Order Number 9425780

Grammar and harmony: The written representation of musical sound in Carolingian treatises

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Los Angeles

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The Written Representation of Musical Sound
in Carolingian Treatises

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Musicology

by

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1994

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---, trans. *Selections from the Columbian Lawsuits.* Repertorium Columbianum 8. Berkeley and Los Angeles: University of California Press, in preparation.

---. "Interpretive Models for Guido of Arezzo's *Micrologus.*" *Comitatus* 20 (1989): 20-42.

---. "Platonic and Grammatical Theory in Guido's *Micrologus.*" Paper presented at "Visions of Antiquity," a colloquium sponsored by the Center for Medieval Studies at California State University, Northridge. February 1989.

ABSTRACT OF THE DISSERTATION

Grammar and Harmony:
The Written Representation of Musical Sound
in Carolingian Treatises

by

Blair Sullivan
Doctor of Philosophy in Musicology
University of California, Los Angeles, 1994
Professor Marie Louise Göllner, Chair

While accepting a pragmatic view of the pluralistic origins of neumatic notation, this study extends the range of present inquiry by looking at materials that serve to increase the understanding of intellectual circumstances that surround and precede early efforts to represent musical sound, not just liturgical song, on the written page. The investigation is conducted in two fundamental intellectual terrains: grammatical theory and harmonic theory, as transmitted from Plato and Aristotle through Dionysius of Thrax, Varro, Quintilian, and

Aristides Quintilianus and codified in the early Middle Ages by such Latin writers as Calcidius, Martianus Capella, Diomedes, Donatus, Probus, Servius, Pompeius, Marius Victorinus, Priscian, Boethius, Cassiodorus, and Isidore of Seville. A large collection of treatises has been read with a single purpose: the location of materials pertaining to the written representation of sound and the exploration and comparison of the underlying assumptions that produced Greek pitch notation and neumatic systems. A tightly-woven net of circumstances--music historical, socio-linguistic, and socio-political--direct the focus of the investigation toward the Carolingian culture and writers such as Hrabanus Maurus, Alcuin, Johannes Scottus, Aurelian of Réomé, Hildemar of Corbie, Hucbald of St.-Amand, Regino of Prüm, Remigius of Auxerre, and the theorists of *Musica enchiriadis*, *Scolica enchiriadis*, and *Commemoratio brevis*. Particular attention has been given to Boethius's Latin translation of Aristotle's *Peri hermeneias* (*De interpretatione*) and his two commentaries on that text in which he proposes a semantic theory having a direct application to the written representation of musical sound. A fundamental distinction between the two disciplines, which is described by Regino of Prüm--knowledge of music is acquired with the eyes and demonstrated with the fingers, while the strength of grammar lies in human speech and cannot be seen--is seen to direct the Carolingian interest in literacy toward a system of music notation

based on pitch rather than one that attempts to record the prosody of chanted text, with its nuances, gestures, and articulation.

INTRODUCTION

Defining the term "new medievalism" as a revisionist movement in medieval studies "that is resolutely eclectic yet relatively consistent in its concerns and presuppositions," Stephen G. Nichols (1991, 1-2) describes the dynamics of medieval cultural expression: "We saw that the Middle Ages continually improvised new genres and modes of representation--manuscript illumination, lyric forms, polyphony, hagiography, to name but a few; it also revised and transformed classical modes. But rather than focusing on questions of representation *tout court*, the period appeared as preoccupied with the matter as with the method of representation. In the Middle Ages, one senses a fascination with the *potential* for representation, even more than with theories or modes of representation: something like an attempt to seek ways for extending the range of what was known of the material world and the world beyond matter through alchemy, through science, through physical and psychical voyages."

A mode of representation that Nichols does not mention but that is of extraordinary interest to historians of western art

music is the notation of music. And, as will be argued, fundamental to this development was exactly that fascination with the *potential* for the written representation of music, that is, for its existence on the page.

But first, the terms of the present inquiry must be defined and the current state of knowledge, or at least strong belief, established. The development of neumatic systems for musical notation took place during the Middle Ages; that at least is certain. Much less clear are the circumstances surrounding the origin, or origins, of neumatic notation. The earliest surviving sources for this type of notation, which did not indicate specific pitches, have been dated to the ninth century.[1] At that time, a different system

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[1] Huglo (1990, 236) writes, "Aujourd'hui, la majorité des chercheurs est d'accord sur la date d'apparation des premiers neumes: pas de neumes de première main anterieurs au IXe siècle." Levy ("On the Origin of Neumes," 59-60) agrees about prevailing scholarly opinion, but cites the efforts of Spanish scholars to establish an earlier date: "Spanish scholars like to speak of neumes going back as far as Gregory the Great. Yet the prevailing opinion is that of Solange Corbin, who saw the neumes as an invention of the earlier ninth century for the purpose of recording ancillary and novel music like lections, celebrants' chants, tropes, sequences and polyphony, while the central repertory of Gregorian propers remained consigned to oral transmission until about 900."

of notation, which had been devised by Greek theorists and used letters to indicate specific individual pitches within a system, was already in place. Why, then, was the "new" notation necessary? Was the "new" notation derived from the Greek or some other existing practice, and, if so, what was its purpose? Was it perhaps intended to assist oral declamation of a text? And if a quantum leap occurred--an invention in the strictest sense--when and where did it happen?

