins to associate the Hypoaeolian (10) mode with the third and fourth psalmody formulas. These changes reconnect the interval patterns expressed by the altered psalmody formulas with a corresponding set of well-defined species-modes. Let us observe how these developments arise chronologically in Glarean's three treatises.

3.1. Glarean's *Isagoge in musicen* (1516)

Shortly after enrolling at the University of Cologne in 1506—one year after Wollick published his *Opus aureum*—Glarean began to study with Cochlaeus. In this time, he must have encountered both Wollick's treatise and his teacher's *Musica* (1507), and thus much of what ultimately appeared in Cochlaeus's *Tetrachordum musices* (1511). After graduating in 1510, Glarean moved to Basel, where he published his first music treatise, *Isagoge in musicen* (1516).[74]

In his *Isagoge* treatise, Glarean essentially recapitulates Cochleaus's presentation of the modes and the corresponding plainchant formulas. But while the *Isagoge* does not change any of his predecessor's work, it provides evidence of Glarean's growing dissatisfaction with the interface between mode and psalmody then established. More specifically, the text reveals that Glarean was aware of the inconsistencies with the altered species-modes 5 and 6, and he was beginning to recognize that transposition and the role of B♭ were the main culprits.

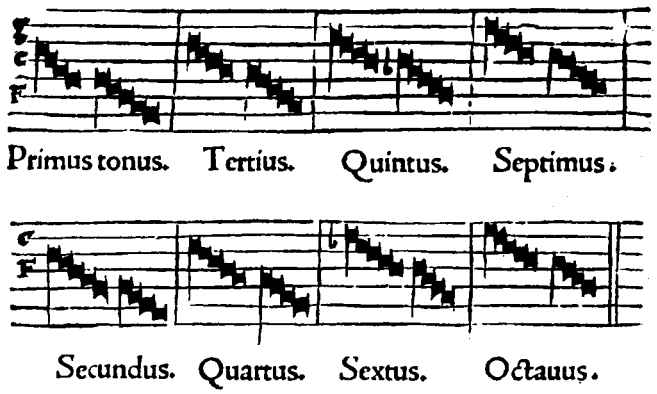
In his *Isagoge* chapter entitled "The Use of the Modes in Our Times," Glarean writes out the same modal octaves as Cochlaeus, except that he places the plagal modes on the bottom and the authentic on the top (Figure 23), and he writes the fifth and sixth species-modes with accidental flats instead of signature flats. In the paragraph that follows these examples, Glarean explains that the modes "do not accord with the ancient tradition" and remarks that it is "astonishing [...] that the sixth [altered Hypolydian] and

73 In several places throughout the *Dodecachordon*, Glarean refers to Ionian as the "fifth mode" and Hypoaeolian as the "sixth." This confusing terminology must be understood in reference to the older "altered" fifth and sixth modes from Cochlaeus; see, for example, Glarean, *Dodecachordon Volume 1*, 1:56.

74 Glarean, *Isagoge in musicen* (henceforth *Isagoge*).

seventh [Mixolydian] modes have the same species of octave."[75] This observation reveals that Glarean is aware of the crux of the problem we identified above: Cochlaeus's modified fifth and sixth species-modes accord with the patterns expressed by the altered fifth and sixth plainchant formulas, but these species-modes are now ill-defined and not understood as different, transposed modes. Glarean refrains from addressing this problem any further in his *Isagoge*, however, and instead ends the chapter by hinting at his next project (the *Dodecachordon*): "Thus do our theorists deliver their judgment which, if we were not confining ourselves to writing a Primer, we might assail with good reason. But we advisedly hasten on to other things."[76] Before we move on to this next treatise, however, we must first examine the *Isagoge*'s last chapter, because this portion of the treatise divulges several of Glarean's positions concerning the interface between *repercussio*- and species-modes and the Gregorian psalmody formulas.

Figure 23: Glarean, *Isagoge in musicen*, Eight Species-modes[77]



75 Glarean and Turrell, "The 'Isagoge in Musicen' of Henry Glarean," 134. Prior to Glarean's *Dodecachordon*, some theorists considered the Mixolydian mode to be a "mixed" Lydian mode. For example, Tinctoris explains that the "Mixolydian is so called as being a mixed Lydian"; Tinctoris, *Concerning the Nature and Propriety of Tones*, 2:4. Similarly, Gaffurius writes, "The seventh diapason species [...] was named the Mixolydian, a 'mixed Lydian.' Frequently a more beautiful harmony results from the mutual interplay of the Lydian and Mixolydian modes [...] [The Ambrosians] are accustomed to perform these fifth and seventh modes by exchanging the quality of B-*durum* [B♮] for the B-*molle* [B♭], as though they were mixed diapente or diatessaron species"; Franchinus Gaffurius, *The* Practica Musicae *of Franchinus Gafurius Translated and Edited with Musical Transcriptions*, trans. Erwin Young (Madison; Milwaukee; London: University of Wisconsin Press, 1969), 43. Beyond the similarity of their names, the "mixing" of the Lydian modes by the addition of B♭s made their species of fifth equivalent to the Mixolydian modes, as Glarean observed in his *Isagoge*.

76 Glarean and Turrell, "The 'Isagoge in Musicen' of Henry Glarean," 135.

77 Ibid., 134.

In general, Glarean's *Isagoge* suggests a move away from *repercussio*-modes toward species-modes. In the final chapter of his *Isagoge,* for instance, Glarean emphasizes the importance of attending to octave species: "It is not necessary, if one wishes to decide which mode it [a melody] belongs, to devote too much attention to the point where the melody ends [i.e., the modal final]; one should rather concentrate on the octave species [...] because, as we are always pointing out, the chants are varied as to their position."[78] Later in the same paragraph, Glarean discusses the "church melodies" (psalmody formulas) and prefaces the *repercussio*-mode intervals with a deprecative quip:

> Some [people] are accustomed to add certain rules for the recognition of the modes which they attribute without shame to the authorities, though tossing them off like so many crumbs. Therefore, they say, melodies of the first mode move from re to la; of the second, from re to fa; of the third, from mi to the fa which is a sixth away; i.e., to c; of the fourth, from mi to la; of the fifth, from ut to mi; and thence to sol; of the sixth, from fa to la; of the seventh, from ut to sol; of the eighth, from ut to fa.[79]
>
> Anyone may easily see this in the church melodies. So much for the closing formulas and recognition of the modes, in which matters experience should be considered rather than the clearly puerile teachings of so many of our musical theorists.[80]

Glarean's presentation of the *repercussio*-modes as "certain rules [...] attribute[d] without shame to the authorities" and as "clearly puerile teachings" suggests that he was dissatisfied with this system.

In addition to revealing Glarean's move away from the *repercussio*-modes, the *Isagoge* contains additional insights that problematize an element of Powers's *Psalmody to Tonality* narrative. In a crucial part of his argument, Powers suggests that the psalm tones—and not the modes more generally—were transposed in the seventeenth century for *alternatim* singing with an organ to lower the reciting tone of the psalm tone to a more appropriate range for the tenor.[81] Although Powers's proposal seems likely, Glarean offers

78 Glarean and Turrell, "The 'Isagoge in Musicen' of Henry Glarean," 135.

79 Compare Glarean's expression with Cochlaeus's verse in note 65.

80 Glarean and Turrell, "The 'Isagoge in Musicen' of Henry Glarean," 135–36.

81 Powers, "From Psalmody to Tonality," 291–96, contends that "The purpose of transposition [of the church keys] is to bring the actual sung reciting tones, the psalm-tone tenors, to written pitch levels within a somewhat narrower compass, for in *alternatim* psalmody the choir must sing its psalm verses at comfortable pitch levels that will also fit the organ with its fixed tuning; that is so whether they sing them in plainchant or polyphony, and if in polyphony, whether they do or do not use psalm-tone material as *soggetti*. Particularly noticeable are the ways Banchieri's transpositions raise the reciting tone of psalm tone 2, written f, up to B♭." For further development of Powers's psalm-tone transposition narrative, see Michael R. Dodds, "Organ Improvisation in 17th-Century Office Liturgy," *Philomusica online* 12 (2012), 23–48.

a broader explanation of transposition that is rooted in modal theory. Glarean explains that composers who wrote polyphonic music frequently transposed works in species-mode 2 up a fourth with the help of B♭ (i.e., G Hypodorian) to allow the voices to sit more comfortably.[82] In this passing comment, we learn that transposition was a more general practice, not one solely performed to adjust the reciting note of the psalm tones. According to Glarean, "they do this [i.e., transpose melodies] because they are constrained to keep the voices inside the range of the Guidonian scale; since the lowest voice frequently sounds with the middle octave, they find it more suitable that the voices be compressed within the scale than to be extended outside its limits."[83] In other words, Glarean suggests that the transposition of certain psalm-tone formulas was not limited to *alternatim* practice, but represented a broader approach to modal transposition.

In addition to explaining why pieces in species-mode 2 were regularly transposed to G with a signature flat (thus, G Hypodorian), a close reading of Glarean's comments provides some insight into why the Phrygian (3) and Hypophrygian (4) modes were replaced with the Aeolian (9 & 10) modes. Consider Glarean's lengthy clarification of the role of B♭ for transposition:

> In the church melodies, indeed, it is not necessary to transpose the chant because of one or another "ficted," i.e. chromatically altered note, which may be introduced by custom rather than by reason. In the same way [as the transpositions made to species-mode 2], the third and fourth modes end their melodies not only on E, but also on a, so that *fa* occurs on B♭, although sometimes, certain ones have dared to write B♮, though these are only smatterers. For the scale-degrees both above and below are inconsistent with the systems, as one who is not ignorant of their nature readily perceives. The fifth and sixth likewise can finish their melodies, not only on F but on C or c, the systems of both remaining immobile.[84]

Glarean's comments imply that there was widespread confusion about mode 3 and 4 chants when they were transposed up a fourth because they were not always given the necessary signature B♭ that would preserve their interval species. Perhaps, therefore, just as the Lydian modes (5 and 6) gradually changed into the Ionian modes (11 and 12) by

82 Glarean explains this transposition in Greek terminology: "Very frequently, in the polyphonic composers [*symphonetes*], the cadence falls on G with B♭, using the synemmenon tetrachord"; Glarean and Turrell, "The 'Isagoge in Musicen' of Henry Glarean," 135. Subsequent theorists reiterate this modal transposition. In his 1564 treatise, *Precepts of Poetic Music*, for example, Gallus Dressler notes that the second mode is "generally transposed by a fourth in polyphony"; Gallus Dressler, *Praeccepta musicae poeticae*, online as *Traités français sur la musique* (Indiana University, 2015), 239, http://www.chmtl.indiana.edu/tml/16th/DREPRA_TEXT.html. For Glarean's discussion of the common transpositions made to the modes, see Glarean, *Dodecachordon Volume 1*, 1:70–71.

