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## Interpretive Models of Guido of Arezzo's *Micrologus*

### 1.

Commentaries on *Micrologus* of Guido of Arezzo, written ca. 1030, began appearing as early as the second half of the eleventh century. Throughout its 960 year lifetime this succinct treatise has continued to draw the attention of theoreticians and historians of music.<sup>1</sup> These scholarly examinations of Guido's work vary in range from a few sections to the entire treatise and focus largely on the explication of specific points of theory. Several commentators have undertaken to identify the sources used by Guido, but none have attempted a study of the nature of the ideas that Guido presents in terms of his intellectual heritage. It is the purpose of this article to present such an analysis.

We set our stage with a discussion of two fundamental questions: what was Guido's training and intellectual heritage? And what exactly was the eleventh century conception of the "art" or "discipline" of music?<sup>2</sup>

Guido would have been educated according to the seven liberal arts originally formulated by Cicero: the trivium, consisting of grammar, dialectic, and rhetoric; and the quadrivium, consisting of arithmetic, music, geometry, and astronomy.<sup>3</sup> The Latin grammatical-rhetorical tradition was represented in the early medieval curriculum by the works of Augustine, Bede, Donatus, Cassiodorus, and Priscian (Chase, 5-26). Evidence about the path of Latin culture in the ninth and tenth centuries is incomplete, but grammarians and humanists are known to have existed in the monasteries. Remi d'Auxerre (A.D. 841-908), for example, wrote commentaries on Donatus, Priscian, and Augustine. Gilson mentions, in fact, that during the tenth and eleventh centuries the Italians exhibited a preference for grammar above all other liberal arts (231). *Micrologus*, as will be demonstrated, shows the strong influence of this tradition on Guido.

On the side of the quadrivium, it is beyond doubt that Guido had access to the works of Boethius and Cassiodorus and thus, indirectly at least,

to the precepts of Greek music theory. His exposure to Greek philosophy could have come indirectly through the works of Boethius and Augustine, for example, or directly through the Latin translation of the first fifty-three sections of Plato's *Timaeus* provided by Calcidius as the first part of his extensive commentary on that dialogue. The continuity of the Platonic tradition throughout the Middle Ages has been established by Klibansky, who writes of the major role of the Calcidius commentary in providing a blending of myth, science, and wisdom (74-7). A somewhat different transmission of Platonic doctrine is given through Plotinus and Augustine. Both aspects are present in *Micrologus*.

Concluding the prologue to his treatise, Guido writes of the "multis musicis argumentis" to which he has previously turned his attention (86). That this exposure included more contemporary music treatises has been discussed by several authors.<sup>4</sup> Prominently mentioned are *Musica Enchirididis*, *Scholica Enchirididis*, and *Dialogus*. And indeed, these treatises are all plainly marked by the intellectual heritage sketched above. It must be noted that the discussions to follow operate more in the background than in the foreground. Thus, in the main, the object is not to identify specific texts borrowed by Guido but to suggest possible sources for his analytical framework.

Examination of the nature of the art or discipline of music leads to the formulation of two different aspects. The first, pertaining to discipline, comes from a consideration of music as part of the quadrivium and deals with inner structure. The second, arising from a recognition of certain communalities between the spoken word and the sung word, pertains to practice and uses methods of analysis proper to the trivium to treat the outer structure. Guido, reflecting perhaps the Italian fondness for grammar and rhetoric, states a preference for the outer model; he wishes to discuss the practice of chant. But, as will be indicated, the inner model is present in *Micrologus*; in fact, the interplay of these two models is at the foundation of this treatise. A process of abstraction from certain of the works mentioned above will lead to a more precise delineation of each model.

Plato's *Timaeus* is the treatise which is fundamental to the inner model. In this dialogue *Timaeus*, a man trained in Pythagorean doctrine, describes the origin and nature of the physical world. Central to the cosmological drama is the Demiurge, a kind of primary arranger. Calcidius, a Christian, takes this arranger as his first principle, *Deus*. The Demiurge, upon beginning his work, finds matter without form or quality in a state of primitive chaos. This matter, *hyle*, is placed in a state of order through the use of definite shape and number.<sup>5</sup> The numbers used by the Demiurge are

the harmonic ratios originally described in Pythagorean theory, permitting an analogy between the ordering of the physical world and the ordering of pitches on a scale. Furthermore, no order exists without harmony, and anything which is knowable must be in a motionless state of order, therefore in a state of harmony. The soul, whose nature consists of these same harmonic numbers, has a contradictory function in Plato which is not clarified by Calcidius. On the one hand, it is the source of life or motion, and on the other, the source of theoretical reason and knowledge of that which is ordered and motionless. The senses, as instruments of the soul in its second function, provide important initial observations which can lead, through stimulation of the intellect, to the attainment of truth. Special importance is given to sight and hearing: sight as the primary source of sensible observation, and hearing as the means of appreciation of musical sound whose harmonic ratios are identical to those which order the universe.<sup>6</sup>

Augustine presents his version of Platonic cosmology in *De Ordine*, described by Gilson as Platonism filtered through Plotinus and given a Christian orientation (137).<sup>7</sup> The cosmological model given by Augustine is much the same as that described above. Augustine, however, postulates a creation *ex nihilo* from space, thus differing from Calcidius' doctrine of an ordering of original chaos.<sup>8</sup> (Plato, it should be noted, is not entirely clear on this point.)

The inner model can be summarized as follows:

1. The basic material of the universe is ordered by certain unchanging and motionless ratios.
2. Since numbers are the principles of all things, arithmetic, which is the science of numbers, is the primary quadrivial art.
3. Music, whose harmonic structure is given by these same ratios, provides an *exemplum* of these ratios and an analogy for the structure of the universe. Therefore the science of music is given a place next to the science of numbers in the quadrivial arts.
4. Only that which is ordered and unchanging can be known. The senses, in particular sight and hearing, can stimulate the soul to perform its function of theoretical reason. Nothing, however, in the constantly changing physical world is knowable.
5. Music has a special role, in that it is both knowable and unknowable. Its knowable nature is its harmonic structure; however, its outer aspect, physical sound, can only suggest truth.