The truth is that no one knows; the surviving body of evidence is simply not sufficient to establish beyond doubt any single one of the arguments and suggestions put forth. Acknowledging this state of affairs, Leo Treitler in a recent paper describes his own research goals and the "renewed reflection on the early history of neumes" in the following terms: "My title speaks of the beginnings of notational practice, not the origin of notation. The new round of discussion has indeed brought up theories of origin, all recycling, with new evidence and interpretation, one or another of the theories that had been advanced earlier. . . . But I shall neither advance nor report on

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Citing lists of neumes from the ninth century compiled by Corbin (1977) and Hiley (1980), Huglo stresses the need for musicologists and paleographers to work together to accomplish accurate identification and dating of new and previously known sources containing neumes.

unified and systematic theories of origin, which necessarily blot out aspects of what seems to have been a highly active and pluralistic situation" (1992, 134).[2] On the positive side, Treitler

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[2] Treitler (1982) disputes the theory, advanced by Corbin (1977) and others, that neumatic notation was derived from the accent marks of written Latin and examines a variety of neumatic systems, seeking to establish a distinction, based on semiotics, between "iconic" and "symbolic" neumes. Two years later (Treitler, 1984) he states that circumstantial evidence indicates that neuming began with the Carolingians. Classifying the notational nomuments of the ninth century as treatises and collections of ecclesiastical texts, he states (142, n.22): "I proceed throughout this paper with the premise that these notational systems were invented during the Carolingian period, i.e. that their differentiation is not the result of a long evolution whose earlier traces have disappeared." He argues that the first neumes were derived from the Carolingian system of punctuation that was in place around 780. Levy ("Charlemagne's Archetype," 1987) claims that a fully notated gradual must have existed during the lifetime of Charlemagne (d. 814), possibly as early as the last quarter of the eighth century. His highly technical argument is based in large part on the history of a particular chant, *Factus est repente.* Huglo, also in 1987, argues from the absence of a liquescent marker in Visigothic neumatic notation to the

proposes "to identify those materials that particularly contribute to a picture of the circumstances of the beginnings of notation, and to understand the purposes for which notations were invented, the principles on which they functioned, the conceptions of the musical objects or acts they were meant to denote (melodies, singing), and the roles they played in performance and written transmission" (1992, 134).

This study accepts Treitler's pragmatic view of the pluralistic origins of neumatic notation, but extends the range of his study by looking at materials that serve to increase our understanding of the intellectual circumstances that surround and

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possibility that the Visigothic system predated other European neumatic notations. The Levy-Treitler exchange (1988) rehearses each scholar's previous positions. In particular, Treitler argues that because Carolingian neuming was derived from a system of punctuation that was not in place until 780, a fully notated gradual could not have existed by 800; further, he claims that the performance of Mass propers during the ninth century was based on an oral tradition. Huglo ("Bilan," 1990) gives an extremely useful and non-polemical survey of current research. Finally, Treitler (1992), as quoted above, writes rather cautiously about the pluralistic origins of neumatic systems of notation, echoing Huglo's statement (1990, 236): "Il faut résolument renoncer à rechercher une origine unique."

precede early efforts to represent musical sound, not just liturgical song, on the written page. The investigation will be conducted in two fundamental intellectual terrains: grammatical theory and harmonic theory, as transmitted from the Greeks through the Romans and codified in the early Middle Ages by such writers as Donatus, Martianus Capella, Priscian, Boethius, Cassiodorus, Isidore of Seville, and many others.[3] A tightly-woven net of circumstances--music historical, socio-linguistic, and socio-political--suggests that such an investigation focus on the Carolingian culture.

Briefly, the music historical circumstances have simply to do with surviving specimens: the earliest extant examples of neumatic musical notation that appear in manuscripts of Frankish

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[3] All of the texts that will be examined in this monograph have been previously studied within a wide variety of contexts; and relevant commentary and interpretation, occasionally conflicting, will be cited along the way. The fundamental contribution of the present study is to reread a large collection of treatises with a single pūrpose, that is, the location of materials pertaining to the written representation of sound; and the exploration and comparison of the underlying assumptions that produced Greek pitch notation and neumatic systems.

provenance have been dated to the ninth century.[4] Admittedly, as Hucke and Treitler have pointed out, the propagation of Gregorian chant, the distribution of manuscripts with neumes, and the invention and development of neumatic systems of notation are separate phenomena (Hucke 1980, 447; and Treitler 1992, 174). But no claims about origins will be made, although it is certainly possible that neumatic musical notations were invented as well as developed within the Carolingian empire. It is the existence of practices of representation of musical sound that is of importance to this study.

The socio-linguistic circumstances arise from the status of the Latin language within the Carolingian culture, that is, the coexistence of both spoken and written versions and the emergence of Romance in the Frankish kingdoms west of the Rhine. There is no scholarly agreement on when Romance became a language that was perceived as distinct from Latin by hearers and speakers, or on the length of the prolongation into the ninth

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[4] Treitler (1992, 176) states that the oldest surviving specimen of medieval European musical notation (found at the end of the manuscript München, Bayerische Staatsbibliothek Clm 9543) is of east-Frankish provenance and has been dated by Bernhard Bischoff to 820-48. He writes that all other ninth-century specimens have been dated to the second half of the ninth century and are of west-Frankish origin (176).

century of an organic connection between written and spoken languages.[5] A view advanced by Roger Wright, which is to some extent shared by Michel Banniard, is described by Rosalind McKittrick in her monograph, *The Carolingians and the Written Word* : "Wright challenges the view of written Latin and spoken Romance as two separate languages coexisting before 800. He argues that late Latin was early Romance, that there was no difference between spoken and written Latin until the Carolingians created it, not just with their emphasis on correct Latin, but by introducing new, and reviving old, rules for the *pronunciation of written Latin* " (10; italics added).

What is important for this study is the fact that under the leadership of Alcuin, who had witnessed firsthand the regional differences in the pronunciation of Latin, the Carolingians sought to create a perfect correspondence between the spoken Latin word and its written counterpart. Wright documents the lengths to which Alcuin was willing to go: "When he came to Charlemagne's court, his first task was to teach people to spell in the old way; and his second was to teach them how to pronounce when reading aloud or reciting anything official. His rules were promulgated in

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[5] The rēader is referred to Banniard (1989 and 1992); Itkonen (1978); Richter (1982, 1983, 1985); and Wright (1982). The controversy is described in broad terms in McKitterick (1989, 7-22).

a treatise on *orthographia*, i.e. on how to write properly: not on how to master a separate language, but on how to write in an acceptable way the one they had. The language everyone spoke in real life was hardly affected: but when reading aloud Alcuin insisted on the following of certain rules, which probably corresponded to the way he had learnt to read it aloud at York. *All the written letters had to be distinctively pronounced, so that each word had the same number of sounds in reading and recitation as it appeared to have in writing* " (1976, 181; italics added).[6]