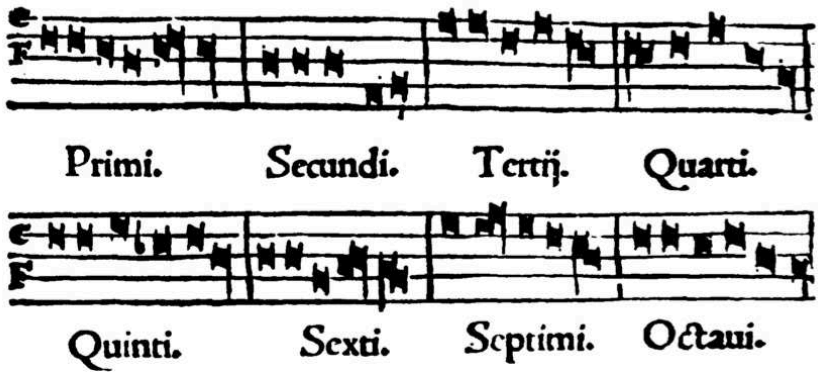
83 Glarean and Turrell, "The 'Isagoge in Musicen' of Henry Glarean," 135.

84 Ibid., 135.

the replacement of B♮ with B♭, outlined in greater detail below, so too did the Phrygian modes (3 and 4) change into the Aeolian modes (9 and 10)—albeit after a transposition up a fourth with a missing B♭.[85]

Finally, the last chapter in the *Isagoge* further highlights Glarean's growing displeasure with the *repercussio*-mode system. Glarean lists eight principal psalm-tone *differentiae* (Figure 24) and the major and minor psalm-tone formulas with their corresponding modal numbers next to them (the fifth and sixth formulas are shown in Figure 25).[86] He then concludes: "I am not satisfied simply to memorize the forms of the verses in the ecclesiastical chants which they call the Introit, Tractus, Alleluia and Responses, nor that so much should be left to usage. And for his reason, if anyone wishes to possess these things completely, he should not expect it here from me."[87] Whereas Guido recommended that his readers become well acquainted with the psalmody formulas as aids for recognizing other chants' modes (i.e., learning their *repercussa* and thus the *repercussio*), Glarean appears to reject this practice.

Figure 24: Glarean, *Isagoge* (1516), Principal *Differentiae*[88]



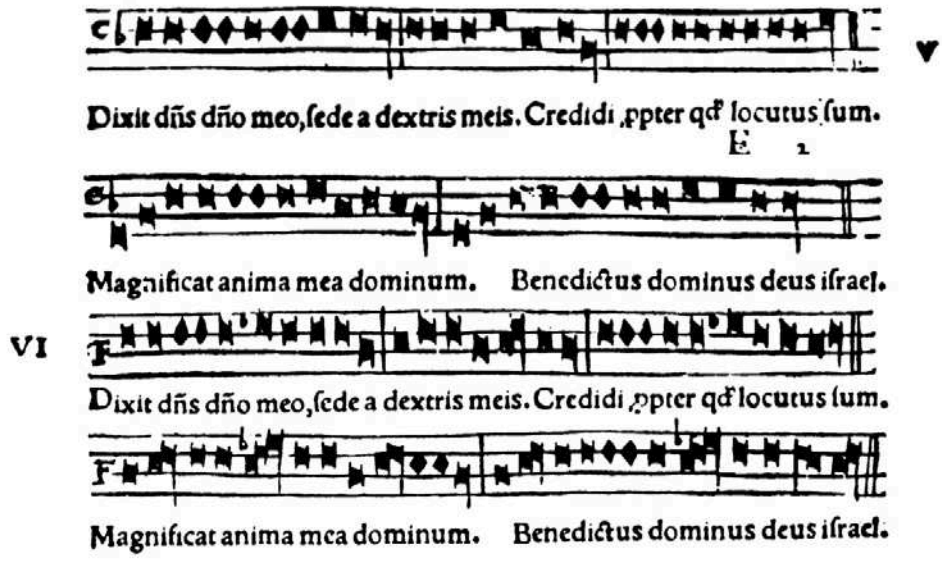
85 In his *Dodecachordon*, Glarean remarks more generally that "church singers practice an excessive freedom in transposing songs, a freedom from which they could certainly abstain. For why is it necessary to transpose an entire song because of one or another little false tone, especially when these are introduced by custom rather than by a definite theory?" Glarean, *Dodecachordon Volume 1*, 1:70.

86 Glarean likely reproduced these *differentiae* from his teacher's *Tetrachordum musices*: compare Glarean's *differentiae* in Figure 24 with Cochlaeus's in Figure 16, and his major fifth and sixth psalm-tone formulas in Figure 25 with Cochlaeus's in Figures 14 and 15.

87 Glarean and Turrell, "The 'Isagoge in Musicen' of Henry Glarean," 138.

88 Ibid., 136.

Figure 25: Glarean, *Isagoge* (1516), Fifth and Sixth Minor and Major Psalm-tone Formulas[89]



3.2 Glarean's *Dodecachordon* (1547)

Let us turn now to Glarean's second treatise. About fifteen years after publishing his *Isagoge*, Glarean had the opportunity to study several Greek and Roman authors at the Benedictine monastery at St. Georgen, including treatises by Boethius, Guido, and Berno of Reichenau among others.[90] It was during this time that Glarean began to formulate his monumental treatise, the *Dodecachordon*, which would resolve the issues he identified in his prior *Isagoge*.

In the *Dodecachordon,* Glarean introduces four additional species-modes (Ionian, Hypoionian, Aeolian, and Hypoaeolian), resulting in a total of twelve species-defined modes.[91] As we will discover, these four new species-modes allowed Glarean to improve the interface between the altered Gregorian plainchant formulas and the species-modes. In brief, Glarean explains that species-modes 5 and 6 (Lydian and Hypolydian) have a third-species fifth that "includes the tritone, a hard interval, [...] [that is] somewhat unsuitable to the diatonic system." "So it happened," he continues, "that our time has almost abolished the sharpness in the fifths of the Lydian and Hypolydian, and by changing a single semitone

89 Glarean and Turrell, "The 'Isagoge in Musicen' of Henry Glarean," 137.

90 On Glarean's study of other sources, see Clement A. Miller, "The 'Dodecachordon': Its Origins and Influence on Renaissance Musical Thought," *Musica Disciplina* 15 (1961), 159–60.

91 For more on the origin of the chronological development of the *Dodecachordon*, see Miller, "The 'Dodecachordon,'" 158–62.

has lowered them from the *diazeugmenon* tetrachord to the *synemmenon* tetrachord and has formed the Ionian and Hypoionian, which have a softer contour, undoubtedly produced by the fifth without a tritone, namely, the fourth fifth-species."[92] In modern terminology, Glarean explains that musicians transformed[93] chants in the Lydian mode into the Ionian mode by changing B♮ to B♭ to temper the tritone between F and B; in other words, they changed the third-species fifth (TTTS) to a fourth-species fifth (TTST).

Although scholars acknowledge Glarean's explanation of the relationship between the altered Lydian modes and the transposed Ionian modes, they have devoted less attention to how he reassociates the altered fifth and sixth Gregorian psalmody formulas with these new Ionian modes. This relationship may have been neglected because the interaction between the psalmody formulas and the species-modes is somewhat obscured in the *Dodecachordon* (it is more apparent in his later *Musicae epitome*, discussed next). Nevertheless, we can trace their connection by comparing the plainchant examples scattered throughout the *Dodecachordon* that Glarean uses as examples of the species-modes.

In his chapter titled "The Modes Used in Choir Singing,"[94] Glarean reproduces the liturgical plainchant formulas that were listed in his teacher's *Tetrachordum musices* (the eight principal *differentiae*, minor psalm intonations, major psalm intonations—i.e., the *Magnificat* and *Benedictus* canticles—responsorials, and introits). These formulas are equivalent to the formulas he wrote in his *Isagoge* and thus appear to be based on Cochlaeus's formulas, but he does not include the eight species-mode octaves in this chapter as Cochlaeus had (i.e., Figure 13), nor does he directly explain how these plainchant formulas interface with his twelve-mode system.[95] Thus, although the relationship between these psalmody formulas and his twelve modes may have been self-evident to Glarean, modern readers might interpret the plainchant formulas as existing separately from his twelve-mode theory. We can dispel this misconception by examining the formulas in greater detail and by comparing the examples provided in Glarean's treatise.

The easiest way to trace how Glarean reassociates the altered Gregorian psalmody formulas with his new modes is to compare the *differentia* that end his chant examples. Because each of the eight psalm-tone formulas have a principal *differentia*, and each *differentia* begins with the psalm formula's reciting note, we can determine how Glarean reas-

92 Glarean, *Dodecachordon Volume 1*, 1:131.

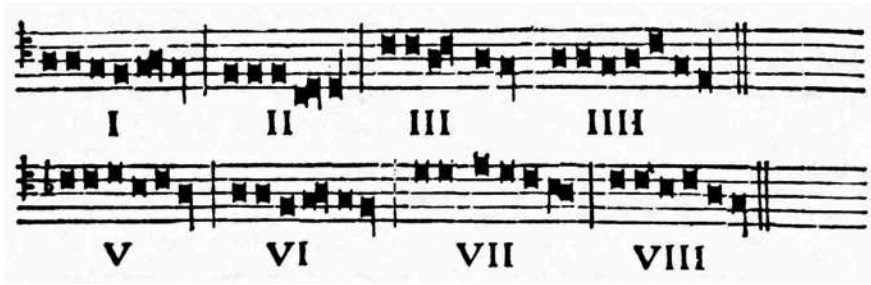
93 I use "transformed" in reference to Guido of Arezzo's formulation of this process discussed above in Section One; Guido, "Guido of Arezzo's *Micrologus*," 64.

94 "De Modorum usu in Cantantium Choro"; Glarean, *Dodecachordon*, 35–42. For an English translation of this chapter, see Glarean, *Dodecachordon Volume 1*, 1:74–81.

