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Music Notation and Its Influence on Music in the Middle Ages

As with so many subjects, our understanding of the details surrounding the development of early notation is unclear owing both to the paucity of surviving documents and to the absence of clear statements of purpose in the earliest extant sources of information. There is sufficient material to make it possible to roughly trace the various systems from the earliest stages, but what is not clear is the motivation for some of the innovations and alterations in the earliest forms, or indeed the very reason for the earliest notation. It is generally assumed that the purpose for writing something down is to transmit information from one person to others. In many cases this is true, but not in all, and may not be the principal motive behind some of the earliest forms of musical notation. Since it is comparatively straight-forward to trace the gradual evolution of Western notation from its earliest forms up to the one in common use, I shall present that first, leaving until later the more speculative attempt to understand the motivation behind the changes and to chart the effect that developments in notation had on the art of music.

Notation

In order to accurately communicate the simple basics of a musical phrase it is generally understood today that a notation must indicate both pitch and duration. Other, more sophisticated elements, such as voice inflection, ornaments, and additional subtleties can also be included or omitted, but without a clear indication of the relative pitch of each note and its duration the music cannot be reproduced by someone who does not already know it. It is perhaps surprising then, that most of the oldest examples we have of a system of notation omit at least one of these basic elements, and that once an accurate system was developed it was not immediately adopted.[1]

The earliest surviving documents with musical notation are from the ninth century, the earliest being a single example from some time

in the first third of that century.[2] There are ambiguous statements in earlier documents that may indicate that ome system may have been in use as early as the seventh century, but no firm evidence of this has yet come to light. There is some variation in the earliest extant examples, but they roughly agree in the kind and amount of information transmitted. As can be seen in Plate 1, taken from what is believed to be the earliest source (first third of the 9th century), the neumes are fairly simple; they consist mainly of dashes and strokes, with a few other small shapes. In contrast to later developments, this notation does not pretend to be a graphic representation of relative pitch—the neumes are all on the same plane, rather than displaying relative pitch by placement higher or lower on a graph. The neumes also do not indicate duration, at least not by their shapes, but it is currently thought that rhythm is indicated in another way. Although there is no complete agreement about rhythm in early chant, a theory that appears to have gained some support in recent years is based on the idea that proportional rhythm can be found in the grouping of the neumes, and that a relative value of a note is determined by its position within the grouping.[3]

The neumes in Plate 1, therefore, may represent an accurate reproduction of the rhythm of the chant but not of its melody. The strokes and dashes in this system indicate higher, lower, or the same pitch, but do not specify exactly how high or low a note must be from its neighbour and therefore cannot convey to a reader the exact melody. The exact interval is not marked—a skip up or down of a full octave or a single step is indicated the same way. Plate 2 shows neume shapes from several other manuscripts, demonstrating the kind of variation found in different geographical areas within Europe between the ninth and eleventh centuries.

Manuscripts from different areas vary somewhat in the complexity of neume forms, with some including signs for various vocal inflection.[4] But regardless of the amount of performance detail present in the forms, none of these notation systems indicated precise melodic intervals. It has been concluded therefore, that the earliest surviving notation in Western sources would have been useful only to assist someone who already knew the music and simply needed a reminder—an *aide mémoire*.[5] Statements that this was indeed the usual practice can be found in a least two theoretical treatises: that

of Hucbald from ca. 900: "You cannot even vaguely detect how this was prescribed by the composer unless you get it by ear from someone."[6] and that of Guido of Arezzo from ca. 1030, who developed a new system for teaching and notating chant:

> In our times, of all men, singers are the most foolish . . . though they sing every day for a hundred years, [they] will never sing one antiphon, not even a short one, of themselves, without a master.[7]

These quotes tend to support the conclusion that until a more exact pitch notation was developed in the eleventh century, all members of religious orders were required to memorize a staggering quantity of chants taught to them by rote. The only help available was in the form of memory aides for some of the repertory originating sometime in the early ninth century, although manuscripts with neumes were neither plentiful nor widespread until several centuries later. In addition, both rote teaching and the memory aids were open to problems in accuracy of transmission, as attested to by the late eleventh century St. Gall writer John, who, in the course of advocating Guido's new system, pointed out what he believed to be a serious weakness in both earlier teaching methods:

> Since in the ordinary neumes [i.e. unheighted] the intervals cannot be ascertained, and the chants that are learned from them cannot be securely committed to memory, many inaccuracies creep into them . . . It can easily be seen how neumes without lines promote error rather than knowledge . . . The result is that everyone makes such neumes go up or down as he himself pleases.[8]

John goes on to observe that there was little agreement among the masters who were responsible for teaching others. It was only gradually that Guido's teaching system and the eventual adoption and extension of his staff system added speed, accuracy and uniformity to the transmission of the chant repertory.