It remains to derive a second model for analysis of the outer aspect of music, physical sound. Cicero, in formulating the liberal arts, had spoken of the dual importance of *sapientia* and *eloquentia*. Man's gift of rational

speech should be cultivated for the purpose of effective communication of wisdom, according to his model. The paradigms that were constructed toward this end begin with the classification of types of physical sound and end with rules and procedures for logical and convincing discourse. Exemplification of the type of scheme that Guido adapted to his own purposes is provided by *Institutio Grammaticarum* of Priscian, a grammar treatise which codifies in Latin the writing of the Greek authors Apollonius and Herodianus; and *De Doctrina Christiana* of Augustine, an application of Latin grammatical, rhetorical, and dialectical principles to the interpretation and exposition of scripture.<sup>9</sup>

The Priscian treatise begins with the definition and classification of *vox* and *littera*: "Vocis autem differentiae sunt quattuor: articulata, inarticulata, literata, illiterata. articulata est, quae coartata, hoc est copulata cum aliquo sensu mentis eius, qui loquitur, profertur. inarticulata est contraria, quae a nullo affectu profiscitur mentis. literata est, quae scribi potest, illiterata, quae scribi non potest" (5).<sup>10</sup> In orderly fashion the treatise moves from voice and letters through syllables, feet, accents, parts of speech, and structure. In each section the special character of the topic is carefully considered. For example, *littera* is described as "pars minima vocis compositae," defined as "vox quae scribi potest individua," and characterized as "nota elementi," that is, the smallest spatial entity which serves as a sign of articulate sound (6). Vowels and consonants are carefully distinguished, vowels having the character of *anima*, consonants that of *corpus*: "Multa enim est differentia inter consonantes, ut diximus, et vocales. tantum enim fere interest inter vocales et consonantes, quantum inter animas et corpora" (13).<sup>11</sup> This particular characterization of vowels and consonants is unique to Priscian and will be important to the discussion of chapter 17 of *Micrologus*.

*De Doctrina Christiana* spends very little time on purely grammatical analysis; however, Augustine does present in book two a discussion of letters as signs of words. Man's speech, he argues, because of its ephemeral nature, can be visible to the eyes only through the use of such signs: "Sed quia verberato aere statim transeunt nec diutius manent quam sonant, instituta sunt per litteras signa verborum. Ita voces oculis ostenduntur, non per se ipsas, sed per signa quaedam sua" (35).<sup>12</sup> This passage is particularly suggestive since ephemerality is one of the many common characteristics of man's spoken and sung word. In book four Augustine presents his adaptation to Christian purpose of the five tasks of the orator as given by Cicero: *inventio*, *dispositio*, *elocutio*, *memoria*, *actio*. Stressing the importance of a clear and simple style, he writes, "Quid enim prodest locutionis integritas quam non sequitur intellectus audientis, cum loquendi omnino

nulla sit causa si quod loquimur non intellegunt propter quos ut intellegant loquimur? Qui ergo docet, vitabit verba omnia quae non docent" (135).<sup>13</sup> Guido expresses this idea in the concluding sentence of his prologue: "Quae enim de musica ad canandum minus prosunt, aut si qua ex his quae dicuntur non valent intelligi, nec memoratu digna iudicavi" (87).<sup>14</sup>

To summarize the grammatical model suggested by *Institutio Grammaticarum* and *De Doctrina Christiana*:<sup>15</sup>

1. Grammatical analysis begins with the sound of the human voice. Human sounds which are both articulate and understandable are the basis of rational discourse.

2. Letters are the basic elements of grammatical analysis. The two types of sounds of letters, consonants and vowels, differ in character and function.

3. Visible signs of letters are needed because of the ephemeral nature of physical sound. That man makes sounds which are articulate and can be made visible is a characteristic of his rationality.

4. All grammatical entities are constructed according to certain rules, and all have distinct natures.

5. Rhetorical analysis is concerned with the effectiveness and appropriateness of speech.

Two analytical procedures abstracted from Guido's intellectual heritage have thus been identified: a model for the inner structure of music derived from Platonic cosmology, and a model for the analysis of man's speech derived from the grammatical tradition. It is an assertion of this paper that Guido's presentation of *musica disciplina* is built on the framework of the Platonic model and his discussion of the practice of chant is based on an adaptation of the grammatical model to the analysis of sung speech. The two models are not developed independently but interact throughout the twenty chapters of *Micrologus*, to which we now turn.

## II.

Just as Priscian begins his treatise with the consideration of *vox*, so does Guido. The *vox* which Guido in chapter 1 of *Micrologus* describes as fundamental to the art of music is analogous to the *vox articulata* of Priscian, that is, an intelligible sound.<sup>16</sup> Each *vox* or primary element, according to Guido, has distinct character and strength or effect and must be learned separately, in similar fashion to the basic components of human speech: "Igitur qui nostram disciplinam petit . . . regulas saepe meditetur, donec vi et natura vocum cognita ignotos ut notos cantus suaviter canat" (91-2).<sup>17</sup>

In the way that letters are employed as visible signs of human speech, Guido in his second chapter assigns letters to the *voces*. He uses the term *nota* to denote *vox* made visible to the human eye.<sup>18</sup>

Seven letters only (A,B,C,D,E,F,G) notate Guido's twenty-one pitch gamut, although the signs for these letters are varied according to their placement. The number seven is important in Pythagorean numerology and is mentioned repeatedly in *Timaeus* where, for example, Plato defines seven possible physical motions and describes a process in which the mixture of the world's soul involves a seven-part division. Particularly relevant to Guido's division of the monochord is the series of seven numbers on which Plato bases his division of the soul: 1, 2, 3, 4, 8, 9, 27.<sup>19</sup>

In chapter 3 Guido describes a procedure referred to as *dispositio* for ordering and locating *voces*. *Dispositio* is the second task of the rhetorician and refers to the orderly arrangement which follows *inventio*, the finding of materials. What is particularly interesting about Guido's process of *dispositio* is that it involves the interaction of the inner and outer models of music through the medium of the monochord. The string of the monochord is divided according to ratios formed from the set of seven numbers given above by procedures which are analogous to the ordering of the basic material of the cosmos by the Platonic Demiurge (Archer-Hind, 105–15).<sup>20</sup> Science imitates nature in the construction of the monochord, with the result that from invisible and inaudible harmonic ratios are created audible *voces*. The final step, a procedure taken from the grammatical model, is the use of letters to create the now visible, as well as audible, *notae*.

Guido writes that in theory the procedure for locating *notae* could continue *in infinitum*, but that the authority of the rules of art provides constraints: "Posses in infinitum ita progredi sursum vel deorsum, nisi artis praeceptum sua te auctoritate compesceret" (98).<sup>21</sup> This curious passage is similar to one found in the first chapter of *Musica Enchiriadis*: "Verum quia, ut dictum est, eorum multiplicatio in inmensum procedit, ex hac inmensitatis confusione certum sibi numerum elegit ratio disciplinae et in decem et octo sonis sibi speculationem posuit"(5).<sup>22</sup> Although the wording is different, the basic thoughts are the same; that is, that an infinite amount of musical matter is available.<sup>23</sup> Augustine writes in *De Ordine*: "Namque illud quod in nobis est rationale . . . vidit esse imponenda rebus vocabula, id est, significantes quosdam sonos; ut, quoniam sentire animos suos non poterant, ad eos sibi copulandos sensu quasi interprete uterentur. Sed audiri absentium verba non poterant; ergo illa ratio peperit litteras, notatis omnibus oris ac linguae sonis atque discretis. Nihil autem horum

facere poterat, si multitudo rerum sine quodam defixo termino infinite patere videretur. Ergo utilitas numerandi magna necessitate animadversa est" (138-40).<sup>24</sup> There is an evident relationship between this passage and the first three chapters of *Micrologus*.