95 To see the likeness between Glarean's formulas in his *Dodecachordon* and Cochlaeus's *Tetrachordum musices*, compare Cochlaeus and Miller, *Tetrachordum musices: Introduction, Translation, and Transcription*, 52–58 with Glarean, *Dodecachordon Volume 1*, 1:74–80.

signs the eight psalm-tone formulas to an eightfold subset of his twelve species-modes by comparing the principal *differentiae* (Figure 26) to the *differentiae* that he appends to the antiphons that he cites as representative of the new modes. For our purposes, the most instructive comparison involves the fifth principal *differentia* (and thus the fifth psalm tone), because this ending pattern includes a B♭ (see the bottom left of Figure 26). Does he associate this altered *differentia* and consequently the altered fifth psalm tone with the authentic Lydian (5) or the transposed Ionian (11) mode?

Figure 26: Glarean, *Dodecachordon*, Principal Psalm-tone *Differentiae*[96]



The scattered plainchant examples that Glarean provides throughout his treatise for each mode reveal that he connects the altered fifth *differentia*, and thus the fifth (altered with a signature B♭) psalm tone that it represents, with the transposed Ionian (11) mode—not the Lydian (5) mode. Consider, for instance, the antiphon "Alma redemptoris mater" (Figure 27), which Glarean supplies as an example of the Ionian (11) mode.[97] The *differentia* that he appends to the chant matches exactly the fifth principal *differentia* that has a B♭ (compare with the fifth *differentia* in Figure 26). By contrast, the chant he provides as an example for the Lydian (5) mode, "Montes et omnes colles humiliabuntur," ends with a *differentia* that lacks a B♭ (circled in Figure 28). These comparisons clarify that Glarean has reassociated the fifth (altered with a B♭) principal *differentia*—and presumably all the fifth plainchant psalmody formulas (with signature B♭s; see Figure 29)—with a transposed Ionian (11) mode, not an altered Lydian (5) mode.[98] He similarly links the sixth Gregorian psalmody formulas with the Hypoionian (12) mode, although this connection is made more explicitly in his subsequent treatise, *Musicae epitome*, discussed next.

96 Glarean, *Dodecachordon*, 35.
97 Ibid., 17.
98 Ibid., 129.

Figure 27: *Alma redemptoris mater*, Transposed Species-mode 11 Example[99]

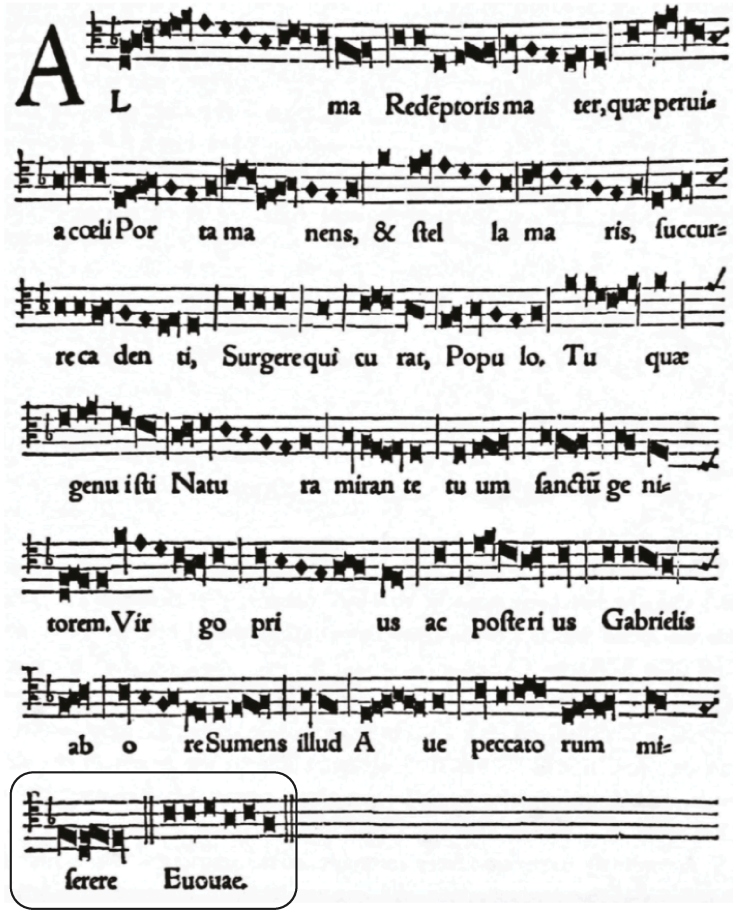
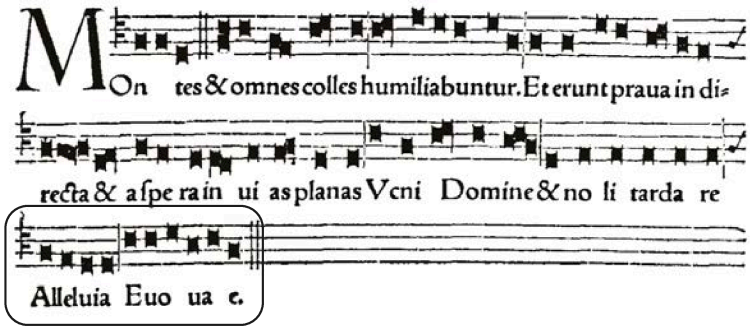
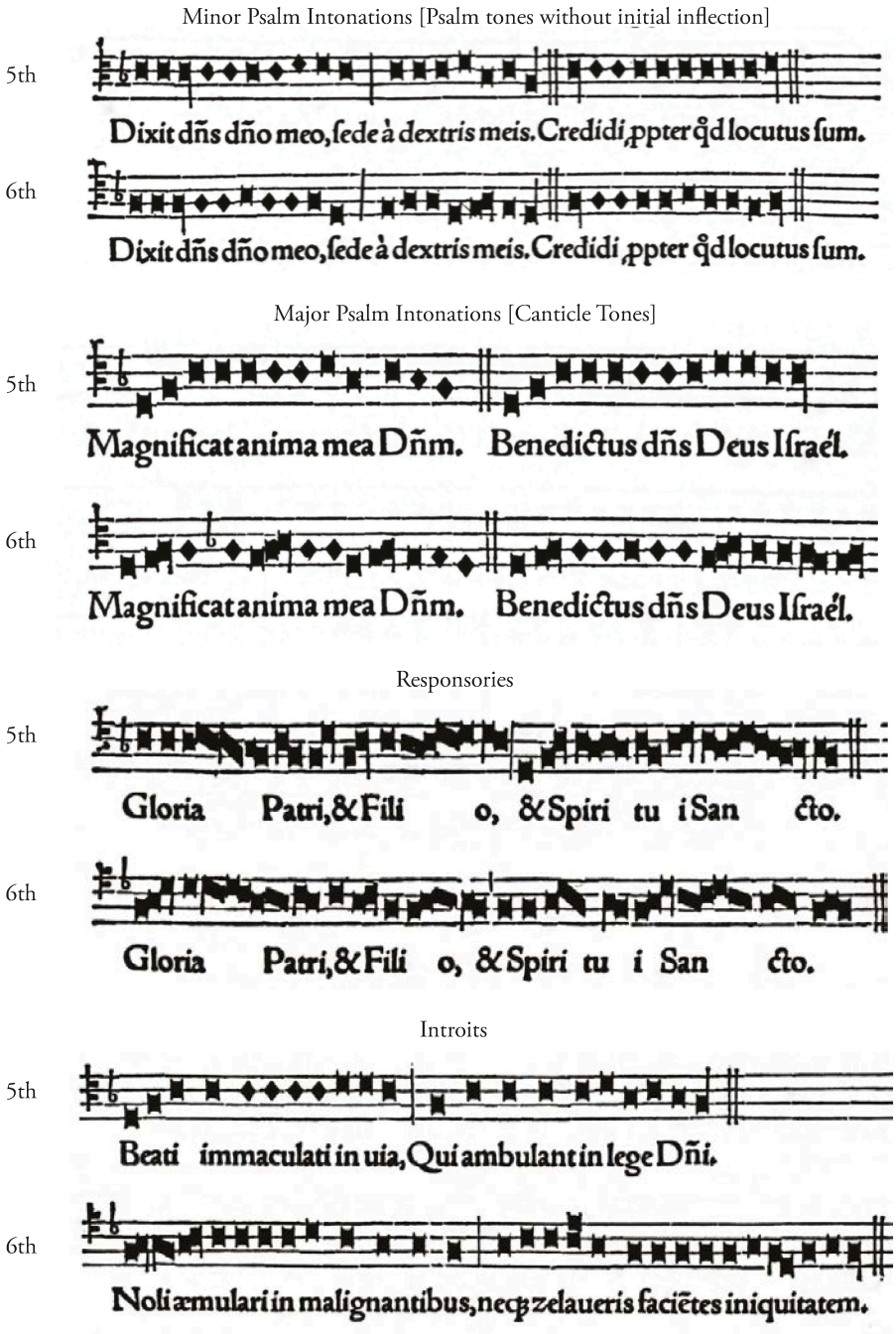


Figure 28: *Montes et omnes colles humiliabuntur*, Species-mode 5 Example[100]



99 Ibid., 16–17.
100 Ibid., 129.

Figure 29: Glarean, *Dodecachordon*, Fifth and Sixth Plainchant Formulas[101]



101 Ibid., 36–39.

3.3. Glarean's *Musicae epitome* (1558)

Ten years after his monumental *Dodecachordon* and one year before Zarlino published his *Istitutioni harmoniche* (1558), Glarean wrote a more concise and pedagogical reduction of the *Dodecachordon* entitled *Musicae epitome* (1557) with the help of his stepson, Joannes Litavicus Wuonneger. Although this treatise does not introduce any completely new ideas, it demonstrates more plainly Glarean's updated interface between the twelve species-modes and the (altered) Gregorian psalmody formulas.

Musicae epitome was published simultaneously in German and Latin in 1557 and reprinted in 1559; it was widely distributed and was used as the basis for the music lectures that Glarean gave to students at the University of Freiburg.[102] It is thus likely that many subsequent influential German theorists such as Gallus Dressler (1533–1589), Christoph Praetorius (d. 1590), Joachim Burmeister (1564–1629), Sethus Calvisius (1556–1615), and others learned of Glarean's new modal theory through *Musicae epitome*, rather than the larger *Dodecachordon*.[103]

Perhaps Glarean's *Musicae epitome* has received less scholarly attention than the *Dodecachordon* because the smaller, untranslated treatise is recognized as a pedagogical and abridged reduction—or even mere collection of "excerpts"[104]—drawn from the theorist's larger work.[105] This characterization is essentially correct, but the concision of the *Musicae epitome* turns out to be a strength for our purposes. Compared to the *Dodecachordon*, which presents the plainchant formulas separately from the theoretical discussion of the modes, *Musicae epitome* couples the psalmody formulas with the species-based modal explanations—i.e., one mode per section. This new organization further clarifies that Glarean has reassociated the altered psalmody formulas with new (transposed) species-modes.