During the early centuries several systems of notation other than neumes were developed, including alphabet (descending from a Greek model found in the treatise of Boethius), or other symbols connected to scale types. Most of these systems were the reverse of the unheighted neumes described above in that they indicated exact pitch but not rhythm or vocal inflection, although at least one, that advocated by Hucbald, consisted of a cumbersome combination of letters

for pitch and neumes for rhythm and voice inflection.[9] It can be concluded from context that these were principally intended for theoretical discussion of scale and modal types, rather than a vehicle for transmitting repertory for performance; none appears to have been adopted for any purpose other than to illustrate a theoretical discussion intervals in a treatise.[10]

The now-famous practical system advocated by Guido of Arezzo for the speedy teaching of chant was not notation but a system of identifying various degrees of the scale with positions on the human hand, thus allowing a teacher to indicate exact rise and fall of a melody by pointing to various joints of the fingers. But it was neumes along with later refinements of Guido's idea of lines and spaces that eventually evolved to the present system of notation.

The logical middle step between unheighted neumes and staff notation was the heighting of neumes, a system found for the first time in tenth- and eleventh-century manuscripts, many of the earliest of them from the monasteries affiliated with abbeys of St. Martial in Limoges and St. Gall. To allow accurate relative placement of the neumes, two or more dry lines were made on the page above each line of text, and the neumes organized in proximity to them. Guido of Arezzo is credited with the use of two coloured lines (yellow and red), to mark the positions of the two half-steps in the scale, thus further facilitating accurate neume reading.[11] Shortly thereafter the presently used system of lines and spaces was developed, although liturgical books notated with staffless neumes were still produced in some areas as late as the fifteenth century. By the end of the thirteenth century most varieties of neume shapes were simplified into so-called "square notation," which became the basis of all further developments in note shapes; the present-day oval note shapes being simply a stylization of the diamond headed notes of the 'square notation' system.

It would be possible to continue to trace minor variations and refinements in the development of notation through the next several centuries, but for the purposes of this essay it is sufficient to note that once the staff and square note shapes were generally adopted, all further major developments in notation were in the area of rhythm. The three basic note formations, long, breve, semibreve, were further refined and subdivided in order to allow for the notation of

sophisticated rhythmic patterns.[12]

One eventual result of the developments in rhythmic notation was to free the music from its dependence on groupings as a method of determining relative duration. Each note shape was imbued with a more or less absolute value which could transcend the limits of any of the exterior organizations used as pacing units of time measure, which also allowed a particular rhythmic grouping to extend well beyond one or more units of measure in a way in which the unit itself need not be acknowledged. In effect, the changes separated the two temporal functions of the notation—pacing of the composition, and measuring the individual notes within the phrases.

The development of a notational system that accurately indicated both pitch and duration aided in the development of one of the more interesting musical inventions in the Western world, and one that sets it quite apart from almost all other cultures: polyphony, music in more than one part. Polyphony, in its most rudimentary form consisted of the practice of singing the same song at different pitches, a technique known as parallel organum. This practice is so simple that it did not need to be notated. But if the added voice part is to have a contour and a rhythm of its own that is different from that of the original melody, the need to notate becomes imperative. At least this is what is generally believed about the development of singing in parts, and it is also believed that the stimulus for an accurate pitch and rhythmic notation system was caused at least in part by interest in the composition of this new repertory of simultaneously sounding contrasting parts. There is no doubt that in order to compose and transmit to others a complicated relationship of several composed parts, each with its own rhythmic and melodic content, the written form would be the most efficient, but it was not absolutely necessary for the creation of polyphony. A practice of improvising polyphony is known to stem from approximately the same time as the written variety and continued on at least into the seventeenth century.

Once the first interest in sophisticated polyphony developed in the Western world in the late eleventh century it is possible to trace an inexorable march as it replaced monophony as the principle musical form for serious composers and listeners. Little by little over the centuries of the late Middle Ages polyphony, both sacred and secular, became the favoured music of the upper classes. At first it was a

special effect saved for unusual occasions; later, perhaps as early as the mid-fourteenth century, it became a regular fixture along with the monophonic repertory for both secular and sacred occasions; and by the end of the fifteenth century it had almost completely supplanted monophonic secular music in the courts and held the dominant role in all churches of any size or importance, to the point of replacing much, although not all, of the chant, especially on festive occasions.

By incorporating the new rhythmic developments into polyphonic compositions, composers were able to extend rhythmic interest on more than a single level. Each voice part in the polyphonic composition could be given an interesting and sophisticated rhythmic shape, and a new dimension of rhythmic relationship between the parts could be explored. When combined with harmonic concerns this produced a multi-dimensional composition that was new and exclusively Western; one in which there was interest in horizontal rhythmic patterns in each voice individually, and at the same time on both rhythmic and harmonic vertical relationships among the parts. The amount of new area for experimentation that was opened up by the new rhythmic notational developments was so great that for four hundred years nearly all experimentation and style changes related principally to rhythm; the harmonies of the early fifteenth century were little changed from those of the twelfth. It was not until the mid-fifteenth century—the end of the Middle Ages—that the attention of composers was once again drawn towards experimentation with the harmonic aspects of the music, a development that also was marked by a lessening in the intricacies of the rhythms.