Having identified, notated, and located his basic elements, Guido turns in chapter 4 to the consideration of connections (*iungere, coniungere*) of *voces*. The schema he follows is exactly that of a classical grammar text as described above. Priscian, for example, after discussing *vox* and letter, turns to the connecting or joining together (*coniungere*) of letters into syllables (44). Just as Priscian gives explicit rules for the formation of syllables, so Guido identifies six joinings of *voces* which are utilized in the creation of chant. The six consonances he identifies (*semitonum, tonum, ditonum, semiditonum, diatessaron, and diapente*) are described in terms of distances derived from the Pythagorean-Platonic scheme which he used to locate *notae* on the monochord. This is another example of the interaction of the outer and inner models: the audible and visible *voces* are bound together in ways prescribed by their inaudible and invisible harmonic ratios.

Writing of the six melodic consonances, Guido uses the phrase "*cumque tam paucis clausulis tota harmonia formetur*" (105-6).<sup>25</sup> By *harmonia* Guido means properly formed melody; the grammatical analogy is to the ultimate derivation of correct sentences from step-by-step considerations of *vox*, letter, syllable, and word. *Clausula* is a rhetorical term which refers to a well-formed section of a discourse.

In chapter 6 Guido explains that his procedures for dividing the monochord are based on four basic ratios: 2:1, 3:2, 4:3, and 9:8. Not only are these ratios given the physical property of sound on the monochord, they are also given dimension (*spatium*) (115). They have certain lengths and include within their physical boundaries fixed numbers of tones. This procedure of moving from measurement in terms of ratios to measurement in terms of intervals is directly analogous to that described by Plato when he is speaking of the mixing of the soul of the world: "He first marked off a section of the whole, then another twice the size of the first. . ." (48).

In his seventh chapter Guido argues that each of the seven fundamental *voces* occurs in one of four different modes of *voces* (*modus vocum*), described in terms of the disposition of tones and semitones surrounding each *vox*. The word *modus* is used by Priscian and other grammarians to indicate the manner in which the action or state denoted by a verb is conceived. In this usage the word carries the idea of specificity both in function and flavor. It is also a word used extensively by Calcidius, along with



*ordo*, to describe an orderly arrangement within fixed bounds of the material of the universe.

Guido describes affinities of the seven *voces* through the diatessaron and the diapente. *Affinitas* (*adfinitas*) in its classic sense refers to a connection by marriage. Quintilian uses the word figuratively to describe joinings of letters (Lockwood and Smith, 13). In Guido's model the affinities between *voces* are made through the diatessaron and the diapente.<sup>26</sup> The idea is that the strongest and most important audible ties between *voces* are those which are based on primary harmonic ratios of the inner model: 4:3 and 3:2 respectively. The discussion of affinities is illustrated in chapter 8 with a *figura*. This particular *figura* has a dual function. First, just as letters are signs of articulate sound, so Guido's *figura* is a visible sign of certain audible relationships between *voces*. Second, it is an outer sign which turns man's reason inward toward the contemplation of that which can be known, in this case, the unchanging harmonic structure.

Guido writes, "De similitudine vocum pauca perstrinximus, quia quantum in diversis rebus similitudo conquiritur, tantum ipsa diversitas, per quam mens confusa diutius poterat laborare, minuitur; semper enim adunata divisio facilius capiuntur" (126-7).<sup>27</sup> Two Platonic concepts are given in this passage. The first, a dialectical principle, holds that reasoning consists essentially of judgments of sameness and difference. This principle permeates the structure of the Cosmos; for example, the Demiurge, after giving the appropriate mathematical structure to the soul of the world, divides the soul into a Circle of Sameness and a Circle of Difference (Lee, 46-7).<sup>28</sup> In writing about the need to find similarities between *voces*, Guido is applying the Platonic dialectic.

The second Platonic concept is an epistemological one: only that which is ordered can be known. The application of the dialectical procedure gives a structure which is analogous to that of the soul and which can therefore be judged to be true. In Guido's application the physical observation of certain audible affinities between *voces* leads to the knowledge that these affinities are based on an underlying harmonic structure.

In chapter 10 Guido writes that displacing a neume or a chant by a tone or a semitone can result in its ending where there is no *vox* as, for example, a tone below F (137). The idea is that the basic elements of the outer model, the *voces*, are themselves a complete and ordered system for the discussion of chant. Priscian, analogously, provides rules for the proper construction of words and phrases using only the basic material of his system, the articulate and literate sounds of human speech. In the following

chapter Guido argues that all *vores* of a chant are affected by the last (140); that is, their style or external condition is altered by the power of this particular *vox*. Again, the basis of his argument is taken from grammar. His penultimate paragraph contains an explicit reference: "Nec mirum regulas musicam a finali voce sumere, cum et in grammaticae partibus pene ubique vim sensus in ultimis litteris vel syllabis per casus, numeros, personas, tempora discernimus" (145).<sup>29</sup>

Speaking of the organization of a chant, Guido states that all its phrases, *distinctiones*, should most properly end with that *vox* which is the ultimate (145). *Distinctio*, a rhetorical term, refers in this case to a separation or a division in discourse.<sup>30</sup> That the phrases of a chant should close at the same location and with the same sound is analogous to the rhetorical maxim pertaining to *dispositio* that all major divisions of a speech should relate directly to the final and most important division, *peroratio*.

Guido, making an analogy in chapter 13 with the eight parts of speech and the eight beatitudes, writes that all song is diversified by the particular qualities of the eight modes as it moves among these modes.<sup>31</sup> It is difficult to know exactly what he means, but the grammatical analogy he gives is helpful. Parts of speech, in a grammar text such as that of Priscian, occur on an organizational level just above the syllable; they form a disjunct and complete classification of the set of all words, in the way that Guido intends the eight modes to form a disjunct and complete classification of all chant. In addition, analogously to the modes, the different parts of speech have distinct character and quality and function accordingly within a phrase or sentence. (In modern texts on usage this scheme is reversed; function is taken to be the primary dimension.) When Guido writes that all song (*cantilena*) moves among the eight modes, one can think by analogy of all phrases and sentences as having a potential existence in the set of all words. In both cases the possibility for diversity lies in the existence of eight subdivisions which are distinct in character.