In addition to influencing German theorists, *Musicae epitome* was cited by important non-German-speaking musicians and theorists who have played a significant role in

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102 See Inga Mai Groote, Bernhard Kölbl, and Susan Forscher Weiss, "Evidence for Glarean's Music Lectures from His Students' Books: Congruent Annotations in the Epitome and the Dodekachordon," in Iain Fenlon and Inga Mai Groote (eds.), *Heinrich Glarean's Books* (Cambridge: Cambridge University Press, 2013), 280–302, https://doi.org/10.1017/CBO9781139136976.016.

103 Klaus Wolfgang Niemöller, "Deutsche Musiktheorie im 16. Jahrhundert: Geistes- und institutionsgeschichtliche Grundlagen," in Cristle Collins Judd (ed.), *Musical Theory in the Renaissance*, 1st ed. (Routledge, 2017), 501, https://doi.org/10.4324/9781315090689-14.

104 See Niemöller, "Deutsche Musiktheorie," 501.

105 Clement Miller, for example, calls *Musicae epitome* "a concise, 151-page abridgment of the voluminous *Dodecachordon*"; Clement A. Miller, "Johannes Ludwig [Ioannes Litavicus] Wonnegger," in *Grove Music Online* (Oxford Music Online, 2001), https://doi.org/10.1093/gmo/9781561592630.article.30533. *Musicae epitome* is not mentioned in in Lester's modal account (1989), Powers's psalmody-focused origin story (1998), Wiering's modal study (2001), or in Harold S. Powers et al., "Mode," 2001. Although modern scholars have written very little on the *Musicae epitome*, the treatise appears to have been important for early seventeenth-century scholars, such as the Belgian writer Pierre Maillart (1550–1622), who cites the treatise extensively in his dissertation, *Les tons ou discours, sur les modes de musique, et les tons de l'Eglise, et la distinction entre iceux* (Tournay: Charles Martin, 1610).

prior origin stories of the church keys. For example, the French organist Jean Titelouze (c. 1562–1633)—an important theorist in Powers's psalmody-focused origin story for Mattheson's keys[106]—writes in the preface to his 1626 Magnificat cycle that, "I shall not go on to demonstrate that there are twelve modes in the antiphons that are chanted in the church, Glarean, Litavicus and others have proved it sufficiently [...]. I will only say that the Church having reduced all the antiphons and canticles to eight tones, it is necessary that we follow that arrangement."[107] In this comment, Titelouze obliquely cites the *Musicae epitome* by referencing both Glarean and Litavicus. Evidently Glarean's small work reached beyond his immediate circle.

In their treatise, Glarean and Litavicus make explicit the relationship between the fifth and sixth Gregorian psalmody formulas and the new Ionian (11 and 12) modes. As this treatise has not been translated to English, I cite it at some length. For the Ionian (11) mode, they write:

> In our time no other mode is used as much as the Ionian, but not in its natural position, rather it is raised a fourth higher on f with *fa* on *b* [...] for 400 years [from ca. the twelfth to the sixteenth century], they [the Ecclesiastics] have often made the Ionian from the Lydian, with the fifth *fa fa* [F to C] corrupted to *ut sol* [F to C with B♭] [...], the *fa* [B♭] [may have] slipped in, or they may have deemed it to sound softer than [with] a *mi* [B♮]. Moreover, the cantors have no other song in their ear than this mode [the Ionian], about which one could speak a lot, but what does it help in the face of those that don't understand? The intonations are without a doubt those of the Lydian [mode] with *fa* for *mi* on *b*: *Sol sol la fa sol mi,* for *fa fa sol mi fa re*.[108]

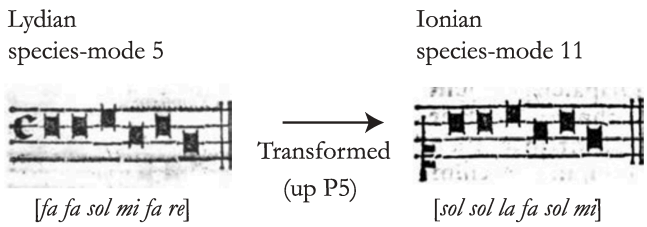
106 See Powers, "From Psalmody to Tonality," 306–9.

107 "Je ne m'étendrai point, pour montrer qu'il y a douze modes aux antiennes qui s'y chantent: Glarean, Litavicus et d'autres l'ont assez prouvé, joint que cela n'est point de mon sujet; je dirai seulement que l'Église ayant réduit toutes les antiennes et les cantiques en huit tons, il faut que nous suivions cet ordre." Cited and translated in Almonte C. Howell, "French Baroque Organ Music and the Eight Church Tones," *Journal of the American Musicological Society* 11/2–3 (1958), 107–8; Jean Titelouze, "Le Magnificat ou Cantique de la Vierge pour toucher sur l'orgue, suivant les huit tons de l'Église" (Paris: Pierre Ballard, 1626). Glarean and Litavicus are also discussed extensively in Maillart, *Les tons ou discours*.

108 "ZV [In] unseré zitté ist kein Modus mer im bruch [Gebrauch] dañ diser Ionicus aber nitt in sinem natürliché sitz [?] sunder ein Quart erhöcht in f mitt dem fa in b. Zů tantzen Tripudiem/ uñ zů allez liecht fertikeit gar geschickt durch alle dise land/ aber by den alté[n] Ecclesiasticis gar seltzam/ wie wol ietz vó cccc. Saren här/ hatt man vß dé Lydio offtermal Ionicum gemacht/ so die Quint fa fa gefälscht wirt/ in ut sol. Etlich von andacht das fa hinin geschloufft/ oder bases sy důcht hett/ weicher Tönen / dann mi. Es hand ouch die Cantores kein gesang in ur/ dañ dises Modi/ da vó vil gesagen wär/ aber was hilfft es vnuerstenden? Die Intonationes sind onzwifel wie in Lydio fa für mi in b: Sol sol la fa sol mi/ für fa fa sol mi fa re." Glarean and Litavicus Vuonneger, *Uß Glareani Musick ein Ußzug [Musicae epitome ex Glareani Dodecachordo]*, 92–93. I thank Tobias Tschiedl for helping me translate this passage. This is similar to a passage Glarean wrote in the *Dodecachordon*, although it is not located in the same chapter as the plainchant formulas; Glarean, *Dodecachordon Volume 1*, 1:166–67.

In short, Glarean explains that the fifth Gregorian plainchant formulas that were "corrupted" with B♭s (see Figure 29) are now transposed F Ionian (11) mode melodies. Observe, however, how Glarean takes this one step further: the solfège syllables he writes at the end of the description references the change he makes to the fifth principal *differentia*: he transposes the unaltered fifth principal *differentia* originally associated with the Lydian mode a perfect fifth up so that it appears in its "natural" position without accidentals (Figure 30). This change removes the B♭, which results in the C Ionian mode.

Figure 30: Glarean's and Litavicus's Species-modes 5 and 11 *Differentiae*[109]



Before we move on, let us review the developing changes to the link between mode and the fifth psalmody formulas. Figure 31 summarizes the changes in three stages. In the first, the fifth *differentia* and species-mode 5 are shown in their original form, as can be found, for example, in Gaffurius's *Pratica musicae* of 1496.[110] In the second stage, Wollick adds a signature flat to the *differentia* and corresponding *repercussio*-mode, presumably to reflect the altered fifth psalmody formula. In the second part of this stage, Cochlaeus replaces the altered *repercussio*-mode with an altered fifth species-mode by adding a signature flat, which Glarean later reinterprets as a transposed F Ionian (11) mode. In the final stage, Glarean transposes the altered fifth *differentia* from stage two a perfect fifth upward so that it appears in its "natural" position (i.e., C Ionian). Glarean's fifth mode in his new octonary set is thus transformed from Lydian to Ionian due to the symbiotic and evolving relationship between mode and psalmody.

It seems unlikely to be a coincidence that Glarean's and Litavicus's *differentia* for species-mode 11, the C Ionian mode, matches Banchieri's altered principal *differentia* for psalm tone 5 in his *Cartella musicale* of 1614 (Figure 32).[111] Perhaps the *differentia* correspond, as do all but the first three *differentiae*, because Glarean established this new relationship

109 Glarean and Litavicus Vuonneger, *Musicae epitome ex Glareani Dodecachordo*, 85, 102.

110 Gaffurius writes the fifth and sixth ecclesiastical formulas, including their *differentiae*, without flats; Franchinus Gaffurius, *Pratica musicae* (Milan: Guillaume Le Signerre, 1496), 45–47.

111 Adriano Banchieri, *Cartella musicale*, 3rd ed. (Venice: Giacomo Vincenti, 1614), 71.

between the fifth Gregorian plainchant formulas and the Ionian modes, and this connection propagated into subsequent Italian treatises through Zarlino (see the next section).

In sum, the changes to the fifth psalm tone and its principal *differentia* and fifth species-mode demonstrate effectively that mode influenced the development of the Gregorian plainchant formulas, just as changes made to the plainchant formulas influenced the modes.[112] Let us turn now to the sixth psalmody formula and its corresponding modal assignment.

Figure 31: Development of the Fifth *Differentia* and its Corresponding Species-mode in Three Stages

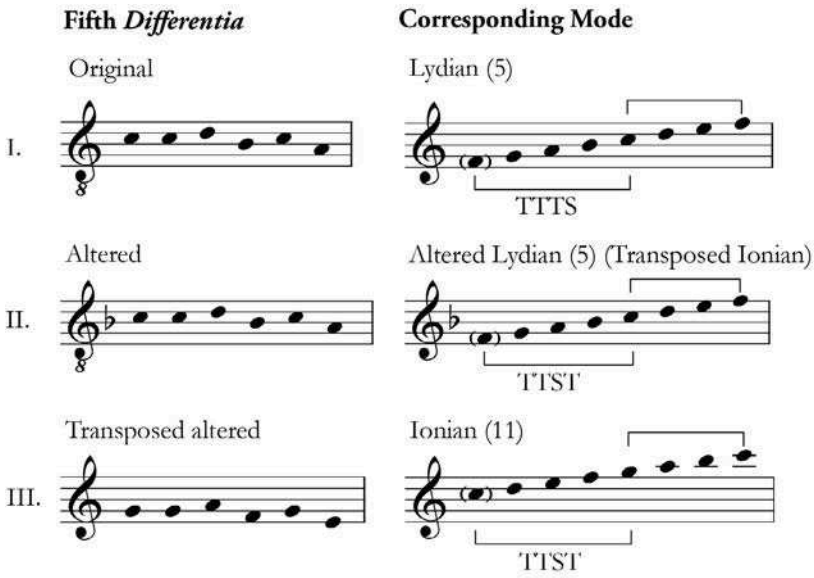
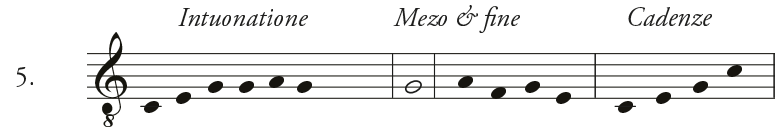


Figure 32: Banchieri's Altered Psalm Tone 5 with Principal *Differentia* and Corresponding Cadence Structure[113]



112 The claim that mode influenced Gregorian plainchant is by no means restricted to the sixteenth century. In the context of the twelfth century, for instance, Atkinson, *The Critical Nexus*, 219, has similarly noted that mode became "a Procrustean bed that forced modifications in the very melodies it was supposed to help preserve."