In many of the stages of the development of rhythmic notation in the twelfth, thirteenth, and fourteenth centuries it is not possible to say how much influence the notation had on the kinds of music that was being written. It is a truism to say that the new rhythmic systems were developed in answer to a need—but I am unable to pinpoint exactly what was that need or even for whom the system was changed. Was it the scribes who wished to notate more accurately those things that actually were being sung by the performers? Was it the performers who wished to have their ornamentation practices accurately notated? Or was it the composers who wished to be able to notate new musical concepts?

If any or all of the above were the reasons for the development,

then one can safely state that form followed function. But it undoubtedly did not stop there; once developed, the notation system suggested ideas to the composers who then took it to its limits, thus feeding a continuous cycle in which developments and refinements made to serve one purpose, suggest new ideas which in turn make new demands for further refinements. It is possible to actually see this cross fertilization in some cases. The most extreme example of experimentation with the limits of the notation practice is found in the repertory known to musicologists as the 'ars subtilior,' an isolated practice in Southern France and Northern Italy at the end of the fourteenth century that produced music that is so rhythmically complex that even the finest modern ensembles have difficulty performing it, example 1.

There are two possible explanations for the existence of these compositions: that they were actually experiments or didactic works intended to explore the limits of rhythmic notation but were never intended to be performed; or that this was an attempt to notate exactly the various rhythmic subtleties that were extemporized into compositions of the time by performers. The latter of these two explanations is not as absurd as it may seem if one thinks of how the members of a 1950s 'big band' actually played a written composition. Music written for that ensemble was quite simply notated, but the convention of the time called for minute anticipation or delay of many of the notes which resulted in a rhythmic complexity of such a degree that any attempt to accurately notate the practice would undoubtedly result in notation as complicated and difficult to read as that of the 'ars subtilior.' Whatever its purpose, the practitioners of 'ars subtilior' notation pushed to the very limits the ability of the notation to express subtle variations in rhythmic organizations, adding to the existing system a method of indicating ratio and diminution of the note values by changing colour (red outline, red interior, white and black interior). Some of these techniques were incorporated into the notational developments in the fifteenth century, but not until experiments in the mid-twentieth century was their any further attempt to notate music in such a complex manner.

Two other late-medieval compositional developments can be explained unequivocally as inspired by the notation itself: mensural canons and isorhythm. The mensural canons are clever experiments

demonstrating the flexibility of the notation system, especially the aspect of changing the speed and subdivision of various levels of notes. They consist of a single line of music which is changed into a polyphonic composition for two or more voices by requiring the performers to apply different systems of subdivision, Plate 3 and Example 2.

The other notationally inspired technique, isorhythm, is a process of applying a lengthy rhythmic pattern numerous times to a continuing melody so that, although the notes of the melody continue to change, the rhythm repeats over an extended period. The technique served as a composer's device for the organization of a composition and is not always audible. By the early fifteenth century this technique was occasionally extended and applied to more than one part of a polyphonic composition, resulting at its most extended use in compositions such as John Dunstaple's motet 'Veni sancte spiritus/ Veni Creator,' in which isorhythm is applied to all four voices in combination with changes of speed through note ratio.[13] The result is a composition in which the melody continues to change while the rhythm of all parts repeats in four large sections, each section employing different subdivisions of the major counting unit and proceeding at a different pace. The composition is a dazzling demonstration of Dunstaple's control of the techniques of notation; an exploration of the refinements which allow the employment of a sophisticated combination of the repetition of rhythmic and melodic elements with proportional variants.

The examples given above illustrate the influence of developments in the notational system on written music once an accurate system had been established for notating both pitch and rhythm. It is usually not possible to know the sequence or motivation behind most of the changes, whether they resulted from demands on the existing system or from experimentation with the limits of new developments. This is a 'chicken or egg' question and, in fact, the cause of any one change in the notation need not have been limited to just a single motive. The question probably has no answer nor need it be asked in most cases in order to trace the development of notation. To me, however, the most interesting questions arising from this study relate to motivation at the very beginning of notation practices: what was the reason to develop a notation system at all when obviously it had

been considered unnecessary for so many centuries, and why, after the decision was made to notate, exact pitch was considered to be optional for so long.

The most often repeated reason for the invention of a notation system is that the quantity of chants had grown too large to commit faithfully to memory. It would seem logical that as the corpus of chant grew, there was need at first for memory aids until the quantity finally grew beyond the capacity of the memory. But perhaps this was not the sole reason or even the principle cause of the development of notation, in spite of the testimony given by the ninth- and tenth-century theorists quoted above. A preliminary investigation suggests that a more plausible motive might be found by pursuing the change of influences on the early Roman Church, its organization, and its changing orientation from Eastern to Western aesthetics during the early centuries of the Middle Ages. That topic is far beyond the scope of the present essay, but the question opens up entirely new possibilities for an understanding of how changes within the Church may have had significant influence on the style of its music, resulting in the desire and the need to write it down.