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[6]Banniard (1992, 363) challenges the strength of Wright's remarks, noting that Alcuin's general rules for pronunciation are close to those found in the rhetorical text of C. Julius Victor, and are traceable ultimately to Quintilian. Halm argues that C. Julius Victor was, in fact, one of Alcuin's principal sources during the redaction of his rhetorical treatise. The Alcuin text that Wright has translated and commented upon, is, "Verba sint passim et aequabiliter et leniter et clare pronuntiata, ut suis quaeque litterae sonis enuntientur" (Halm 546). The Julius Victor text, drawn from Quintilian, is, "Ut expressa sint uerba ut suis quaeque sonis enuntientur" (Halm 441). We will consider what we take to be the important difference between these two texts--the explicit identification of separate letters with separate sounds and the assumption about its relation to proper pronunciation-- in the second chapter of this study. In any case, the fact remains that

In simplest terms, from the late eighth century the Carolingian court was increasingly concerned with the potential for and the form of the written representation of sound--in this case, Latin prose and verse. Banniard writes: "En effet, le huitième siècle post-mérovingien avait laissé une situation mouvante, au sein de laquelle les différents registres du langage parlé et écrit par les sujets les plus instruits restaient en un contact plus ou moins étroit avec l'expression orale des locuteurs les moins instruits. L'écriture (l'acte d'écrire) tissait un certain *continuum* entre les forms spontanées et les formes élaborées du langage"(1992, 322).[7]

Finally, the socio-political circumstances arise from a phenomenon that Treitler describes as "the extraordinary explosion of the Carolingian culture into script" (1992, 170). The extent and the manifestations of literacy in the Frankish kingdoms

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Alcuin was obsessed with restoring correct pronunciation of Latin, thus with investigating the correspondence between the spoken and the written.

[7]The post-Merovingian eighth century had left a situation in flux, at the center of which the different levels of language spoken and written by the most educated subjects remained in quite close contact with the modes of oral expression of the least educated speakers. Writing (the act of writing) wove a sort of continuum between the spontaneous and the elaborate forms of language.

are carefully documented by McKitterick in *The Carolingians and the Written Word* within sections devoted to the relation of the spoken to the written word, the legal status of the written word, the evidence of the charters for the existence of a literate community, book production and the organization of knowledge, and the literacy of the laity.[8] The relevance to the present study of the Carolingian penchant for writing things down should be clear; McKitterick makes the point herself: "Indeed, there are many more functions and manifestations of literacy, not the least the development of written musical notation, than it has been possible to deal with in the compass of one book, . . ." (1989, 272-73).

In summary, it is known that the Carolingians at least as early as the ninth century were engaged in the development of musical notation.[9] And because of the socio-linguistic situation

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[8] For other discussions of Carolingian literacy, see Banniard (1989 and 1992;) Riché (1989); and Hildebrandt (1992), who takes considerable exception to McKitterick's arguments for the existence of "external schools," arguments that Hildebrandt claims are based on a particular interpretation of the phrase *schola puerōrum*. An excellent general study of medieval literacy is Stock (1983).

[9] Levy, as noted above, ("Charlemagne's Archetype," 1987; and "On the Origin of the Neumes," 1987) argues that a fully-notated gradual was in existence during the eighth century.

in the post-Merovingian eighth century and, in particular, the conservative efforts of Alcuin with respect to written and spoken Latin and the strength of his influence in the court of Charlemagne,[10] the Carolingian culture can reasonably be viewed as fertile ground on which to investigate theories about the potential for the written representation of sound. That the Carolingians had the opportunity to glean ideas from the intellectual terrain described above is well-established.[11] Donatus and Priscian were widely known, in addition to other Latin grammarians such as Pompeius, Sergius, and Diomedes.[12] Ninth-century Carolingian scholars such as Johannes Scottus and

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[10]For information on Alcuin in general and on his efforts at reformation in particular see, in particular, Banniard (1989 and 1992); Bullough (1991); Ganshof (1971); Godman (1987); Halphen (1968); Roger (1905); Wallach (1959); Wieland (1992;) and Wright (1976 and 1982).

[11]See, for example, Riché (1989); as well as Banniard (1989); and McKitterick (1989).

[12]The transmission to the Carolingians of the grammatical treatises written by these authors will be discussed in chapter one under the rubric, "Latin grammarians known to the Carolingians." For a general work on medieval transmission of texts, see Reynold (1985); for information on Latin manuscripts prior to the ninth century, see Lowe (1934-72).

Remigius of Auxerre wrote commentaries on Martianus Capella. And, as every student of music history knows, the music theory treatises of Boethius, Cassiodorus, and Isidore of Seville are transmitted in Carolingian works on music theory such as Aurelian of Réomé's *Musica Disciplina*, the anonymous *Musica* and *Scolica enchiriadis*, and Hucbald of St.-Amand's *De institutione musica*.

Having established a prima facie case for the location within the Carolingian culture of this study of the intellectual circumstances that surround early efforts to represent musical sound in writing, we turn first to an investigation of the grammatical theory that was known and studied by the Carolingians and specifically to the treatment therein of the written representation of sound.

One influential Carolingian's expression of his high regard for grammar, which he took to be the foundation of proper expression, will serve to set the stage:[13] "Si omni homini recte loqui bonum est, tum grammatica bona est. Nulli dubium est, quin recte loqui bonum est. Utique grammatica bona est, quia rectiloquium sine grammatica esse non potest. Item si rusticitas mala est, utique grammaticam non legere malum est, quia omnis homo absque grammatica rusticus est." (Alcuin *De dialectica*,

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[13]For information on Alcuin and grammar, see, mainly, Banniard (1992) and Roger (1905).

Patrologiae cursus completus sive bibliotheca universalis. . .omnius ss. patrum (PL) 101: 965D)[14]

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[14]If it is valuable that a person speak correctly, then grammar has value. But there is no doubt that correct speech is to be valued. Thus, grammar is valuable, because correct speech cannot exist without grammar. In the same way, if the absence of culture is undesirable, then not reading grammatical treatises is undesirable, because without grammar any man is uncultured.