Guido explains that for each mode a certain neume has been found which is a true representative of that mode.<sup>32</sup> Arguing by analogy from the premise that the ownership of a tunic can be determined by fit, he states that a chant can be correctly identified as to mode by finding which of these neumes it is best suited to.<sup>33</sup> The underlying structure of this argument has an analogy in Platonic doctrine. In *Timaeus* Plato writes, "We must make a threefold distinction and think of that which becomes, that in which it becomes, and the model which it resembles" (69). The idea is that from basic material, objects of the physical world are created after certain models. The objects are imperfect and changeable copies of the

models, which are perfect and unchanging. Only that which is unchangeable is knowable, but one can, through observation and proper use of the same-other dialectic, reason from copy to form. Guido assumes the existence of forms or ideal realizations of chant. The special neumes serve as reasonable embodiments of these forms. Thus one can learn about any particular chant, created as it is from the basic material of sung speech, by comparing it to these neumes and making a reasonable decision. Guido closes his discussion of modal theory by stating the doctrine of the ethical nature of the modes, an aspect of Greek theory which was widely transmitted in the writings of Plato and others.

Having examined in chapters 1 through 14 of his treatise the inner and outer structure of music and the modal classification of the existent body of chant, Guido turns in chapter 15 to a discussion of rules and principles governing *modulatio*, a term which is difficult to translate.<sup>34</sup> In classical rhythmic it is used to denote methods of changing from one rhythm to another. The definition of music as *bene modulandi scientia* is given by many writers (e.g. Augustine, Cassiodorus, the author of *Scolica Enchirididis*); Holzer has concluded that the phrase originates in the lost works of Varro on the liberal arts (6-15).

Guido's opening passage in chapter 15 makes explicit reference to the analogy between the structure of speech and that of chant: "Igitur quemadmodum in metris sunt litterae et syllabae, partes et pedes ac versus, ita in harmonia sunt phtongi, id est soni, quorum unus, duo vel tres aptantur in syllabas; ipsaeque solae vel duplicatae neumam, id est partem constituunt cantilenae; et pars una vel plures distinctionem faciunt, id est congruum respirationis locum" (162-3).<sup>35</sup> The form of this analogy, which is not by any means original to Guido, can be found in the Calcidius commentary, in *Disputatio de Somnio Scipionis of Favonius Eulogius*, and in *Musica Enchirididis*.<sup>36</sup> A possible impetus is found in *Timaeus*: "For no one has yet explained their origin, but we talk as if people knew what fire and each of the others (earth, air, water) are, and treat them as the alphabet of the universe, whereas they ought not really to be compared even to syllables by anyone with the least sense" (66). It is Guido's intention in this chapter to analyze chant as sung speech; to set his stage he has chosen a traditional analogy.

The greater part of chapter 15 is devoted to the presentation of rules and standards for the analysis of melodic lines. Crocker has examined this section from the point of view of classical metrics, rhythmic, and rhetoric. Citing works of the grammarians Quintilian and Augustine as possible sources, Crocker identifies Guido's implicit use of rhetorical, metrical, and

rhythmical techniques. This proceeds, no doubt, from Guido's desire to apply techniques with which he is familiar to the analysis of chant composition. Again the outer and inner models interact; the study of rhythmics and metrics deals with quantitative speech, a physical phenomenon made rational through its underlying numerical structure.<sup>37</sup> In this particular case, the structure of man's speech provides an analogy with the basic structure of the Platonic cosmos in the way that music does in general. Seen in this light, Guido's choice of techniques is extremely appropriate.

Guido then returns to the discussion, begun in chapter 11, of the importance of the final *vox* of a chant, that is, the principle *vox* of that chant's mode.<sup>38</sup> Not only should phrases end with this *vox*, he writes; it is desirable for phrases to begin with the principal *vox* as well. The idea expressed is that of unity, and the underlying structure is Platonic.<sup>39</sup> To Plato, as to Pythagoras, the principle of numbers is given in the number one, the Unity from which all others evolve. Calcidius adopted this doctrine and identified God with Unity or Monad.<sup>40</sup> Augustine in *De Musica* argues the importance of the return to one: "Although as we have said numbers progress to infinity, men have made certain articulations in counting by which they return again and again to One, the beginning or principle of numbers. For in counting, we progress from one to ten, and from there we return to one" (194-5). When Guido writes of the fundamental importance and strength of the one principal *vox* of a mode, he is applying Platonic doctrine to the organization of chant. In a later paragraph he applies the idea to the words of a chant as well, writing, "Item ut in unum terminentur partes et distinctiones neumarum atque verborum" (173-4).<sup>41</sup>

Guido writes, "Item ut rerum eventus sic cantionis imitetur effectus, ut in tristibus rebus graves sint neumae, in tranquillis iocundae, in prosperis exultantes et reliqua" (174).<sup>42</sup> The notion that the voice should be regulated to conform to the meaning of the spoken word is rhetorical in origin.<sup>43</sup> Guido is applying that idea to the sung word. More important, this is a further binding together of word and melody. Not only must they come to a final unity, word and melody must also have the same effect throughout the chant.

In chapter 16 Guido turns from his discussion of measurable motion (*modulatio*) to a classification of *motus vocum*, melodic motion. He remarks again that all of chant is formed from a few *voces* bound together by six consonant intervals, and he reiterates the analogy with grammar and the binding together of letters into syllables and words (178). Just as the variety in quantitative verse is studied by grammarians, so Guido proposes to investigate the ways in which different neumes can be arranged. Again

an underlying Platonic model is evident: the ordering according to numerical principles of a basic material.

In the style of the grammarians, Guido presents a highly schematic exposition of the possibilities for melodic motion. His approach is basically combinatorial, with possibilities at each juncture for motion upward (*arsis*) or downward (*thesis*) by one of the six allowable melodic intervals, or for motion in place (*repercussas*). The framework is that of basic material, the seven *voces*, set in motion by six forms derived from the underlying harmonic ratios which order music, a perfect *exemplum* of Platonic cosmology. Specifically, Calcidius describes the basic material of the cosmos as being without form, quality, or motion; motion is created when the intelligible, numerically structured forms are placed in matter (316–24).

The concept of motion, which Guido addresses in this and the following chapter, is of fundamental importance in Platonic theory. Motion is a property of the material, changing world, as is time, the material extension of eternity against which motion is measured. Augustine describes in *De Musica* a linguistic cosmology in which the syllable is a unit of motion and time in a universe of quantitative verse. The numbers which quantify Augustine's verse are, of course, the ratios which order Plato's universe and Guido's melodic structures. As we will argue, Guido's unit of time and motion is the sung syllable.

Guido opens chapter 17 with the following syllogism: "Perpende igitur quia sicut scribitur omne quod dicitur. Ita ad cantum redigitur omne quod scribitur. Canitur igitur omne quod dicitur" (187).<sup>44</sup> The sense of this chain of implications is the following: all articulate speech is literate. All that is literate can be reduced to song. Therefore all articulate speech can be sung.