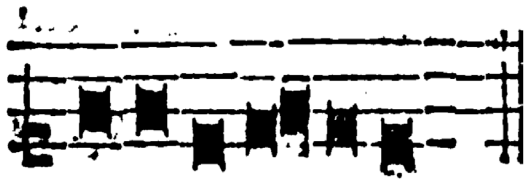
113 Banchieri, *Cartella musicale*, 71.

Glarean and Litavicus similarly associate species-mode 12 (Hypoionian) with the altered sixth Gregorian psalmody formulas to address what they believe is a common misconception: namely, that the Hypoionian (12) mode is merely a modified Hypolydian (6) mode. They write:

> No less is this mode now in use, the Hypoionian, from the master Ionian: from which the complaint arises, that it is the Hypolydian with its *fa* on *b* for the *mi*. It befits daily, courtship, and lighthearted songs, and also, for instance, laments, as one also sees in *Tütschenliedlinen* [small song books], more than is good. That is why it slowly creeped into the church, and was taken for the Hypolydian, but we must testify that it [the Hypolydian (6)] is not the mode, whether one uses it to good or to bad ends.[114]

Following their description of the Hypoionian (12) mode, they provide the sixth principal *differentia* (Figure 33) without a flat, presumably because there is no B to alter in the *differentia*'s notes.[115] Still, by listing the sixth *differentia* with the Hypoaeolian (12) mode, Glarean and Litavicus make it clear that they associate the sixth psalm tone (and all of the other sixth Gregorian psalmody formulas with B♭s) with a transposed Hypoionian (12) mode, not the Hypolydian (6) mode.

Figure 33: Hypoionian (12) *Differentia*[116]



Having discussed the changes to the original fifth and sixth modes and psalmody formulas, let us turn briefly to the Aeolian (9 & 10) modes and their corresponding psalmody formulas. Glarean's descriptions of these modes and chants provide some additional insight

114 "Njtt minder ist ietz im bruch [Gebrauch] diser Modus Hypoionicus/ dañ sin herr Ionicus: Von welché eben die klag ist/ die von Ionico sinen herren/ fûr den Hypolydio ist erin her gerissen/ mitt s[e]inem fa in b/ fûr das mi. Zû Tagw[e]isen/bûlerlied/ vñ anderen liechtfertikeiten/ etwå auch zû clag ganz geschickt/ als man auch in Tütschenliedlinen sicht/ mehr dañ etwan gût ist. Derhalben er langsam in die Kerchen krochen/ vñ für den Hypolydio angenoñen/ wie wohl wir dennoch bekenné mûssend kein Modus sin/ man mag in zû gûten und zû bösen bruchen." Glarean and Litavicus Vuonneger, *Uß Glareani Musick Ein Ußzug [Musicae epitome ex Glareani Dodecachordo]*, 93. I thank Tobias Tschiedl for helping me translate this passage.

115 The clef Glarean and Litavicus provide looks different than the C clef they normally use. However, comparison of the Latin and German versions of the examples in *Musicae epitome* make it clear that the clef is a C clef and not an F clef.

116 Glarean and Litavicus Vuonneger, *Musicae epitome ex Glareani Dodecachordo*, 102.

into why the Phrygian modes were replaced with the Aeolian modes. In short, the reason for these changes appears to be rooted in more general issues with melodies in these Phrygian modes: namely, the prominent tritone between F and B in the second species of fifth (STTT), which appear to have posed the same problems as the prominent tritone in the Lydian modes between F and B.

The tritone in the Lydian (5 & 6) modes could be tempered by simply changing B to B♭, but the same could not be done with the tritone in the Phrygian (3 & 4) modes, because B was one of the defining notes for the mode's species of fifth and fourth. Thus, to mitigate the tritone in the Phrygian (3 & 4) modes without altering their species definitions, some theorists suggested transposing chant associated with the Phrygian (3) and Hypophrygian (4) modes up a fourth with the addition of a B♭. This transposition had the added benefit of accommodating the *musica ficta* commonly used in these chants, because B♭ was employed in place of what would have been F♯.[117] But, as Glarean lamented in his *Isagoge*, some musicians seem to have left out the B♭ after transposing Phrygian mode chants. This omission led to the chants taking on Aeolian (9 & 10) characteristics, namely, a first-species fifth instead of a second-species fifth (i.e., TSTT instead of STTT).

In addition to the changing interval patterns, some additional issues appear to have caused the Phrygian modes to be replaced by the Hyperaeolian mode (and not the Aeolian). Glarean associates the Aeolian (9) mode with the so-called "wandering" psalm tone—i.e., the *tonus peregrinus* that is used with the chant "In exitu Israel de Aegypto" (Figure 34).[118] Notably, he also includes the *Magnificat* formula in this section (i.e., the major psalm or Canticle tone shown in Figure 35), which bears some similarities with the fourth major psalm-tone formula (Figure 36), albeit transposed (compare Figure 35 with Figure 36). Given Glarean's emphasis on interval-species, it seems plausible that he initially associated the transposed third psalmody formulas with the Aeolian (9) mode. This relationship was complicated somewhat, however, because he had already assigned the *tonus peregrinus* psalmody formula to the Aeolian (9) mode. For this reason, he may have connected the transposed third Gregorian plainchant formulas with the new plagal Hypoaeolian (10) mode instead.

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117 For more on why the plainchant associated with the Phrygian modes was transposed to accommodate *musica ficta*, see Aktkinson's and Pesce's discussion of the chant *Beatus servus*; Charles M. Atkinson, "The Heritage of the Church," in *The Critical Nexus*, 128–33, https://doi.org/10.1093/acprof:oso/9780195148886.003.0004; Dolores Pesce, *The Affinities and Medieval Transposition* (Bloomington; Indianapolis: Indiana University Press, 1987, https://doi.org/10.2979/theaffinitiesandmedi), 90–93.

118 For Glarean's discussion of the *tonus peregrinus*, see Glarean, *Dodecachordon Volume 1*, 1:147. Glarean's association of the *tonus peregrinus* with the Aeolian mode differs from prior theorists, e.g., Gaffurius associates the chant with the Mixolydian mode; see Franchinus Gaffurius, *The* Practica Musicae *of Franchinus Gafurius Translated and Edited with Musical Transcriptions*, 58. For more on the *tonus peregrinus* in the sixteenth century, see Mattias Lundberg, *Tonus Peregrinus: The History of a Psalm-Tone and Its Use in Polyphonic Music* (London; New York: Routledge, 2016), especially pages 39–58.

Figure 34: Glarean, *Musicae epitome*, Aeolian Mode (9), *Tonus Peregrinus*[119]

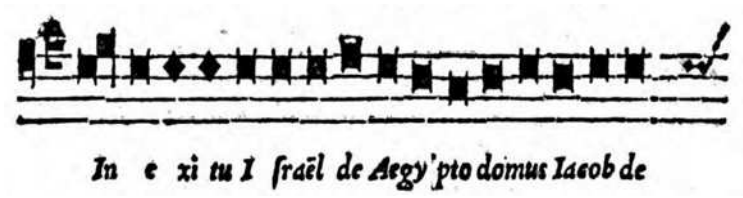
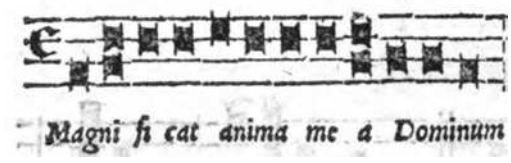


Figure 35: Glarean, *Musicae epitome*, Aeolian Mode (9), Major Psalm-Tone Formula[120]

Figure 36: Glarean, *Musicae epitome*, Phyrgian Mode (3), Major Psalm-Tone Formula[121]



To understand more fully the relationship between the third and fourth psalmody formulas and the Hypoaeolian (10) mode, consider how Glarean's and Litavicus's explanations compare with those of the author of the late-fifteenth-century treatise referred to as Anonymous XI. Anonymous XI explains that, to avoid the use of *musica ficta* (referred to as *coniunctae*) in many mode 4 antiphons[122] and to smooth the connection between psalm tone 4 and the subsequent repetition of the transposed antiphon, one should transpose the psalm tone 4 *differentia* (Figure 37)—and thus psalm tone 4—up a fourth (Figure 38). Anonymous XI transposes the *differentia* but does not add a signature flat. This omission would be a mistake in Glarean's view because Anonymous XI thus altered the chant melody's distribution of whole and half-steps—i.e., they transformed the psalmody formula.

119 Glarean and Litavicus Vuonneger, *Musicae epitome ex Glareani Dodecachordo*, 97.
120 Ibid., 97.
121 Ibid., 80.
122 These antiphons include "Stetit angelus," "Benedicta tu in mulieribus," and "Exaltata est," which Gevaert has classified as "theme 29" antiphons; Pesce, *The Affinities and Medieval Transposition*, 92.