All English translations provided in this monograph that are not otherwise identified are my own.

CHAPTER 1

GRAMMATICAL THEORY: BACKGROUND AND HISTORICAL CONTEXT

1.1 The origins and development of grammatical theory through the first century A.D.

It is difficult to understand the methods and preoccupations of late Latin grammarians such as Donatus (ca. 350 A.D.) and Priscian (ca. 500 A.D.), whose works were fundamental to Carolingian grammatical theory, without some knowledge of the origins and development of what had by their time come to be known as the *ars grammatica*.[15] For the purpose of this investigation, linguistic aspects will be emphasized, that is, the study of speech-sounds and problems that arise when speech is

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[15] For a more complete discussion of the origins and development of grammatical theory, see, for example, Robins (1951). Law (1982) provides information on Roman and early medieval grammarians. Rosier (1988) is a collection of articles on the history of grammar.

related to writing. The present distinction between grammar and linguistics, in which the former is regarded as a branch of the latter, was not made.

The study of grammar began among the pre-Socratics as part of a study of the nature of speech and was continued through Socratic and Platonic investigations into the nature of the origins of language, whether natural, in which the form of a name is in some way connected to its meaning, or conventional, in which it is not.[16] The word "grammar" is taken from the Greek term *gramma*, denoting that which is written, with an extended meaning that included the study of letters as elements of words and their phonetic values. That is, Greek grammar began with the study of the written word, not the spoken.[17]

The following exchange in Plato's *Cratylus* between Socrates and Hermogenes illustrates both the argument for the natural origins of words through the imitative work of the name-giver and the elemental nature of letters (*Dialogues of Plato* 369-70):

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[16]Plato's *Cratylus* contains summaries of the arguments on either side of this controversy, which extended well into the Middle Ages, with the addition of the possibility of a divine origin.

[17] General observations on the history of grammatical theory are drawn from Robins (1951).

"Soc.: Well, and if any one could express the essence of each thing in letters and syllables, would he not express the nature of each thing?

Her.: Quite so.

Soc.: The musician and the painter were the two names which you gave to the two other imitators. What will this imitator be called?

Her.: I imagine, Socrates, that he must be the namer, or name-giver, of whom we are in search.

Soc.: If this is true, then I think that we are in a condition to consider the names "stream," "to go," and "retention," about which you were asking; and we may see whether the namer has grasped the nature of them in letters and syllables in such a manner as to imitate the essence or not.

Her.: Very good.

Soc.: But are these the only primary names, or are there others?

Her.: There must be others.

Soc.: So I should expect. But how shall we further analyse them, and where does the imitator begin? Imitation of the essence is made by syllables and letters; ought we not, therefore, first to separate the letters, just as those who are beginning rhythm first distinguish the powers of elementary and then of

compound sounds, and when they have done so, but not before, they proceed to the consideration of rhythms?

Her.: Yes."

Building on the work of Plato, Aristotle made two important contributions to grammatical theory. First, he divided the Greek language into nouns and verbs, both having a definable significative function, and conjunctions, which in themselves have no meaning, but which form the connective tissue of meaningful discourse. Further, Aristotle indicated that words--nouns and verbs--have meaning because they stand for something that exists either physically in the real world or conceptually in the mind, a point of semantics that will be shown to have considerable importance for the theory of musical notation.[18]

Following Plato and Aristotle, the Stoic grammarians of the third and second centuries B.C. advanced the study of speech-sounds and developed the concept of phonetic nonsense, that is, sounds that can be assigned letters of a language but that have no meaning within the context of that language. The Stoics referred to the parts of speech as elements, comparing them to the

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[18] Aristotle's theory of meaning, which will be discussed in detail in chapter 5 of this monograph, is presented in the treatise on logic *Peri Hermeneias.*

phonetic elements of syllables, *phone* or *vox*, and to the elements that made up the physical world and human bodies.[19]

Stoic influence was superseded during the first century B.C. by the teachings of the Alexandrian school. Dionysius Thrax in his *Techne grammatike* presented a phonetic theory of Greek based on letters and syllables; he identified and defined eight parts of speech: noun, verb, participle, article, pronoun, preposition, adverb, and conjunction. Apollonius Dyscolus continued the study of Greek grammar during the Roman Empire and was an important source for the late Latin grammarian Priscian, who explicitly acknowledges Apollonius as his master (Robins 43).[20]

Study of the early history of grammar at Rome is made difficult by the loss of important texts by Pliny, Verrius Flaccus, Palaemon, and others. Of the three original sections of Varro's *De lingua latina* (47 to 45 B.C.), etymology, morphology, and syntax, only parts of the first two have survived. Mere fragments exist of

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[19] See Robins (1951, 26-27) who gives a reference to the work of the Stoic grammarian Theodosius Alexandrinus. According to Vivian Law, "The model for almost every Latin grammar of Late Antiquity was, consciously or unconsciously, the Stoic *techne peri phones* developed by the philosophers of the school at Pergamum in the third and second centuries B.C." (1982, 12).

[20] The grammatical treatise of Apollonius Dyscolus is available in a recent edition by Egger (1987).

his discussions of fundamental topics such as phonetics and the elemental status of letters. These bits of material are evident, however, in the treatises of the Latin grammarians of the fourth century, so that Varro's influence cannot be doubted.[21]

We do have intact the work of the first century rhetorician Quintilian, who devotes a section of the *Institutio Oratoria* to grammar. He completes his description of the process of learning the sounds of the individual letters with a musical analogy very like those that are found in music theory treatises of the ninth century (1.6, Butler 64): "Ne quis igitur tanquam parva fastidiat grammatices elementa, non quia magnae sit operae consonantes a vocalibus discernere ipsasque eas in semivocalium numerum mutarumque partiri, sed quia interiora velut sacri huius adeuntibus apparebit multa rerum subtilitas, quae non modo acuere ingenia puerilia sed exercere altissimam quoque eruditionem ac scientiam possit. An cuiuslibet auris est exigere litterarum sonos? non hercule magis quam nervorum."[22]

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[21] On the contributions of Varro, see D. J. Taylor ("Varro and the Origins of Latin Linguistic Theory," 37-48) in Rosier (1988). For a discussion of the dependence of Latin grammarians on their Greek predecessors, see F. Desbordes ("La fonction du grec chez les grammairiens latins," 15-26) also in Rosier (1988).