The conclusion of this derivation is a major point for Guido because the statement that all speech can be sung, in combination with the self-evident proposition that all sung text can be spoken, establishes a correspondence between *cantus* and *oratio*. The first line of the derivation has already been established by the grammarians. Priscian, for example, writes: "literate est, quae scribi potest, illiterata, quae scribi non potest. inveniuntur igitur quaedam voces articulatae, quae possunt scribi et intellegi, ut: Arma virumque cano" (5).<sup>45</sup> Thus it is to the second line of the derivation that Guido turns, opening his next paragraph with a discussion of vowels: "Sed in longum nostra regula producat, ex hisdem litteris quinque tantum vocales sumamus sine quibus nulla alia littera, sed nec syllaba sonare probatur earumque permaxime casus conficitur" (187).<sup>46</sup>

All classical grammarians treat vowels and consonants, the components of syllables, separately. The idea that consonants without vowels are mute

is found in many writers. Augustine, for example, writes in *De Ordine*: "Progressa deinde ratio animadvertit eosdem oris sonos quibus loqueremur et quos litteris jam signaverat, alios esse qui moderato varie hiatu, quasi enodati ac simplices faucibus sine ulla collisione defluerent, alios diverso pressu oris, tenere tamen aliquem sonum; extremos autem qui nisi adjunctis sibi primis erumpere non valerent. Itaque litteras hoc ordine quo expositae sunt 'vocales, semivocales et mutas' nominavit" (140).<sup>47</sup> And Priscian, in his economical style, explains, "Ex his vocales dicuntur, quae per se voces perficiunt vel sine quibus vox literalis proferri non potest, unde et nomen hoc praecipue sibi defendunt; ceterae enim, quae cum his proferuntur, consonantes appellantur" (9).<sup>48</sup> Guido makes the same point, but uses the verb *sonare*, which in its usual sense means to sound as a noise, and in its metaphorical sense, to sound as a tone. The word is carefully chosen to reinforce the correspondence that he is establishing between that which can be written and that which can be sung.<sup>49</sup>

Guido's next step is to explain a procedure whereby *voces* of the monochord are each joined to one of the five vowels. The monochord again plays the role of intermediary between inner and outer models; in this case, however, the outer model makes explicit the correspondence between *oratio* and *cantus*. He continues with the following passage: "In qua descriptione id modo perpende, quia cum his quinque litteris omnis locutio moveatur, moveri quoque et quinque voces ad se invicem ut diximus, non negetur" (189).<sup>50</sup> Guido is describing vowels as the source of motion in speech. The resemblance between this idea and the thoughts expressed by Priscian in the following passage is striking: "Multa enim est differentia inter consonantes, ut diximus, et vocales. tantum enim fere interest inter vocales et consonantes, quantum inter animas et corpora. animae enim per se moventur, ut philosophis videtur, et corpora movent, corpora vero nec per se sine anima moveri possunt nec animas movent, sed ab illis moventur. vocales similiter et per se moventur ad perficiendam syllabam et consonantes movent secum, consonantes vero sine vocalibus immobiles sunt" (13).<sup>51</sup> This conceptualization of the motive force of vowels is not found in Donatus or Bede and is clearly an ancestor of Guido's idea, making the Priscian treatise a likely source of inspiration.

Taking a specific phrase, Guido now binds each of its syllables, through its vowel, to an identical vowel on the monochord and thus to a *vox*. Taking motion from its vowel and tone from its *vox*, each syllable is now a unit of sung speech. Guido has completed his demonstration of the proposition to which he turned his attention at the beginning of this chapter: all that is literate can be reduced to song. The conclusion follows immediately:

all articulate human speech can be sung. The correspondence between *oratio* and *cantus* is thus established.

Guido, in chapters 18 and 19, turns to the aspect of chant practice known by the Greek term *diaphony* or the Latin term *organum*. Diaphony, he writes, sounds as a disjunction or separateness of *voces* in the following manner: "Diaphonia vocum disiunction sonat, quam nos organum vocamus, cum disiunctae ab invicem voces et concorditer dissonant et dissonanter concordant" (196-7).<sup>52</sup> That is, organum is a sounding of two *voces* in union or harmony, and a sounding of a union or harmony of two *voces*. Guido's neat syntactical framework refers to the following aspect of the harmonic structure of music: the sounding of two separate *voces* has an aspect of union and an aspect of disjunction. The former is based on the harmonic ratio of the two *voces* and the latter on the interval or distance between them. The sounding will be a concord or agreement if it corresponds to one of a specific set of intervals. As previously mentioned, a tenet of Pythagorean numerology embraced by Plato is that Unity or the Monad is the principle of all numbers. In particular, Duality or the Dyad proceeds from Unity. And, on the other hand, all numbers, in particular the Dyad, flow back or return to Unity. Simply put, every plurality contains an aspect of unity, and every unity is potentially plural. The sounding of two distinct *voces* provides an elegant *exemplum* of this doctrine.

At the close of chapter 19 Guido writes that he will now make known to his readers the origin of *musicae artis*, a term which has not been used by him since the introductory *Epistola* and *Prologus*. By returning to it now, Guido creates a sense of unity and allows himself to move smoothly into his final chapter, in which he pays homage to Pythagoras and Boethius.

### III.

In order now to summarize and to assess the nature and importance of *Micrologus*, some mention of prior treatises will prove useful, although an extensive examination along these lines is not intended. In the introduction to his study of Guido's chapter 15, Crocker describes the task of the medieval theorist, who had inherited Greek music theory without exemplary music, and sacred chant without a specific theory. He concludes his remarks as follows: "The history of early medieval theory may be seen as the working-out of a relationship between these two elements, a rationalization of the sounding art work—the sacred chant—according to the intellectual methods of Greek theory. For the medieval theorist is immediately

concerned with the art-work, which he must sing and teach others to sing from day to day throughout the cycle of the liturgical year" (2).

That the writers of early medieval musical treatises felt the need to provide the sort of rationalization that Crocker mentions is one aspect of their common intellectual heritage, specifically, the Platonic tradition. Kliban-sky, for example, writes: "Of great import for the history of thought in general, however, was the fact that in the Latin *Timaeus* the scholar of the early Middle Ages became acquainted with the classical formulation of the principle of causality, and through the commentaries on the dialogue became aware of its importance" (74-5).

Without doubt Guido typifies the early medieval theorist described by Crocker. *Micrologus* shows the strong influence on Guido of Greek rationalism, for which the inner model is a paradigm. And the need to ask questions and seek causes, described by Kliban-sky, was certainly a motivating factor for Guido. It was his need to explain and codify chant practice that led him to adapt the tools of grammatical analysis to musical structure.

*Micrologus* is not by any means the first medieval treatise to contain the language and methods of the trivium. Gushee, in the introduction to his edition of *Musica Disciplina*, cites Aurelian's use of a grammatical approach to the analysis of chant (9). This treatise from the middle of the ninth century was not, as far as is known, widely disseminated; thus it may not have been familiar to Guido. At any rate, Aurelian's use of this approach is quite limited.