Investigations of influences on the Roman liturgy of the Late Middle Ages have demonstrated at least two separate strains coming from the opposing directions of the Eastern Mediterranean and Northern Europe. It has always been acknowledged that earlier liturgies from the Eastern Mediterranean would have been the logical source of much of the background for the Roman liturgy, and a connection between Byzantine chant formulas and Roman chant has been investigated by numerous scholars. Recent work by several scholars, among them Terrence Bailey, Jrgen Raasted, and Michel Huglo, have established a clear relationship between early Greek melodic formulas and melodic outlines used in Western chant, thus providing a possible long-term tradition for the patterning of new chant melodies along general outlines determined by their modal (scale) assignment.[14] Technical details are far too involved for this essay, but in general what is suggested is that for each mode there was established a characteristic melodic outline, allowing a singer who was trained in these outlines to correctly invent a chant for a new text. This would result in not identical melodies from different singers, but melodies that agreed at the all important places.

Looking at the North of Europe for possible influences, Richard Crocker has recently pointed to strong changes on the chant stemming from the Franks as they received the traditional repertory from Rome,[15] and Leo Treitler connects this with the beginning of notation, stating that "The trend toward more informative notations must have been motivated by the need to represent non-traditional matter, and also by the need to represent even traditional matter for singers who were not as well versed in the tradition."[16] That the Northern singers were following a different melodic tradition is attested to by the ninth-century theorist Aurelian of Réomé who, while discussing one of the modes states:

> At this point, the custom of the old singers must be considered, especially of those living in Gaul, who, not following any authority of Tone, changed the verses of the responses into a procedure different in one way or another from what the sonority of the Tone is, the great number of syllables ensnaring them.[17]

What may well be at least a partial solution to the riddle of motivation for musical notation, therefore, may be tied up in this changing influence and orientation from East to North. As the Roman church expanded northward it was forced to contend with the musical traditions of its newest members. The older traditions inherited from the East were foreign to these northerners and they did not or could not adopt the traditional Eastern musical system, thus requiring both graphic instruction and at the same time significantly influencing the nature of the musical product. In other words, it may not have been the quantity of chant that caused the development of its written form, but the lack of familiarity with the traditional system of improvising the melodies, together with the Northern European changes to the basic musical concepts. The hybrid musical product that gradually resulted apparently required a new system of transmission, and we can witness this evolution in the Northern manuscripts as a system of notation began to emerge in the early ninth century.

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NOTES

1 For the purpose of this paper I am referring only to notation that appears to be intended for practical performance use and that enters into a continuous

tradition of notation. I omit notations such as those found in early theoretical accounts that were developed in order to discuss intervals but were not intended for performance.

2 The earliest example is the prosula, 'Psalle modulamina' in Munich, Bayer. St. Bibl., clm. 9543, folio 199v, from St. Emmeram, Regensburg, written between 817 and 834. In this essay I deal exclusively with Western notation. Other parts of the world developed separate systems, some of them earlier, but there is presently no known connection between that which developed in the West and any other system. See *The New Grove Dictionary of Music and Musicians*, ed. Stanley Sadie, 20 vols. London, 1980, vol. 5, p. 335.

3 See E. Cardine *Semiologia gregoriana*, Rome 1968, Fr. transl. *Etudes grégoriennes*, 11 (1970), 1–158; J.W.A. Vollaerts, *Rhythmic Proportions in Early Medieval Ecclesiastical Chant*, Leiden, 1958, rev. 1960; and G. Murray, *Gregorian Chant according to the Manuscripts*, London, 1963.

4 On the possible relationship of the various neume styles see E. Jammers, "Die paläofränkische Neumenschrift," *Scriptorium* 7 (1953); and M. Huglo, "Le domaine de la notation bretonne," *Acta Musicologica* 35 (1963), 54–84.

5 On the theory of the evolution of these notation signs from grammar see *Paleographie Musicale*, Series 1, vol. 1, Solesmes, 1889; and G.M. Sunol, *Introducció a la paleografia musical gregoriana*, Montserrat, 1925.

6 *De harmonica*, in *Hucbald, Guido, and John on Music*, transl. Warren Babb, ed. with introductions by Claude V. Palisca, New Haven and London: Yale Univ. Press, 1978, 36.

7 "Prologus antiphonarii sui," transl. O. Strunk, in *Source Readings in Music History; Antiquity and the Middle Ages*, New York: Norton, 1965, 117–20.

8 *De Musica*, in *Hucbald, Guido, and John on Music*, 147.

9 See Hucbald, *De harmonica*, in *Hucbald, Guido, and John on Music*.

10 As for example in the works of Boethius, Hucbald, and the *Musica enchiriadis*.

11 For details of Guido's system see Joseph Smits van Waesberghe, "The Musical Notation of Guido of Arezzo," *Musica Disciplina* 5 (1951), 15–63.

12 For a detailed history of the development of western notation see the bibliography following the article 'notation' in *The New Grove*, vol. 5, 344–54.

13 Published in *John Dunstable, Complete Works* ed. Manfred F. Bukofzer, 2nd revised ed., Margaret Bent, Ian Bent and Brian Trowell, *Musica Britannica* vol. 8, London: Stainer and Bell, 1970, 88–91.