Figure 37: Anonymous XI, Psalm Tone 4 *Differentia* (original; mid-to-late fifteenth century)[123]

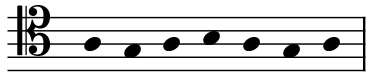
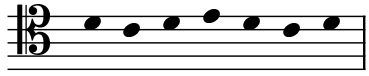


Figure 38: Anonymous XI, Psalm Tone 4 *Differentia* (transposed up a fourth; mid-to-late fifteenth century)[124]



Glarean and Litavicus interpret Anonymous XI's explanation in a different way. Rather than identifying the transposed and transformed version of the fourth principal *differentia* as merely a transposed fourth *differentia* for the Hypophrygian mode, they classify it as the *differentia* for the Hypoaeolian (10) mode:

> We know no proper intonation [for the Hypoaeolian mode] except for one, which nearly falls [Latin: *cadit*, German: *küpt*] into the Hypophrygian [mode], [and this is because] the ministers of the Church care little (although this is sufficient in other ways) about modes. Responsories have their proper verse as is clear from the Responsory *Circumdederunt*.[125]

In this illuminating passage, Glarean and Litavicus clarify that they interpret psalm tone 4 with its principal *differentia* (Figure 39) as a Hypoaeolian (10) mode formula that ends with a Hypophrygian final (E). This logic is sensible because psalm tone 4 with its principal *differentia* has characteristics of the Hypoaeolian (10) mode, with neighboring motion around A and a characteristic "Hypophrygian" (4) descending or "falling" motion that concludes on the modal final E.

Glarean and Litavicus take the association of the fourth psalm tone with the Hypoaeolian (10) mode one step further, however. The principal psalm-tone *differentia* that they

123 Pesce, *The Affinities and Medieval Transposition*, Chapter IV, Anonymous XI.

124 Ibid.

125 "Intonationes proprias nullas nouimus praeter unam quae propemodum in Hypophrygium cadit, parum curantibus Ecclesiasticis cum sit alioqui sat Modorum. Responsoria habent proprium Versum ut patet in Responsorio Circundederunt"; Glarean and Litavicus Vuonneger, *Musicae epitome ex Glareani Dodecachordo*, 99. I thank Alessandra Ignesti for translating this passage. The German version of this passage is similar: "Concerning the intonations, we do not know anything particular, except for one that nearly [*schier*] suits [*küpt*] the Hypophrygian, so we leave it be, as we have enough *Tonen* [i.e., melodies] anyway. The responsory verse is *Circumdederunt me*. We do not know any introits." ("Der Intonation halb wüssend wir nichts sonderlichs, das er schier in Hypophrygian küpt da wir es auch bleibé lassend/ dañ es sunst genug Tonen sind. Der Responsorioru verßt ist im Responsorio Cizcudederut me. Introituu wüssend wir keine.") Glarean and Litavicus Vuonneger, *Uß Glareani Musick ein Ußzug [Musicae epitome ex Glareani Dodecachordo]*, 91.

associate with the Hypoaeolian (10) mode is a transposition of the *differentia* they provide for the Hypophrygian (4) mode up a perfect fourth (see Figure 40). Thus, whereas Anonymous XI explained the transposed (transformed) psalm tone 4 *differentia* as a transposed version to accommodate transposed mode 4 antiphons, Glarean and Litavicus recognize the transformation and reassign it and its associated plainchant formulas to the Hypoaeolian (10) mode.[126]

Figure 39: Psalm Tone 4, Annotated (modern version, equivalent to that found in Guido D'Arezzo's *De modorum formulis et cantuum qualitatibus* and modern Vatican sources)[127]

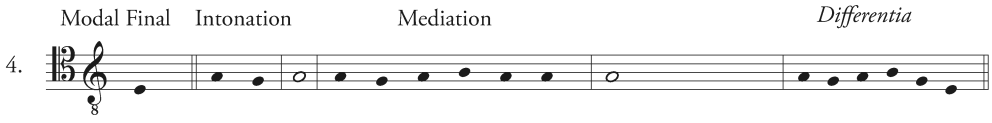
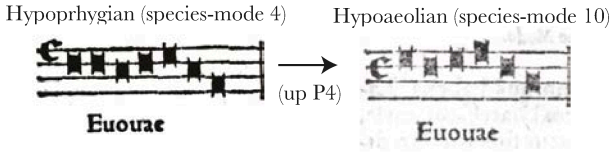


Figure 40: Glarean, *Musicae epitome*, Hypophrygian Mode 4 Principal *Differentia* (left) and Hypoaeolian Mode 10 Principal *Differentia* (right)[128]



In addition to remedying the intervallic connection between the altered third and fourth plainchant formulas and their corresponding species-modes, the Hypoaeolian (10) mode likely served as an ideal replacement for the Phrygian (3) and Hypophrygian (4) modes for Glarean because it offered a modal compromise with them. In his *Dodecachordon*, for example, he explained that the octave E to E can be called "the Second Phrygian or Hypoaeolian" mode,[129] despite the fact that the Phrygian mode is authentic, the Hypoaeolian mode is plagal, and the two modes are defined by different species of fifths (see Figure 41). Nevertheless, the Hypoaeolian (10) mode may have proved a valid replacement for the Phrygian (3 & 4) modes because its species of fifth better reflected the melodic characteristics

126 Glarean makes a similar passing comment about this relationship in his *Dodecachordon Volume 1*, 1:163: "The intonation of the lesser Psalms in this mode [the Hypoaeolian] is deduced from the preceding, and from the Hypophrygian it differs very little in *phrasis*, but very much in position."

127 Troelsgård et al., "Psalm."

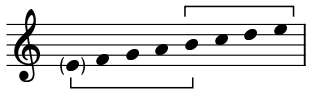
128 Glarean and Litavicus Vuonneger, *Musicae epitome ex Glareani Dodecachordo*, 97, 80.

129 Glarean, *Dodecachordon Volume 1*, 1:114.

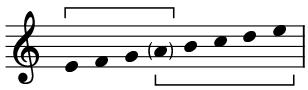
of the frequently transformed third and fourth psalmody formulas (through transformational transposition without a flat); additionally, its species of octave was the same as the authentic Phrygian (3) mode (E to E), and its modal final (on A) matched the note that many mode 3 and 4 chants emphasized and ended on after they were transposed. Finally, as I have suggested above, Glarean likely chose the Hypoaeolian (10) mode in place of the of the Aeolian (9) mode because he had already assigned the Aeolian (9) mode to the *tonus peregrinus* or "wandering" psalm tone.[130]

Figure 41: Species-modes 3 (Phrygian, top, written in ascending motion to represent the authentic mode) and 10 (Hypoaeolian, bottom; finals indicated by parenthesis)

A. Phrygian Mode (3)



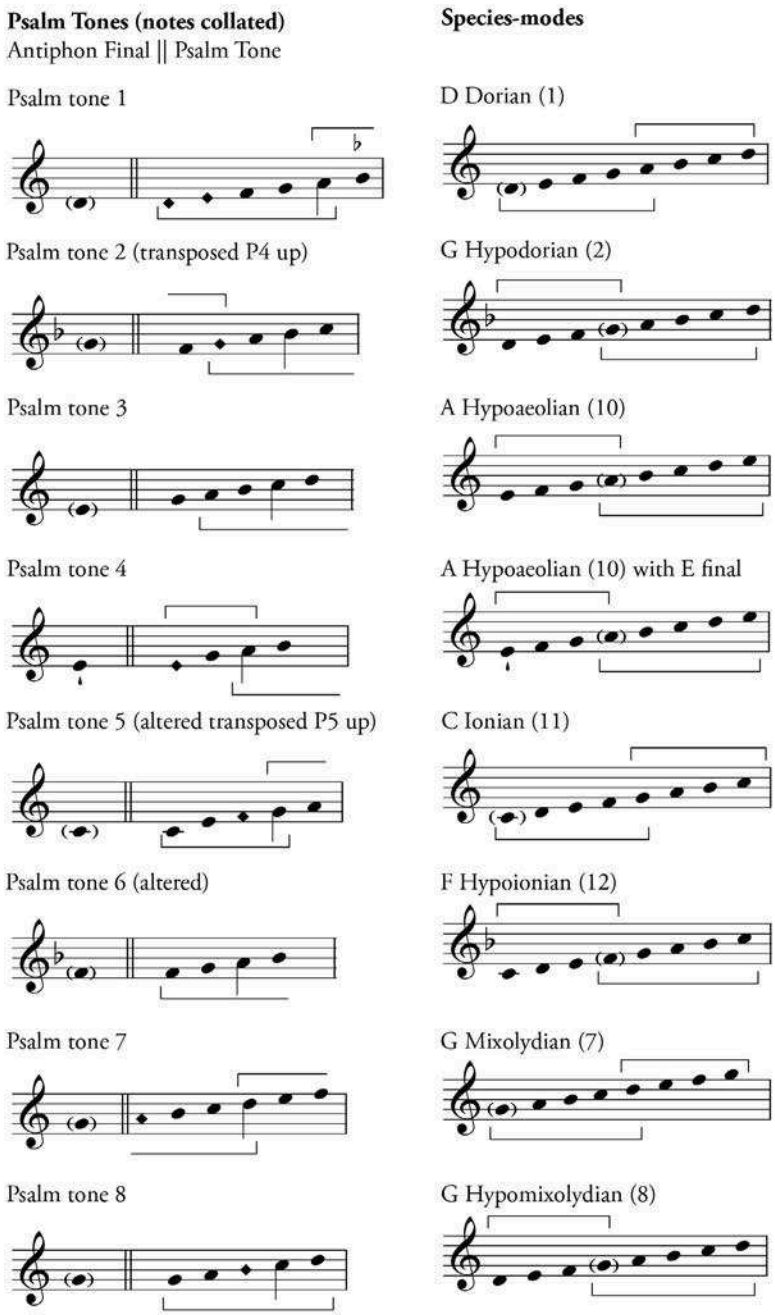
B. Hypoaeolian Mode (10)



To summarize this section, Figure 42 shows the eight psalm tones with their principal *differentia*—some altered, as they were written in several sixteenth-century treatises—with their notes collected and placed in an ascending scalar pattern on the left-hand side, and Glarean's corresponding new set of eight species-modes on the right-hand side. Diamond note-heads on the left-hand side highlight pitches that are in the principal attached *differentiae* but not the psalm-tone formulas. Stemmed notes indicate the psalm-tone reciting notes (*repercussa*). Brackets below the staves partition the species of fifth, and brackets above show species of fourth. Comparison reveals that Glarean's new, well-defined eight species-mode subset, which he formed by replacing and transposing certain modes from the original eight species-modes with his new Aeolian and Ionian modes, now corresponds well to the altered psalmody formulas' melodic intervals.

130 For Glarean's association of the Aeolian mode with the *tonus peregrinus* in his *Dodecachordon*, see Glarean, *Dodecachordon Volume 1*, 1:147–48.

Figure 42: Psalm Tones (collated, left side) with Glarean's Eight Species-mode Subset (right side) (Diamond noteheads indicate notes that are in the psalm-tone *differentia* but not the psalm-tone formula, and stemmed notes indicate the reciting note [*repercussa*].)