The grammatical analogy with which Guido opens his chapter 15 had been used by the theorist of *Musica Enchiriadis*, although the two presentations differ (3). Guido was undoubtedly familiar with this extensively copied treatise; two examples of text borrowing by Guido from *Musica Enchiriadis* have been cited previously. And Huglo argues that Guido refers to it explicitly in *Epistola de ignoto cantu* (119-71). The use of grammatical models in *Musica Enchiriadis*, however, is largely schematic.

The second paragraph of Guido's chapter 15 contains language which is related to that of the *numerosa canere* section of *Scolica Enchiriadis* (86-9). Phillips cites Augustine's *De Musica* as the *Scolica* theorist's source, making the point that Augustine describes metrical and proportional rhythm in relation only to words, while in *Scolica* the application is made to "vocal, sounding music" (338). Guido's application is also to vocal, sounding music, but it is difficult to say whether he was inspired indirectly by Augustine, or directly by the *Scolica* theorist.

A complete comparison of these and other early treatises with Guido's work is beyond the scope of this study. But this cursory examination supports the contention that Guido, in his particular adaptation of grammat-



ical analysis to Greek harmonic theory, made an original contribution to medieval music theory.

We conclude with an overview abstracted from the first seventeen chapters of *Micrologus*: in chapters 1 through 14 Guido deals with the musical sound of chant; text is not mentioned. His precepts are those of Greek theory as modified by chant practice. An implicit analogy is established between the elements of the structure of musical sound and those of grammatical structure. Since the structure of musical sound is itself an *exemplum* of the Platonic structure of the cosmos, the outer and inner models are developed in parallel throughout the first section of Guido's treatise.

Chapter 15 opens with an explicit statement of the analogy between the elements of musical sound and those of grammar. Guido then proceeds to apply the methodology of quantitative verse to the construction of neumes, which are in turn constructs based on the inner model. Text, mentioned in two paragraphs only, is not yet an important consideration.<sup>53</sup> Chapter 16, which begins with a comparison between the potential variety in the structure of quantitative verse and that of melodic lines, is a continuation of chapter 15 with the additional consideration of musical contour. This is not a factor, of course, in spoken quantitative verse, so Guido has had to extend that methodology with his combinatorial approach to *arsis* and *thesis*.

Finally, Guido turns in chapter 17 to the consideration of chant text, proposing to demonstrate that anything which is spoken can be sung. From the *voces* of grammar he selects the five vowels, the source of the motion of sound in the spoken syllable, and binds them to the *voces* of chant. Located on the monochord, the composite unit has pitch, that is, musically organized sound, and potential motion. Since any Latin word can be broken into syllables and any syllable can be identified with its vowel, Guido's demonstration is complete. He has shown that any Latin text has a musical expression. In fact, since the binding of vowels to *voces* is a one-many relation, many possible expressions exist for any specific text. The most appropriate one must be chosen according to the limits prescribed by chant practice and by taste.

With the argument just given, Guido has established the sung syllable as the basis of the correspondence between *cantus* and *oratio*. Since the sung syllable is the union of a component of speech, the syllable, and a component of musical sound, the *vox*, he has found a structural unit which is common to both the Platonic inner model and the grammatical outer model.

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#### NOTES

1. The reader is referred to Smits van Waesberghe (1953), Oesch (1954), and Wolking (1930) for modern commentary on *Micrologus*. The first two works are, in addition, excellent sources for what is known of Guido's biography. For commentary from the past, see Smits van Waesberghe (1951, 1957) and Vivell (1919). The Latin edition of *Micrologus* cited throughout this paper is that of Smits van Waesberghe; the English translation is that of Warren Babb.

2. Both terms are used by Guido in *Micrologus*. For example: "Qua de re cum de ecclesiasticis utilitatibus ageretur exercitium musicae artis. . . ." (82). And, "quae enim de musica ad canendum minus prosunt, aut si qua ex his quae dicuntur non valent intelligi, nec memoratu digna iudicavi, non curans de his, si quorundam livescat invidia, dum quorundam proficiat disciplina" (87).

3. The early Latin fathers had observed the aims of Cicero as codified by Quintilian. But while Quintilian in *Institutio Oratoria* of A.D. 95 describes the goal of liberal education as "vir bonus discendi peritus," Augustine in *De Doctrina Christiana* writes of "vir Christianus dicendi peritus" (Gilson, 176). Indeed, the extensive Psalm commentaries of Augustine provide an example of the early Christian response to Quintilian's belief that the main task of a professor of letters was the explication of the works of the great poets.

4. See, in particular, Smits van Waesberghe (1953), Oesch (1954), and Wolking (1930).

5. Calcidius refers to the Demiurge as *Opifex* or *Fabricator*, and to matter as *silva*.

6. For discussions of *Timaeus* the reader is referred to Archer-Hind (1888; reprint 1973), whose edition and commentary present the text in English and Greek; to the Lee edition of *Timaeus*, and to Cornford (1937). The work of Calcidius is available in the excellent Waszink edition. Commentaries on Calcidius are given by Boeft (1970), Switalski (1902), Waszink (1959), and Winden (1959).

7. Courcelle concurs in stating that there is no evidence that Augustine was familiar with the work of Calcidius and that it is unlikely that Augustine read *Timaeus* directly (137-42). Klibansky postulates that Augustine's sources of Platonic doctrine were the Victorinus Latin translations of Plotinus and Porphyry (22).

8. For a more complete discussion of Augustinian Platonism the reader is referred to O'Connell (1984).

9. Guido would have had access to many grammatical and rhetorical writings. Certain unique aspects of the Priscian treatise are particularly applicable to *Micrologus*; however, any of the writings contained in the seven volumes of the *Grammatici Latini* series (works of Bede, Donatus, Cassiodorus, etc.) could have been studied by Guido. The order of presentation used by Priscian in A.D. 515 is that standardized by Donatus in A.D. 350. Chase writes, "Those who in the five centuries after the sixth essay the task of grammar base their productions more upon Priscian and Donatus than upon any of the other ancient writers of grammar" (15).

10. [Moreover, there are four categories of voiced sounds: articulate, inarticulate, literate, and illiterate. Articulate voiced sounds, flowing together are made up of separate linked elements which are intelligible. Inarticulate voiced sounds, on the other hand, are completely unintelligible. Literate voiced sounds are those that can be written; illiterate, those which cannot be written.]

11. [There is a great difference between consonants and vowels, as much as that between souls and bodies.]

12. All Latin quotations are taken from the Green edition of *De Doctrina Christiana*. The Robertson edition is a translation into English and contains information about the treatise in the introduction. Robertson gives the following translation of this passage: "But because vibrations in the air soon pass away and remain no longer than they sound, signs of words have been constructed by means of letters. Thus words are shown to the eyes, not in themselves but through certain signs which stand for them" (36).

13. "What profits correctness in a speech which is not followed by the listeners? There is no reason for speaking if what is said is not understood by those on whose account we speak. He who teaches should thus avoid all words which do not teach" (Robertson, 134).