[22] The elements of grammar should not be regarded as trivial. Granted, it is not difficult to distinguish consonants from vowels

1.2 Late Latin grammarians

Before undertaking a detailed examination of passages from a selection of late Latin grammarians whose works were transmitted to the Carolingians, it will be useful to identify these authors and to indicate briefly what is known about the transmission of their grammatical treatises.[23]

Donatus. Aelius Donatus worked in Rome as a *grammaticus* in the middle of the fourth century. Undoubtedly the most widely

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and to divide consonants into semivoweis and mutes. But as the student enters the interior of the shrine, many subtleties will appear, which will not only sharpen the wits, but will challenge even the greatest knowledge and erudition. Do you think any ear can ascertain the sounds of the letters? It's no more likely, by heavens, than any ear being able to ascertain the sounds of different strings.

The analogy between letters and pitches will be discussed below.

[23] This section draws material from Banniard (1989); Chase (1926); Holtz (1981); Law (1982); and McKitterick (1989). In addition to the material specifically cited in the short discussion of each Latin grammarian, Keil provides some biographical data and information about manuscripts that were available at the time that his editions were prepared.

known of all the Roman grammarians during the early Middle Ages, "Donat est et reste le grammairien par excellence. A cette époque, comme par la suite, 'étudier Donat' signifie apprendre la grammaire" (Riché 1989, 246).[24] He wrote two Latin grammatical treatises, the *Ars minor* and the *Ars maior*; the first deals only with the parts of speech, while the second includes material related to rhetoric, metrics, and theoretical linguistics. Numerous commentaries were written on both works, which "dominated grammatical studies until the mid-ninth century when they were ousted by Priscian" (McKitterick 1989, 14). The work of Donatus is conserved in numerous manuscripts; in addition, Holtz's study of the diffusion of the *Ars minor* and *maior* has located more than thirty library catalogues that list these treatises (1981, 414).[25]

Probus. This grammarian from the late Roman empire is mentioned specifically by Diomedes, Pompeius, and Priscian. On the basis of two late eighth- and early ninth-century French sources for his *De ultimis syllabis* and his *Instituta artium* (Paris, BN lat. 7520 and lat. 7494), Law suggests that an impetus for the study of Probus may have come from the court of Charlemagne

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[24] Donatus defined the grammatical arts for the Middle Ages. During his time, and in the ages to follow, "studying Donatus" was synonymous with "learning grammar."

[25] Ganz (1990) lists the manuscripts containing works of Donatus held by the monastery at Corbie.

(1982, 26-27). Both manuscripts contain works by Alcuin and Peter of Pisa, a grammarian and member of Charlemagne's court. Ganz mentions a ninth-century manuscript (Paris, BN lat.13025), whose likely provenance is Corbie, containing copies of the works of Probus and Diomedes along with a dedicatory poem to Charlemagne (1990, 65).

Diomedes. The *Ars grammatica* of Diomedes was written in the fourth century and was known in the British Isles in the seventh and eighth centuries. A somewhat abridged copy was made for Charlemagne in 780; this version is contained in Paris, BN lat. 7494. Copies of the *Ars grammatica* are mentioned in ninth-century catalogues from St. Gall and St. Riquier and a tenth-century catalogue from Regensburg in the tenth (Law 1982, 20).

Servius (Sergius). This fourth-century grammarian (or possibly grammarians) wrote various commentaries on Donatus. Law writes that the *De littera* is attested in the catalogues of Bobbio and Lorsch in the tenth century, as well as in a number of ninth-century manuscripts (1982, 17). Ganz describes Servius's text as "the most extensively copied classical author at Corbie" (1990, 61).

Marius Victorinus. Well-known in Rome around the middle of the fourth century, Marius Victorinus produced a grammatical treatise, *Ars grammatica*, containing material reported to be drawn directly from Greek sources that is not included in the work

of Donatus, for example. At least three extant manuscripts establish the transmission of his work to the Carolingians: Vatic. Palat. lat. 1753, Paris BN lat. 7539, and Valentianus 395.[26]

Martianus Capella.[27] Virtually nothing is known about Martianus Capella, aside from what has been extracted from his work, *De nuptiis Philologiae et Mercurii.* Shanzer argues that he was born no earlier than 430 and was writing in northern Africa in the 470s and 480s (1986, 5-28). Stahl, however, is certain that he wrote before 439 and after 410 (1971, 15). Assuming his dating of the work, Stahl states that "during the first two centuries of its existence *The Marriage of Philology and Mercury* was used as a textbook in North Africa, Italy, Gaul, and Spain" (1971, 56). It is referred to by Gregory of Tours at the close of his *Historia francorum* and may have been used by Isidore of Seville.[28]

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[26] For a complete discussion of what is known of Marius Victorinus and his work, as well as his transmission to the Carolingians, see the introduction to the Mariotti edition of the *Ars grammatica* (3-62).

[27] For information on Martianus Capella, see Laistner (1957); Leonardi (1962); Shanzer (1986); and Stahl (1971).

[28] For conflicting views of this possibility, see Fontaine (1959, 2.858); and Leonardi (1959, 461).

At any rate, Martianus Capella seems to have come into unprecedented popularity during Carolingian times; Leonardi notes that of the more than fifty codices containing the unabridged text of *De nuptiis*, nearly half can be dated to the ninth or tenth century and all are heavily glossed (1959, 462). Important commentaries on Martianus were written by Johannes Scottus Eriugenae, Martin of Laon, and Remigius of Auxerre, all scholars who worked and wrote in the Carolingian empire.