14 Terrence Bailey, *The Intonation Formulas of Western Chant*, Pontifical Institute of Mediaeval Studies, Studies and Texts, 28, Toronto, 1974; Jrgen Raasted, *Intonation Formulas and Modal Signatures in Byzantine Musical Manuscripts*, Monumenta Musicae Byzantinae, Subsidia VII, Copenhagen 1966; Raasted, "The 'Laetantis adverbia' of Aurelian's Greek informant," *Aspects de la Musique Liturgique au Moyen Age*, ed. Christian Meyer, Paris, 1991,55–66; Michel Huglo, "L' introduction en Occident des formules Byzantines d'intonation," in *Studies in Eastern Chant*, Vol. 2, ed. Egon Wellesz and Milos Velimirovi, London: Oxford Univ. Press, 1973, 81–90; Huglo, *Les*

Tonaries: Inventaire, Analyse, Comparaison, Paris: Société Française de Musicologie, 1971; Huglo, "Les formules d'intonations 'noeane noeagis' en Orient et en Occident," *Aspects de la Musique Liturgique au Moyen Age*, 43–53.

15 Richard Crocker, in *New Oxford History of Music*, Oxford Univ. Press, vol. 2, 112–14.

16 Leo Treitler, "The Early History of Music Writing in the West," *Journal of the American Musicological Society* 35 (1982), 261.

17 Aurelian of Réomé, *The Discipline of Music* (Musica Disciplina), English transl. Joseph Ponte, Colorado Springs, 1968, 37.