4. GLAREAN'S EIGHT SPECIES-MODE SUBSET IN THE LATE SIXTEENTH AND SEVENTEENTH CENTURIES

Up to this point, we have seen how Glarean reassigned certain altered plainchant formulas to a new set of eight species-modes—a subset of his twelve—in order to remedy modal inconsistencies with the altered psalmody formulas that he likely found in his predecessors' treatises. This final section demonstrates how Glarean's new octonary species-mode subset propagated into subsequent treatises in the sixteenth and seventeenth centuries, suggesting that an improved understanding of this mode-psalmody interface might influence how we understand the tensions between psalmody and mode in the seventeenth century and thereafter. To simplify what follows, this section is partitioned into three shorter parts: (1) an overview of the Lydian modes becoming the Ionian, (2) a snapshot of the Phrygian modes being replaced by the Aeolian modes, and finally, (3) a discussion of the seventh psalm tone and the alternate modal associations that result depending on whether the *differentia* is included in the formula.

4.1. From Lydian to Ionian

Shortly after Glarean published the *Dodecachordon*, the twelve species-mode system was picked up by Italian theorists, most notably Gioseffo Zarlino sometime before 1549.[131] In his *Istitutioni harmoniche* (1558), Zarlino recapitulates Glarean's theoretical advancements but does not cite Glarean as their originator.

Despite the lack of attribution, Zarlino's explanations closely match Glarean's. Zarlino explains, for instance, that species-modes 5 and 6 (the Lydian modes) were changed into species-modes 11 and 12 (the Ionian modes) by "putting the note b-flat in the place of the note b-natural."[132] Zarlino's rehashing of Glarean's modal replacements were repeated in numerous Italian treatises afterwards, most notably in Girolamo Diruta's *Il Transilvano* of 1593, Adriano Banchieri's *Cartella musicale* of 1614, and Giovanni Bononcini's *Musico*

131 It is evident that Zarlino discovered Glarean's theory around this period, as Glarean's new twelve-mode system undermined Zarlino's greatest compositional project of the time, a motet cycle called "Song of Songs" that was initially designed to exemplify the original eight modes. Zarlino changed his classification of his mode 5 piece to mode 11 after encountering Glarean's work; see Cristle Collins Judd, "A Newly Recovered Eight-Mode Motet Cycle from the 1540s: Zarlino's Song of Songs Motets," in Anne-Emmanuelle Ceulemans and Bonnie J. Blackburn (eds.), *Théorie et Analyse Musicales: 1450-1650* (Louvain-la-Neuve: Dèpartement d'histoire de l'art et d'archéologie de l'Université Catholique de Louvain, 2001), 229–70; Cristle Collins Judd, "Renaissance Modal Theory: Theoretical, Compositional, and Editorial Perspectives," in Thomas Christensen (ed.), *The Cambridge History of Western Music Theory*, 389, https://doi.org/10.1017/chol9780521623711.014; Gioseffo Zarlino and Cristle Collins Judd, *Motets from 1549, Part 1: Motets Based on the Song of Songs* (Middleton, WI: A-R Editions, Inc, 2006, https://doi.org/10.31022/R145), vii–xxii.

132 Gioseffo Zarlino, *On the Modes [Istitutioni Harmoniche. 4a pt. English]*, ed. Claude V. Palisca, trans. Vered Cohen (New Haven; London: Yale University Press, 1983), 85–86.

prattico of 1673.[133] It is likely that these later Italian theorists reference Zarlino as the authority on mode because he (to put it bluntly) plagiarized Glarean.[134]

4.2. From Phrygian to Aeolian

Glarean's association of the Hyperaeolian (10) mode with the transposed third and fourth psalmody formulas propagated into the latter half of the sixteenth century and the seventeenth century as well. Zarlino remarks, for example, that species-modes 3 and 4 (the Phrygian modes) are often "mixed" with species-mode 10 (the Hypoaeolian) due to the frequent cadences made on *a* and the regular emphasis on the first species of fifth (TST-T).[135] Later theorists reiterate Zarlino, even though the replacements erase the authentic versus plagal distinction between the modes.[136] Zarlino's modal explanations may somewhat obscure how these replacements relate to psalmody formulas, but it seems likely from our study of Glarean's changes that the relationship between species-mode and altered psalmody formulas drives the modal replacements Zarlino espouses.

In the seventeenth century, the Phrygian (3 & 4) modes appear to be replaced with the Hypoaeolian (10) mode for similar reasons. For example, the Italian musician-theorist Giovanni Bononcini—whom Johann Mattheson named as one of the best theorists[137]—writes in his *Musico prattico* (1673), that "The third and fourth modes are not needed, because they are difficult to set with more than two to three voices on account of the lack of the perfect fifth in the cadence on B, which for these modes is a regular note."[138] In their place, he continues, one should use "the tenth [mode] instead of the third and fourth [modes]—except when the final ending cadence is sometimes used from the fourth tone

133 Girolamo Diruta, *The Transylvanian (Il Transilvano): Volume 2*, trans. Murray C Bradshaw and Edward J Soehnlen, 2nd ed., vol. 38, Musicological Studies (Henryville: Institute of Mediæval Music, 1984), 117; Banchieri, *Cartella musicale*, 137; Giovanni Maria Bononcini, *Musico prattico* (Bologna: Giacomo Monti, 1673), 138.

134 Powers, "Is Mode Real?," 17, remarks that "Zarlino's modal constructions are, to put it plainly but truthfully, plagiarized from Glarean."

135 See Zarlino, *On the Modes [Istitutioni Harmoniche. 4a pt. English]*, 63–64, 89.

136 Diruta, *The Transylvanian (Il Transilvano): Volume 2*, 117, remarks, for example, that, "speaking of the fourth tone [mode], I say that many composers and organists give the name of the fourth tone [mode] to that which is actually the third, since they do not use melodic motion different from the authentic tone [mode]." Glarean similarly notes that "An even mode tends to descend, but an uneven mode tends to ascend"; Glarean, *Dodecachordon Volume 1*, 1:69.

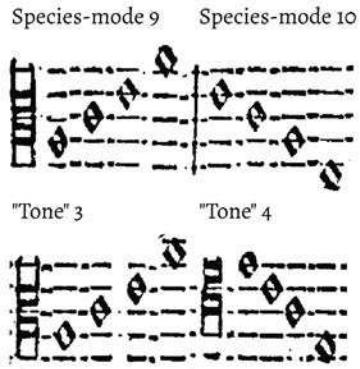
137 See Gregory Barnett, "Giovanni Maria Bononcini and the Uses of the Modes," *Journal of Musicology* 25/3 (2008), 231, https://doi.org/10.1525/jm.2008.25.3.230.

138 "Il terzo, e quarto Tuono non vengano vsati, perche à più de due, ò trè voci non sono bene pratticabili, per mancanza della quinta perfetta nella cadenza di questa corda B regolare de i detti Tuoni"; Bononcini, *Musico prattico*, 147. The German translation of this passage reads: "Es werden der dritte und vierte Ton aber nicht gebraucht, die weil sie mit mehr den zwei biß drei Stimmen schwerlich angehen, wegen Ermanglung der vollkommenen Quinte in der Cadenz B. welches dieser benden Tone regular-Corde ist"; Giovanni Maria Bononcini, *Musico prattico: Part 2* [German Translation: *Musicus practicus*], (Stuttgart: Paul Treu, 1701), 90–91.

[on E]."[139] In other words, he suggests that one should replace the Phrygian (3 & 4) modes with the Hypoaeolian (10) mode and use either a cadence on A or E. For his exemplary duos for modes 3 and 4, Bononcini writes the same duo twice, but adds an additional cadence on E to signify the "cadenza finale del quarto tuono."[140] Bononcini's modal explanation accords well with Glarean's and further demonstrates the symbiotic influence of mode and psalmody.

Banchieri's explanations for the third and fourth "ecclesiastic tones" (church keys) in his *Cartella musicale* (1614) differ from Glarean's modal explanations because Banchieri does not explicitly associate them with species-modes 9 (Aeolian) or 10 (Hypoaeolian).[141] Nevertheless, he writes the same cadence structures for both church keys 3 and 4 and species-modes 9 (Aeolian) and 10 (Hypoaeolian); see Figure 43.[142] I propose that these structural similarities imply that Banchieri conceptualized his church keys 3 and 4 in similar ways as species-modes 9 and 10 (the Aeolian modes).

Figure 43: Banchieri's Cadence Structure for Species-modes 9 and 10 (top) and Ecclesiastical Tones 3 and 4 (bottom)



139 "[I]l decimo in luogo del terzo, e del quattro, eccetuato qualche volta la cadenza finale, che si serue di quella del quarto"; Bononcini, *Musico prattico*, 138. The German version of this passage reads: "Der zehende aber an statt deß dritten und vierten, ausgenommen was die Schluß-Cadenz anlanget indem er zuweilen der jenigen aus dem vierten Ton sich bedient"; Bononcini, *Musico prattico: Part 2* [German Translation: *Musicus Practicus*], 82.

140 Gregory Barnett, "Modal Theory, Church Keys, and the Sonata at the End of the Seventeenth Century," *Journal of the American Musicological Society* 51/2 (1998), 271, https://doi.org/10.2307/831978.

141 See Adriano Banchieri and Clifford Alan Cranna, Jr., "Adriano Banchieri's *Cartella musicale* (1614): Translation and Commentary" (Ph. D. diss., Stanford University, 1981), 299–300.

142 Banchieri, *Cartella musicale*, 136.

Explanations for using the Aeolian modes with alternate cadences instead of the Phrygian modes can be found in seventeenth-century French treatises as well. As Almonte Howell interprets Nicolas Gigault's *Livre de musique pour l'orgue* of 1685, using slightly anachronistic key terminology, "The pieces for Tones III and IV are combined in a rather ingenious manner. They all conclude in A minor, but if the organist intends Tone IV rather than III, he simply stops on the E major dominant chord instead of completing the cadence."[143] Analogously, André Raison, in his *Livre d'orgue contenant cinq messes suffisantes pour tous les tons de l'église* of 1688, shows that the mass in tone 3 can be used for tone 4 if one stops on the penultimate chord (E major) instead of the ultimate (A major through a Picardy third). Thus, we find Aeolian-for-Phrygian modal replacements in the seventeenth century that appear to have been motivated by similar concerns reflected in Glarean's circle.