Pompeius. Working in Africa in the fifth or sixth century, Pompeius wrote a commentary on Donatus, *Commentum artis Donati*, which was enormously popular during the Carolingian period: fifteen copies earlier than 900 A.D. survive. Holtz has located ninth-century references to Pompeius in the catalogues of St.-Riquier, Reichenau, Freising, St. Gall, and Cologne; and tenth-century references in the catalogues of Bobbio and Lorsch (1971, 53-58).

Priscian. Priscian taught at Constantinople between 491 and 518, during which time he compiled his famous treatise *Institutiones grammaticae.* Describing this *grammaticus*, Banniard writes, "Son acuité intellectuel, supérieur à celle de Donat lui-même, le rend digne de son lointain ancêtre Varron et fait par

moments de lui un précursor de la linguistique" (1989, 29).[29] It is, in fact, his quasi-linguistic approach to grammar that will make Priscian's treatise so useful to this study.[30] There is as yet no complete study of the transmission of Priscian in the Middle Ages; Gibson's article, however, provides useful specific information (1972). It is generally accepted that the wide popularity of *Institutiones grammaticae* in the Carolingian regions was achieved after 800; Riché suggests that it was the Celtic grammarians working on the continent who showed a preference for Priscian, mentioning Remigius's commentary on the *Institutiones*.[31] Alcuin's grammatical treatise, at any rate, is greatly dependent on the work of Priscian.[32]

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[29]His keen intellect, superior even to that of Donatus, made him worthy of his distant ancestor Varro and at moments demonstrated that he was a precursor of the study of linguistics.

[30] For an evaluation of the historical context in which Priscian worked, see R. H. Robins ("Priscian and the Context of His Age," 49-55) in Rosier (1988).

[31] Nothing is known for sure about Remigius's origins. Chittenden, the editor of the grammatical treatise of Donatus ortigraphus, mentions the "Irish fondness for Priscian" (1982, XLV).

[32] For a study of Alcuin's arrangement of the *Institutiones*, found in three ninth-century manuscripts and commonly known as *Albini in Priscianum incipit liber primus*, see J. R. O'Donnell ("Alcuin's

Isidore of Seville. Described by Law as the "shortest summary of Latin grammar available," Isidore's seventh-century grammatical treatise is contained in the first book of the *Etymologiae*, an encyclopedic work compiled for a double purpose: "transmettre le contenu d'une éducation profane complète sur la base d'une distribution des connaissances entre les sept arts et compléter cette érudition par une instruction chrétienne appropriée" (Banniard 1989, 163).[33] The rapid spread of the *Etymologiae* throughout Europe after 636 (Bischoff 1966) in a sense guaranteed the popularity of Book I, which was frequently included in ninth-century grammatical manuscripts (Law 1982, 24).

1.3 Carolingian uses of grammatical theory

Before proceeding to a close examination of sections of late Latin grammatical treatises and to hypotheses based upon

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Priscian" in *Latin Script and Letters*, 1976, 222-235). Sullivan (1989) documents the influence of Priscian's grammatical treatise on Guido of Arezzo's eleventh-century treatise *Micrologus*.

[33] To transmit the contents of a classical education based on a division into seven arts, and to complete the erudition by means of appropriate Christian instruction.

The classic study of Isidore's educational efforts in Visigothic Spain is Fontaine (1959; 2nd ed. 1983).

assumptions about the Carolingian scholars' understanding of this material, it is important to review what is presently known or believed about the uses to which these treatises were put.

We begin with the most straightforward use, or so it would seem, Latin pedagogy. Referring to the works of Donatus, Priscian, Pompeius, Sergius, Diomedes, Eutyches, Phocas, and Martianus Capella, among others, McKitterick writes that they "were designed for pupils at schools in a Latin-speaking milieu and for a curriculum in which rhetoric and dialectic were the main objects of study and in which knowledge of the Latin language could be taken for granted." She continues, "One could not learn Latin from the classical grammars, though one could learn much about its structure and peculiarities" (1989,13).

Law, on the other hand, describes the important place that these texts, which are dismissed as a limited pedagogical resource by McKitterick, occupied among the work disseminated by Charlemagne's palace library; to her the position seems "natural," given the grammatical interests of the scholars around Charlemagne: Paulus Diaconus, Peter of Pisa, and Alcuin. Indeed, each of the three wrote grammatical treatises of their own based on the models of Donatus, in the case of the first two, and of Donatus and Priscian, in the case of Alcuin. It is perhaps a point for McKitterick to note that these Carolingian treatises supplement their classical models, while retaining their structure

and text. For example, the opening section of Peter of Pisa's grammar, based on Donatus's *Ars minor*, is in fact an extended commentary, although later sections are copied directly and are not expanded upon.[34]

Rather than writing their own grammar texts, some Carolingian scholars made abridged versions of the classical texts; one must again assume that the the purpose was simplified pedagogy. Law cites, for example, Hrabanus Maurus's *Excerptio de arte grammatica Prisciani* as "a useful compilation and one on which he and his pupils must have depended" (1982, 104). Examples of abstraction abound, a process that in its extreme form produced grammatical *florilegia* such as the treatise of Donatus ortigraphus, composed entirely of unaltered excerpts from other sources.[35] Diametrically opposed to the cut and paste procedure are the extensive commentaries on a single late Latin grammatical

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[34] L. Holtz ("Les innovation théoriques de la grammaire carolingienne: Peu de chose. Pourquoi?" 133-145) in Rosier (1988), explains what he takes to be the fundamentally conservative attitude of Carolingian grammarians toward the works of their predecessors.

[35] Cf. the edition made by Chittenden, who tentatively dates Donatus ortigraphus circa 815, probably post-Alcuin. The editor has included a list of those sources that he has been able to identify.

text written by Carolingian scholars such as Remigius of Auxerre, who glossed the treatises of Donatus, Priscian, and Martianus Capella; and Sedulius Scottus, who prepared a commentary on Donatus's *Ars maior.*

Treatises on grammar were also used as guides for textual exegesis. The process of explication of a text was known as *accessus ad auctores* (Quain 1945), in which the Carolingian *magister* or teacher could "justifier le choix qu'il fait et classer les *auctoritates* selon des critères littéraires et moraux" (Riché 1989, 249).[36] The student extended his basic knowledge of grammar by reading the selected authors and giving, for each word and phrase, an appropriate commentary or *expositio* defined as follows: grammatical explanation (*littera*), discussion of the meaning of the word (*sensus*), and demonstration of a comprehension of the author's intention (*sententia*) (cf. Riché 1989, 248).