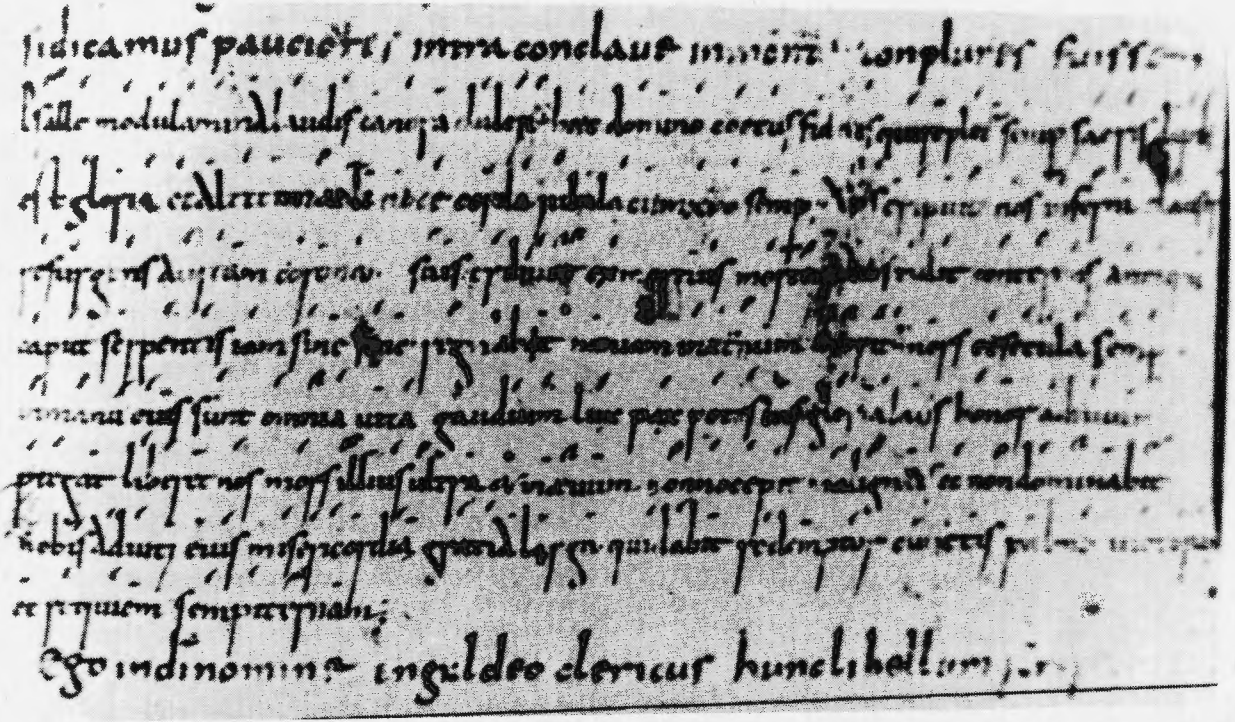


PLATE 1 FOL. 199v from Munich, Bayer. St.Bibl. clm 9543

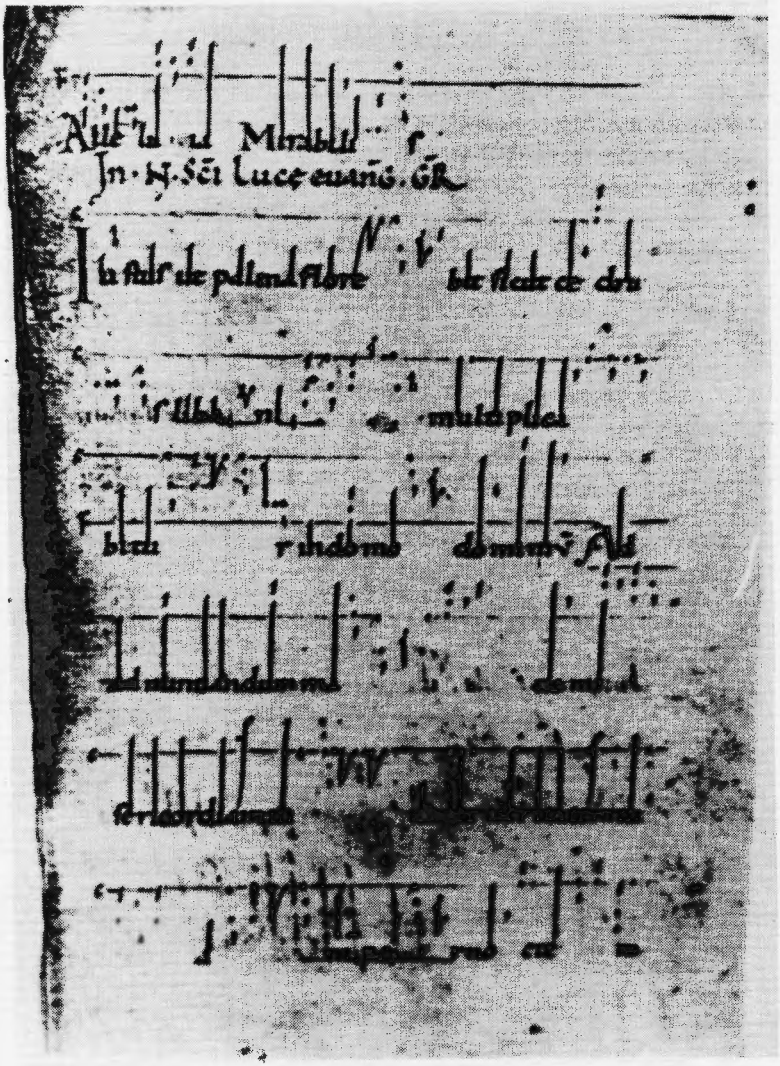


PLATE 2A NONANTULA, North Italian

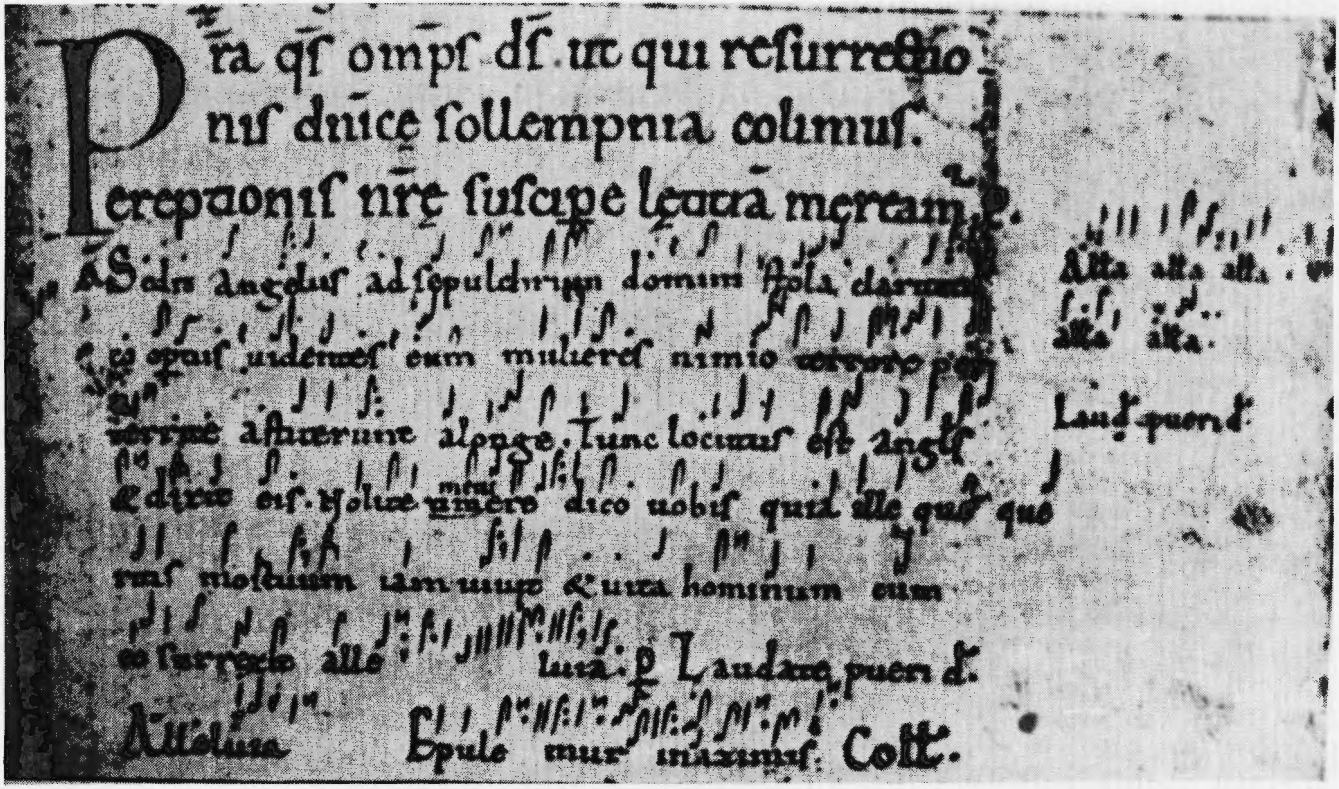