14. "But I judged those musical matters not worth mention which are of little benefit for singing, as well as any of the things that are said but cannot be understood" (Babb, 58).

15. Again, it must be emphasized that these two works were chosen for illustrative purposes from the large number of treatises to which Guido would have had access.

16. "Sed quia voces quae huius artis prima sunt fundamenta. . . ." (92)

17. "Let him who seeks our training frequently ponder these rules, until, having learned the effect and character of the notes, he can smoothly sing unfamiliar music as well as familiar" (Babb, 59).

18. Generally, the Latin words *vox* and *nota* will not be translated. Guido observes a semantical distinction between the two which is obscured by the English word "note." The rules of Latin grammar will not be observed; thus, only two forms will be used in each case: *vox*, *voces* and *nota*, *notae*. For a different interpretation of the semantical distinction the reader is referred to Bower (1982).

19. The reader is referred to the Lee translation (45-9). Unless otherwise indicated, all citations refer to this source.

20. The reader is referred to Handschin for an interesting derivation of a musical scale based on this section of *Timaeus*. McClain discusses musical references throughout the work of Plato.

21. "You could continue up or down thus ad infinitum, did not the precept of art restrain you by its authority" (Babb, 60).

22. "While truly, as it is said, their increase proceeds endlessly, the judgement of custom has picked out of this bewildering quantity eighteen tones" (*Music Handbook*, 2).

23. *Dialogus*, a treatise which has a close relationship to the first thirteen chapters of *Micrologus* and lies in time between *Musica Enchiriadis* and *Micrologus*, describes a procedure for dividing the monochord but says nothing about the possibility of infinite extension (Gerbert 1:253-4).

24. Russell gives the following translation: "Now that which is rational in us . . . saw that names, or meaningful sounds, had to be assigned to things, so that men might use the sense almost as an interpreter to link them together, inasmuch as they could not perceive one another's minds. But they could not hear the words of those not present. Therefore reason, having carefully noted and discriminated all the sounds of the mouth and tongue, invented letters. But it could have done neither of these, if the vast number of things seemed to extend endlessly without any fixed limit. Therefore the great utility of enumerating was brought to mind by its very necessity" (139-41).

25. "Since all melody is formed by so few formulas . . ." (Babb, 61).

26. Pesce discusses Guido's theory of affinities (18-22).

27. "We have confined ourselves to just a few things about the similarities between notes, because insofar as similarity is sought out between different things, to this extent is lessened that diversity which can prolong the labor of the confused mind, for organized material is always more easily grasped than unorganized" (Babb, 64-5).

28. Brisson (1974) gives a fascinating exposition of the same-other principle in the ontological structure of *Timaeus*.

29. "It is no wonder that music bases its rules on the last note, since in the elements of language, too, we almost everywhere see the real force of the meaning in the final letters of syllables, in regard to cases, numbers, persons, and tenses" (Babb, 67).

30. Guido uses the word in its second rhetorical sense, as a figure of speech, in his chapter 8.

31. "Igitur octo sunt modi . . . per quos omnis cantilena discurrens octo dissimilibus qualitatibus variatur" (150).

32. "Neumae inventae sunt, ex quarum aptitudine ita modum cantionis agnoscimus" (150-1). Guido is referring either to the Latin formulas of the modes or to the *Noeane* formulas. See Auda (176ff.).

33. Auda discusses this process in detail (179ff.).

34. Guido's chapter 15 and, in particular, his use of the term *modulatio*, has been the subject of extensive commentary. The reader is referred to Crocker, Vol-laerts (68–94), and Smits van Waesberghe (*Aribonis* xvi–xxiv).

35. "Therefore, just as in poetry there are letters and syllables, words and feet and verses, so in harmony there are *phrongi*, that is, sounds, of which one, two or three are fashioned into syllables; and these, either alone or repeated, constitute a neume, that is a part of a song; and one or more parts make a phrase, that is a suitable place to breathe" (Crocker, 12).

36. For a discussion of the source and use of the analogy in *Musica Enchiriadis*, the reader is referred to Phillips (279–87).

37. The underlying numeric structure of rhythmicity is based on ratios, while that of metrics is based on intervals. The musical analogy is the difference between the fundamental ratios of the *voces* and their positions on a scale. Rational measurement is the more fundamental of the two in both cases and is, in fact, that measurement which orders Plato's cosmos.

38. "Ad principalem vocem, id est finalem" (170).

39. It should be noted that Crocker finds in this passage an application of the principle of *homeoteleuton* or rime, both final and initial (34).

40. Calcidius further identified matter with Duality or Dyad, but he argued that the Dyad was not engendered from the Monad (297ff.).

41. [Likewise let the parts and phrases of neumes and text come to one together.] *Musica Enchiriadis* gives in Chapter XIX, "Item ut in unum terminentur particulae neumarum atque verborum" (58).

42. "Let the effect of the song express what is going on in the text, so that for sad things the neumes are deep, for serene ones they are cheerful, and for auspicious texts exultant, and so forth" (Babb, 72). *Musica Enchiriadis*, chapter 19, gives, "Nam affectus rerum, quae canuntur, oportet, ut imitetur cantionis effectus: ut in tranquillis rebus tranquillae sint neumae, laetisonae in iocundis, merentes in tristibus" (58).

43. Crocker cites Quintilian (15).

44. For a different commentary on this chapter, the reader is referred to Smits van Waesberghe ("Guido of Arezzo," 1951).

45. [Literate voiced sounds can be written; illiterate cannot. An example of articulate and literate voiced sounds is given by 'Arma virumque cano.']

46. "Not to draw out our method to great length, let us take from the letters only the five vowels. Without them, manifestly, no other letter or syllable can sound. . . ." (74)

47. "When reason had gone further, it noticed that of those oral sounds which we used in speaking and which it had already designated by letters, there were some which by a varied modulation of the parted lips flowed clear and pure from the throat without any friction; that others acquired a certain kind of sound from the diversified pressure of the lips; and that there were still other sounds, which could

not issue forth unless they were conjoined with these. Accordingly, it denominated the letters in the order of their exposition: vowels, semivowels, and mutes" (Russell, 141).

48. [Those letters without which voiced literate sounds cannot be produced are called vowels. The rest of the letters which are impelled by the vowels are called consonants.]

49. Guido writes also of lines of verse *tam consonos*, and of *symphoniam grammaticae*, and closes the passage with an analogy between the *concordia* which the vowels bring to words and the *concinientia*, a singing and sounding together, which the vowels will bring to neumes (188).

50. [Consider this representation. Since all speech is set in motion by these five letters (i.e. the vowels), it should not be denied that five *voce*s also may be set in motion among one another, as we have said.]