4.3. Psalm tone 7 and its varying mode

In his psalmody-focused origin story of the church keys, Powers sought to explain why Banchieri's seventh church key (D with a flat) differs from Mattheson's D major. Powers eschewed a modal, interval species-based explanation, favoring instead one that maintained a psalmody-focused narrative. I propose an alternative solution based on the mutual influence of mode and psalmody.

When fixed-pitch space took over relative-pitch space (i.e., when instruments established the pitch space instead of voices alone), theorists initially transposed species-mode 7 (G Mixolydian) chants, including the psalmody associated with that mode (e.g., psalm tone 7 in Figure 44), down a perfect fifth with the help of B♭ to make chants more comfortable to sing (i.e., to C Mixolydian with a B♭; see the transposed psalm tone 7 in Figure 45). Zarlino, for instance, explained that "many times, with the help of the note b-flat, it [the Mixolydian (7) mode] is transposed down by a diapente [fifth] without any trouble."[144] Inconsistencies arose, however, with the relationship between species-mode 7 and psalm tone 7. In his *Cartella musicale* (1614), Banchieri remarks that "The seventh [species-] mode does not work well for the chorus, although [it is suitable] for high instruments. One should employ the tenth [species-]mode [transposed] down a fifth by B♭, which serves as the seventh tone."[145] Why does Banchieri advise replacing an authentic Mixolydian (7) mode with the plagal Hypoaeolian (10) mode?

As Banchieri's modal replacement does not accord well with modal theory alone, perhaps he advanced this replacement to account for the species characteristics (i.e., the me-

143 Paraphrased from Howell, "French Baroque Organ Music and the Eight Church Tones," 116.
144 Zarlino, *On the Modes [Istitutioni harmoniche. 4a pt. English]*, 74.
145 Banchieri and Cranna, "Adriano Banchieri's *Cartella musicale*," 300; Banchieri, *Cartella musicale*, 137.

lodic interval patterns) of the transposed psalm tone 7 formula with the attached *differentia* (Figure 45). The modal characteristics of the transposed D Hypoaelian (10) mode match the (transposed) psalm tone 7's first-species fifth (D up to A, TSTT) in the *differentia* and the final note (D). Banchieri may have chosen to connect the plagal version of the Aeolian mode (species-mode 10) with the seventh psalm tone because he had already assigned the authentic mode (species-mode 9) to the *tonus perengrinus*, as Zarlino, following Glarean, had a half century prior.[146]

Figure 44: Psalm Tone 7 with its Principal *Differentia* in its Natural Position

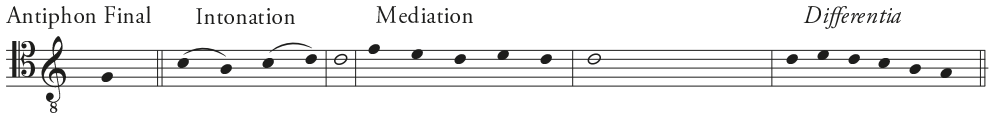
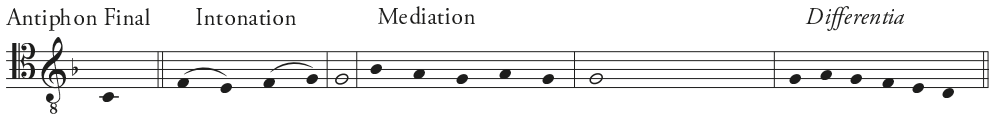


Figure 45: Psalm Tone 7 with its Principal *Differentia* Transposed Down a Fifth with the Help of B♭



It appears that Banchieri's chosen seventh *differentia* (see the right-hand side of Figure 45) played a role in his modal assignment, because seventeenth century composers who ignore the *differentia* associate the seventh psalm tone with the Mixolydian (7) mode. For instance, in the preface to his seventh *Magnificat* setting of 1626, Jean Titelouze writes that "The seventh [psalm tone] has five or six sorts of finals [i.e., *differentiae*], which is why I treated it according to the *dominante* of its antiphon that resembles our ninth mode [a transposed version of Zarlino's renumbered species-mode 9, i.e., Glarean's species-mode 7 (D Mixolydian)] [...] I transposed it a fourth lower for the convenience of the choir."[147] In other words, by ignoring the many *differentiae* assigned to the seventh psalm tone (e.g., see Figure 5), Titelouze maps the transposed seventh major psalm (*Magnificat*) to the transposed D Mixolydian mode. Titelouze and Banchieri thus advance two different modal connections with psalm tone 7, either Hypoaeolian (10) or Mixolydian (5), depending

146 See Glarean and Litavicus Vuonneger, *Musicae epitome ex Glareani Dodecachordo*, 88–90; Zarlino, *On the Modes [Istitutioni harmoniche. 4a pt. English]*, 78–80.

147 "Le Septième fait cinq ou six sortes de finales, c'est pourquoi je l'ai traité suivant les dominantes de ses antiennes qui ressembent à notre Neuvième Mode"; Titelouze, "Le Magnificat ou Cantique de la Vierge pour toucher sur l'orgue, suivant les huit tons de l'Église."

largely on whether the *differentia* is included with the psalm-tone formula. In this light, Titelouze's modal explanation does not seem specious, as Powers suggests.[148] It may have posed difficulties for Powers's psalmody-focused narrative, because he sought to avoid modal explanations, but it is sensible when we recognize the developing and symbiotic interface between species-modes and psalmody.

CONCLUSION

To conclude this article, I summarize Glarean's modal changes and briefly describe how they began to coalesce into a smaller modal subset. In essence, Glarean replaced the Lydian (5 & 6) and Phrygian (3 & 4) modes with the Ionian (11 & 12) and Aeolian (9 & 10), respectively, to improve the connection between their interval species and the interval patterns expressed by an altered set of Gregorian psalmody formulas. Already in Glarean's time, the Mixolydian modes were beginning to coalesce into the Ionian mode, and the Dorian and Aeolian modes were becoming associated with the "minor mode." Although there are some deviations along this path, these combinations arose because the Dorian and Aeolian modes share the first species of fifth (TSTT) and the Mixolydian and Ionian modes share the same fourth species of fifth (TTST). Glarean noted, for example, that the Mixolydian mode was almost unknown during his time because it shared the same species of fifth with the Ionian, a more "celebrated mode," and singers regularly replaced the *re sol* species of fourth with *ut fa*—in modern terminology, singers used the leading tone in many Mixolydian mode pieces, which changed their mode from Mixolydian to Ionian.[149] Glarean also remarked that singers regularly altered the Dorian and Aeolian modes by adding or removing B♭,[150] and suggested that the "intonations of the greater psalms" for the Aeolian mode "do not differ much from the Dorian."[151]

Due to the species of fifths shared by the Dorian and Aeolian modes (TSTT) and the Mixolydian and Ionian modes (TTST), later theorists simply reference the quality of the

148 See Powers, "From Psalmody to Tonality," 306.

149 Glarean, *Dodecachordon Volume 1*, 1:170, writes: "It [the Mixolydian] was in very great use among early church musicians, but in our time the Mixolydian and its plagal, and also the Lydian and its plagal, are almost unknown in recent composers of themes. I think that this has occurred because the Ionian, a more celebrated mode, and as I believe, older in men's usage, has the fifth *ut sol* common with the Mixolydian, although not the octave-species arrangement. Further, this worked out in practice that singers would constantly add *ut fa*, which is the fourth added above in the Ionian, to this fifth, not *re sol*, the fourth of the Mixolydian."

150 Glarean contends that "Some also distort much in these songs so that one rarely finds a song in the Dorian which they have not somewhere turned into the Aeolian through the *synemmenon* tetrachord, which I do not condemn if it is done with good judgement"; Glarean, *Dodecachordon Volume 1*, 1:157.

151 Glarean, *Dodecachordon Volume 1*, 1:147. Zarlino recapitulates Glarean on this point; see Zarlino, *On the Modes [Istitutioni Harmoniche. 4a pt. English]*, 58.

third above the final as major or minor, which seems to have become associated with the quality of the entire scale-structure.[152] The Dorian and Aeolian modes persisted separately for some time into the Baroque era, and some composers continued to distinguish the Phrygian mode,[153] but these differences ultimately lost favor to the simpler "minor" mode that had a first species of fifth (TSTT) with a variable species of fourth (TST or STT, creating the Dorian and Aeolian modes, respectively).

In conclusion, the treatises written by Glarean and his immediate predecessors Wollick and Cochlaeus reveal varying attempts to improve the interface between mode and psalmody. A better understanding of this changing interface in the sixteenth century could help us recognize similar and continuing tensions between mode and psalmody in the seventeenth century. As modal theory and psalmody have clearly influenced each other since the time of Charlemagne, future inquiries into the origins of the church keys and Mattheson's major and minor keys should consider more closely the interaction between mode and psalmody in Glarean's circle.

152 For more detailed accounts of the developments that lead from four modes to two (major and minor) in German sources, see Lester, *Between Modes and Keys*, 77–117. For the French trajectory, see Julie Pedneault-Deslauriers, "The French Path: Early Major-Minor Theory from Jean Rousseau to Saint-Lambert," *Music Theory Online* 23/1 (2017), http://mtosmt.org/issues/mto.17.23.1/mto.17.23.1.pedneault.html.

153 As Barnett points out, "Well into the eighteenth century, theorists continued to argue that newer theories based on two modes, major and minor, amounted to an oversimplification precisely because of Phrygian tonalities"; Barnett, "Modal Theory, Church Keys, and the Sonata at the End of the Seventeenth Century," 271. See also Lester, *Between Modes and Keys*, 124.

Abstract

After summarizing Heinrich Glarean's twelve modes, Johannes Mattheson explained in his *Neu-Eröffnete Orchestre* (1713) that modern Italian composers used a different set of four major and four minor keys. The origin of these eight keys is complicated by modal systems in the sixteenth and seventeenth centuries and the ways theorists reconciled those systems with Gregorian psalmody. This article aims to untangle what Harold Powers (1998) called "confusions in the interface" between modal theory with Gregorian psalmody by illuminating how Glarean and his immediate predecessors resolved contradictions in these systems in the sixteenth century. Section One outlines the relationship between psalmody and early modal systems in the ninth to eleventh centuries. Section Two traces how the interface between psalmody and mode changed in three early sixteenth-century treatises written by Glarean's predecessors, Nicolaus Wollick and Johannes Cochlaeus. Section Three explores how Glarean recognized and accounted for these changes in his *Isagoge in musicen* (1516), *Dodecachordon* (1547), and *Musicae epitome* (1557). Section Four highlights how an improved understanding of the interaction between mode and psalmody in the sixteenth century influences how we understand similar tensions in the seventeenth century.

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