PLATE 2B LONDON, BL Harl. 2961. Anglo-Norman

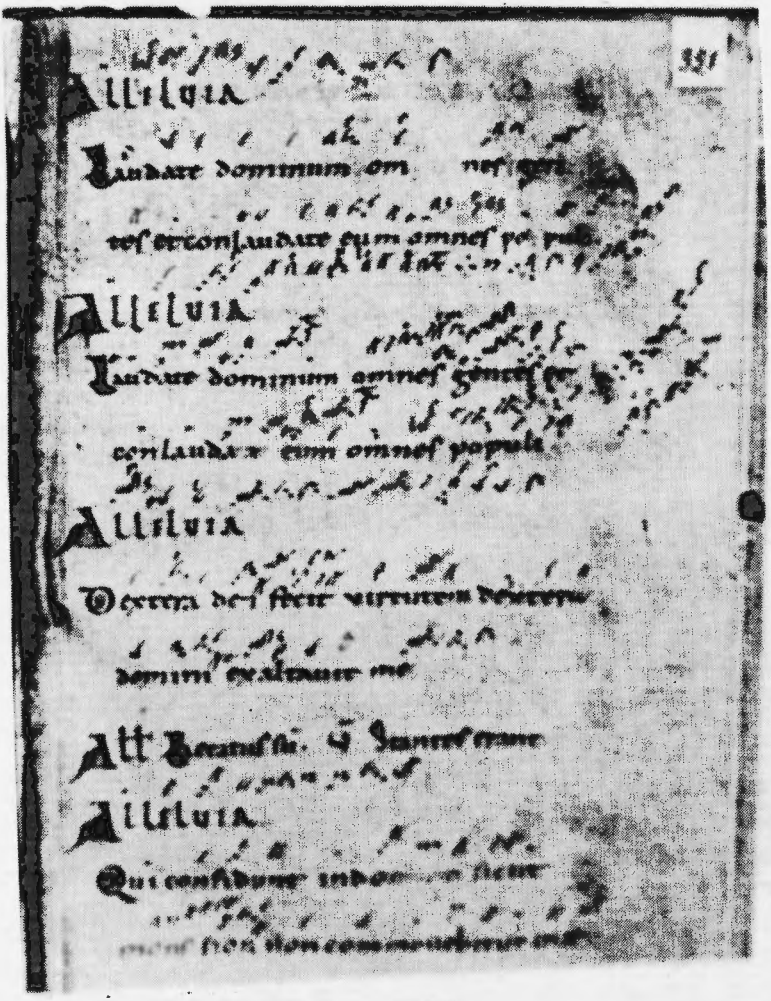


PLATE 2C EINSIEDELN, Stiftsbibl. 121. St. Gall

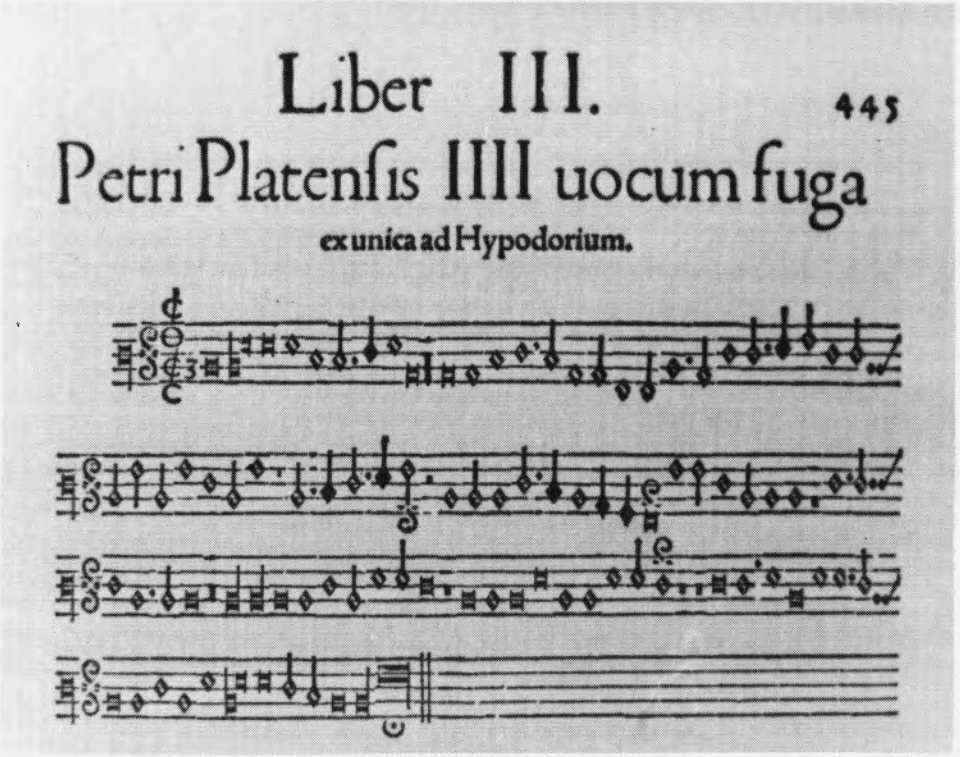
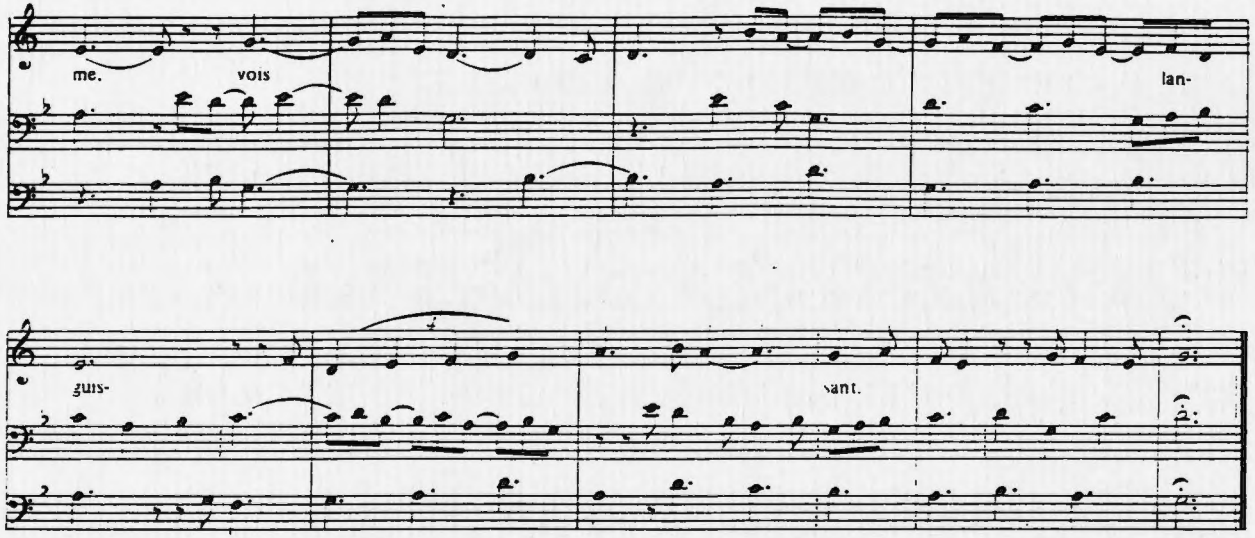