Ganz describes a specifically religious level of commentary: "The study of grammar developed in the course of the Carolingian period. Grammar was the science of the study of texts, and consequently the indispensable base of all understanding. Christian grammar offered a means of establishing the significance of each specific phrase, and the reasons for its

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[36] Justify his choice and rank the classics according to literary and moral criteria.

construction, because these specifics reflected the realities which God required His text to express" (1990, 47).

In summary, Carolingian scholars used the classical treatises on grammar for pedagogical purposes, but indirectly rather than directly, in the form of newly-composed texts based on the old models, abstractions, and self-contained commentaries, and as guides for textual exegesis. In fact, these are exactly the functions listed by Martianus Capella's personification of grammar, *Grammatice*: "Officium vero meum tunc fuerat docte scribere legereque; nunc etiam illud accessit, ut meum sit erudite intelleger probareque, quae duo mihi vel cum philosophis criticisque videntur esse communia" ([230]; Willis 62).[37]

Centering his arguments on the figure of Alcuin, Banniard (1990, 305-368) describes a third use, normative rather than descriptive, to which these classical treatises were put: that of providing a model for the improvement of written and spoken communication within the polyphone and polyglot Carolingian domain and the achievement of the Ciceronian concept of *elegantia* of expression. In an extremely well-documented chapter, Banniard argues that Alcuin, and ultimately Charlemagne, wanted to put in

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[37] Initially I was charged with reading and writing correctly; but now I have the added duty of learned explication and criticism, two tasks that seem to me to be shared with the philosophers and the critics.

place a *norma rectitudinis*, that is, a return to the rules of late Christian antiquity, in the areas of administration, liturgy, instruction, and language (333). The nuclear element of the plan was language; to Alcuin, *rusticitas* was the opposite of *grammatica* (316). Only through "submission to Donatus" could these goals be realised; the grammarian was the *custos latini sermonis* (343) and the study of grammar the first step toward the political and social goals cherished by the court of Charlemagne.[38]

We have mentioned pedagogical, exegetical, and socio-political uses of the late Latin grammatical treatises by Carolingian scholars; a particular analogical use of great importance to this study deserves its own brief section, as it provides concrete evidence of the nature of the connection in the Carolingian mind between grammatical and musical investigations.

1.4 Grammatical analogies in Carolingian musical theory treatises

The use of explicit grammatical analogies in Carolingian musical theory treatises will be demonstrated but not treated extensively at this point, as some of the material will be taken up

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[38] Banniard says that the phrase *custos latini sermonis* originated with Seneca, epistle 95. It is in fact a recurrent image in classical and late Latin grammar texts and will be discussed subsequently in connection with Martianus Capella.

again as part of the investigation of less obvious connections between the two disciplines.[39] The first examples are taken from the *Musica disciplina* of Aurelian of Réomé, thought to have been written between 840 and 850, perhaps at the Benedictine abbey of St. Jean de Réomé, which was located in what is today the village of Moutiers-St.-Jean in the Côte-d'Or.[40] In chapter seven of his treatise, "Quid sit inter musicum et cantorem," Aurelian makes his point as follows: "Tantum inter musicum distat et cantorem, quantum inter grammaticum et simplicem lectorem, et quantum inter corporale artificium et rationem."[41] (Gushee 77) Later in the same chapter he gives a variation on this theme: "Etenim in tantum distare videntur inter se musicus et cantor

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[39] For a general study of the applications of the grammatical arts to music theory, see Bielitz (1977). Sullivan (1989) discusses the importance of the grammatical model to Guido of Arezzo's *Micrologus*. Phillips (1984) examines references to grammatical theory in *Musica enchiriadis*.

[40] Biographical information is drawn from Gushee (1980).

[41] There is as much difference between a musician and a singer as there is between a grammarian and one who merely reads, or between physical ability and intelligence.

quantum magister et discipulus, verbi gratia: is poematibus insistit, ille autem discernit."[42] (Gushee 77)

In the next chapter, "De tonis octo," Aurelian gives the following analogy to establish the individual tone as the element of music:[43] "Est autem tonus minima pars musicae, regula tamen; sicut minima pars grammatice littera, minima pars arithmeticae unitas. Et quomodo litteris oratio, unitatibus catervus multiplicatus numerorum consurgit et regitur, eo modo et sonituum tonorumque linea omnnis cantilena moderatur."[44] (Gushee 78)

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[42] There is no doubt that a musician is as different from a singer as a teacher is from his pupil; for example, the former reaches an understanding of poems while the latter performs an elementary grammatical analysis of them.

[43] The texts that are quoted in this section have been chosen to illustrate the use of grammatical analogies, not to provide a basis for a discussion of the terminology found in ninth-century music theory treatises. Thus, terms such as *modus*, *regula*, and *tonus* have been translated literally. For a discussion of meanings and inconsistencies (for example, the confusion of *modus* and *tonus*), see Maddox (1987). The terms *phthongos*, *sonus*, and *vox* will be discussed in detail in chapters 2 and 4 of this monograph.

[44] The tone is the basic element of music, in addition to being a rule, just as the basic element of grammar is the letter and the

In this same chapter, Aurelian uses another grammatical analogy to explain why there are nine Muses and only eight tones: "Nona autem ad discernendas cantilenarum esset differentias, que non inter tonorum dicitur numero deputari, sed adinventionum nomine censeri. Ut sicuti in adverbio cetere redundant partes, ita in hac cetere dissonantiae quae multimodas habent varietates."[45] (Gushee 81) Finally, as part of a peroration in the twentieth chapter of the treatise, Aurelian stresses the importance of musical education: "Cognoscasque quia apud antiquos tam turpe erat ignorare musicam quam litteram."[46] (Gushee 132)

The next example is drawn from the *De harmonica institutione*, written by Hucbald of Saint-Amand (850-930 A.D.), a student of Johannes Scottus. The treatise has been dated to about

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basic arithmetical element the unit. In the same way that speech arises from and is guided by letters, and that large numbers arise from and are guided by units, so every melody is governed by the limits of its sounds and its tones.