51. [There is a great difference between consonants and vowels, as much as that between souls and bodies. Souls, for example, produce motion in themselves and in bodies. Bodies can do neither. Vowels, similarly, are self-moving and set in motion syllables and consonants. Consonants, indeed, are motionless without vowels.]

52. "Diaphony sounds as a separateness of (simultaneous) sounds, which we also call organum, in which notes distinct from each other make dissonance harmoniously and harmonize in their dissonance" (Babb, 77). As indicated by Palisca in his introduction to the Babb translation of *Micrologus*, Guido's statement is related to that of *Musica Enchiriadis*, "Haec namque est, quam Diaphoniam cantilenam, vel assuete, organum vocamus. Dicta autem Diaphonia, quod non uniformi canore constet, sed concentu concorditer dissono" (54).

53. It is interesting to note that the two paragraphs in Guido's chapter 15 which mention text are those which Guido has borrowed from *Musica Enchiriadis*.

#### WORKS CITED

- Archer-Hind, R. D. *The Timaeus of Plato*. 1888. New York: Arno Press, 1973.
- Auda, A. *Les Modes et les Tons de la Musique*. Brussels: Maurice Lamertin, 1931.
- Augustine. *De Doctrina Christiana*. Ed. W. M. Green. Vindobonae: Hölder-Pichler-Tempsky, 1963.
- . *De Doctrina Christiana*. Trans. D. W. Robertson, Jr. Indianapolis: Liberal Arts Press, 1958.
- . *De Musica*. In *Writings of Saint Augustine*. Ed. R. J. Deferrari et al. 4 vols. New York: Fathers of the Church, Inc., 1947. 2: 151-379.
- . *De Ordine*. Ed. R. P. Russell. New York: Cosmopolitan Science and Art Service Co., 1942.

- Aurelian of Reôme. *Musica Disciplina*. Ed. L. Gushee. Rome: American Institute of Musicology, 1975.
- Boeft, J. den. *Calcidius on Fate*. Leiden: E. J. Brill, 1970.
- Bower, C. Review of *Hucbald, Guido, and John on music: Three medieval treatises*. Trans. W. Babb. *Journal of the American Musicological Society* 35 (1982): 157-67.
- Brisson, L. *Le Même et l'Autre dans la structure Ontologique du Timée de Platon*. Paris: Editions Klincksieck, 1974.
- Calcidius. *Timaeus: A Calcidio translatus commentarioque instructus*. Ed. J. H. Waszink. Vol. 4 of *Plato Latinus*. Ed. R. Klibansky. London and Leiden: J. H. Brill, 1962.
- Chase, W. J., ed. *The Ars Minor of Donatus*. Madison: University of Wisconsin Studies in the Social Sciences and History, 1926.
- Cornford, F. M. *Plato's Cosmology*. London: Lund Humphries, 1937.
- Courcelle, P. *Les Lettres Grecques en Occident*. Paris: Boccard, 1948.
- Crocker, R. "Musica Rhythmica and Musica Metrica." *Journal of Music Theory* 2 (1958): 2-23.
- Favonius Eulogis. *Disputation de Somnio Scipionis*. French trans. R. E. Van Weddingen. Brussels: Latomus, 1957.
- Gerbert, Martin, ed. *Scriptores Ecclesiastici de Musica*. 3 vols. St. Blaise, 1784.
- Gilson, E. *La Philosophie au Moyen Age*. Paris: Payot, 1962.
- Guido of Arezzo. *Micrologus*. In *Hucbald, Guido, and John on music: Three medieval treatises*. Trans. W. Babb. New Haven: Yale University Press, 1978.
- . *Micrologus*. Ed. J. Smits van Waesberghe. Buren: Frits Knuf, 1985.
- Handschin, J. "The Timaeus Scale." *Musica Disciplina* 4-5 (1950): 3-42.
- Holzer, F. *Varroniana*. Ulm, 1890.
- Huglo, M. "L'Auteur du Dialogue sur la Musique Attribué à Odon." *Revue de Musicologie* 55 (1969): 119-71.
- Klibansky, R. *The Continuity of the Platonic Tradition during the Middle Ages*. Millwood, New York: Kraus International Publications, 1982.
- Lockwood, J. and W. Smith, eds. *Chambers Murray Latin-English Dictionary*. Edinburgh and London: Chambers and Murray, 1986.
- McClain, E. G. *The Pythagorean Plato*. Stony Brook: Nicolas Hays, Ltd., 1978.
- Music Handbook*. Trans. L. Rosenstiel. Colorado Springs: Colorado College Music Press, 1976.
- Musica et Scolica Enchiridis*. Ed. H. Schmid. Munich: Bayerische Akademie der Wissenschaften, 1981.
- O'Connell, R. J. *St. Augustine's Platonism*. Villanova: Villanova University Press, 1984.
- Oesch, H. *Guido von Arezzo*. Bern: Verlag Paul Haupt, 1954.
- Pesce, D. *The Affinities and Medieval Transposition*. Bloomington and Indianapolis: Indiana University Press, 1987.

- Phillips, N. *Musica and Scolica Enchiriadis: The Literary, Theoretical, and Musical Sources*. Diss. New York University, 1984. Ann Arbor: UMI, 1984. 85505525.
- Plato. *Timaeus and Critias*. Trans. D. Lee. New York: Penguin Books, 1983.
- Priscian. *Institutio Grammaticarum*. Ed. H. Keil. Volume 2 of *Grammatici Latini*. Leipzig: B. G. Teubner, 1855-80.
- Smits van Waesberghe, J., ed. *Aribonis de Musica*. Rome: American Institute of Musicology, 1951.
- . "Guido of Arezzo and Musical Improvisation." *Musica Disciplina* 5 (1951): 55-63.
- . *De Musico—Paedagogico et Theoretico Guidone Aretino*. Florence: Leonis S. Olschki, 1953.
- , ed. *Expositiones in Micrologum Guidonis Aretini*. Amsterdam: North-Holland Publishing Co., 1957.
- Switalski, B. W. *Des Calcidius Kommentar zu Platos Timaeus*. Münster: Aschen-dorffschen Buchhandlung, 1902.
- Vivell, C., ed. *Commentarius Anonymus in Micrologus Guidonis Aretini*. Vienna: Akademie der Wissenschaften in Wien, 1919.
- Vollaerts, J.W.A. *Rhythmic Proportion in Early Chant*. Leiden: University of Leiden, 1958.
- Waeltnr, E. *Wortindex zu den echten Schriften Guidos von Arezzo*. München: Verlag der Bayerischen Akademie der Wissenschaften, 1976.
- Waszink, J. H. *Studien zum Timaioskommentar des Calcidius*. Leiden: E. J. Brill, 1959.
- Winden, J.C.M. van. *Calcidius on Matter*. Leiden: E. J. Brill, 1959.
- Wolking, H. *Guidos Micrologus de Disciplina Artis Musicae und Seine Quellen*. Emsdetten: Heinr. & J. Lechte, 1930.