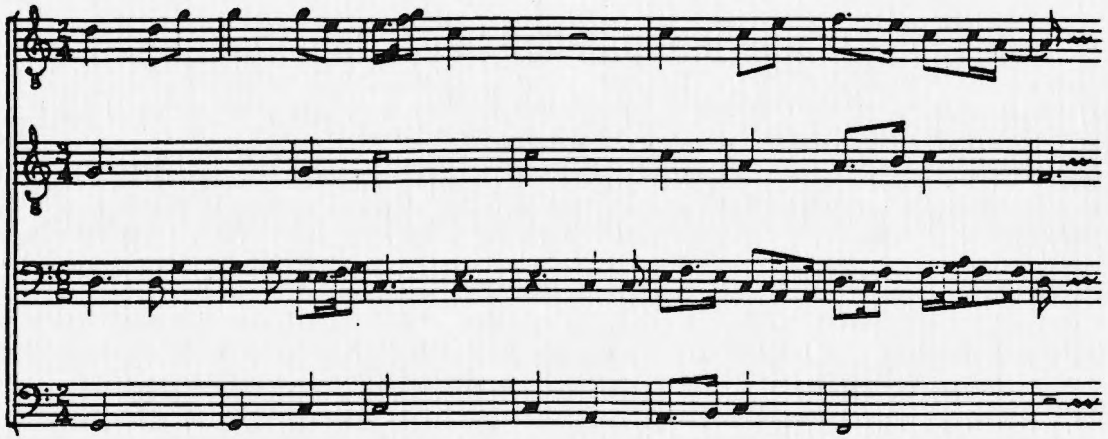


PLATE 3 **HENRICUS GLAREANUS**, *Dodecachordon*, Basel, 1547, p.445



EXAMPLE 1 **PHILIPOCTUS DE CASERTA, 'Enremirant'**



EXAMPLE 2 **PIERRE DE LA RUE.** Realizartion of opening section of mensural canon.