[45] The ninth [Muse] is destined to discern the differences of the melodies and is not counted as one of the tones, but is distinguished by the name of these inventions. In the same way that the other parts [of speech] overflow into the adverb, the other dissonances, which are quite diverse, overflow into this [Muse].

[46] You should know that among the ancients it was as disgraceful to be ignorant of music as to be ignorant of letters.

885 (Chartier, Introduction). Having defined *pthhongi* as individual musical sounds which are eligible for use in a melody, Hucbald continues: "Quod scilicet, quemadmodum litterarum elementis sermonum cuncta multiplicitas coarctatur, et quidquid dici potest, per eas digeritur; ita solerti procuraverunt industria, ut immensitas cantilenarum quaedam haberet exordia, et ipsa certo moderamine comprehensa."[47] (*Scriptores Ecclesiastici de Musica* I.108)

A set of examples is drawn from the anonymous treatise *Musica enchiriadis*, written during the late ninth century--possibly in the last decade--in the northern part of the west Frankish territory (Huglo 1971, 61). The treatise opens with a variation of one of the grammatical analogies used by Aurelian: "Sicut vocis articulatae elementariae atque individuae partes sunt litterae, ex quibus compositae syllabae rursus componunt verba et nomina eaque perfectae orationis textum, sic canorae vocis ptongi, qui Latine dicuntur soni, origines sunt et totius musicae

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[47] Just as the limits of realizable speech are provided by its elements, the letters, and anything which can be said is controlled by them; in the same way [the ancients] accomplished with great skill the limitation of all possible melodies to those that have certain beginnings and are described by a definite rule (*moderamen*).

continentia in eorum ultimam resolutionem desinit."[48] (Schmid 3) Further on, describing a method for assigning letters representing pitches to the syllables of a liturgical song, the anonymous theorist writes: "Donec sonos posse notare vel canere non minus quam litteras scribere vel legere ipse usus efficiat. Et haec utcumque dicta sint ad studia incipientium adiuvanda."[49] (Schmid 13)

Finally, in chapter ten of *Musica enchiriadis*, a grammatical analogy is used to justify the priority assigned to octave, fifth, and fourth: "Ut litterae, si inter se passim iungantur, sepe nec verbis nec syllabis concordabunt copulandis, sic in musica quaedam certa sunt intervalla, quae symphonias possint efficere."[50] (Schmid 23)

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[48] Just as the elementary and individual parts of articulate speech are letters, of which syllables are composed, and in turn nouns and verbs, and finally the complete text of a discourse, so the *pthongi*, which are called *soni* in Latin, are the source of musical sound (*vox*), and the content of all music ends in their final resolution.

[49] This practice will make it possible for us to notate and sing musical notes as easily as we write and read letters, and should be of assistance to the beginning student.

[50] Just as letters, if joined together at random, would not produce meaningful syllables and words, so in music there are certain intervals that are able to produce perfect consonances.

A contemporary and also anonymous treatise, *Scolica enchiriadis*, written in dialogue form, contains the following exchange:

"Discipulus: Hi soni qui sunt?

Magister: Sonos hic ptongos dicimus, id est voculas in canore concordes, quae sunt armoniae elementa. Etenim sicut loquela litteris, ita constat ptongis armonia."[51] (Schmid 61)

Of the nine explicit grammatical analogies cited, five observe the correspondence between letters as elements of syllables (and ultimately words and discourse) and individual notes (*soni*, *pthongi*) as elements of melody. The third excerpt from *Musica enchiriadis* and the excerpt from Hucbald's treatise also equate the grammatical rules for proper formation of syllables, words, and discourse with the harmonic rules that govern the composition of a melody.

Phillips considers the immediate source of the first *Musica enchiriadis* excerpt to be the commentary made by Calcidius (A.D. 356-357 or 358) on Plato's *Timaeus* (Phillips 279-84). Indeed,

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[51] Student: What are these sounds?

Teacher: We call these sounds *pthongi*, that is, the harmonious sounds (*voculae*) used in melody, which are the elements of harmony. Just as speech is composed of letters, so harmony is composed of *pthongi*.

Calcidius's text is similar to that of the anonymous theorist:[52] "Etenim quem ad modum articulatae uocis principales sunt et maximae partes nomina et uerba, horum autem syllabae, syllabarum litterae, quae sunt primae voces individuae atque elementariae--ex his enim totius orationis constituitur continentia et ad postremas easdem litteras dissolutio peruenit orationis--ita etiam canorae vocis, quae a Graecis emmeles dicitur et est modis numerisque composita, principales quidem partes sunt hae, quae a musicis appellantur systemata." (Waszink 92)

The concept expressed in *Musica disciplina* is identical, however, and probably predates *Musica enchiriadis*. At any rate, the notion of the elemental status of the letters of the alphabet can be found in the very Platonic dialogue that Calcidius translated into Latin before beginning his commentary, the *Timaeus*. Speaking of the nature of fire, water, earth, and air, Plato writes (in Calcidius's Latin translation): "Nullus quippe ad hoc usque tempus genituram eorum indicauit, sed tamquam scientibus, quid sit ignis et cetera, sic loquimur et dicimus initia uniuersitatis, constituentes ea quae ne syllabarum quidem locum

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[52] Phillips examines in detail the differences between the two texts.

uicemque pro ueri examinis ratione obtinent."[53] (Waszink 44) The development in late Latin grammatical treatises of this theme, which is likely to have originated with Plato, will be discussed below.[54]

The second grammatical analogy from *Musica enchiriadis* has been located by Phillips in the *De die natali* written in A.D. 238 by Censorinus (Phillips 273-76). The version of this analogy found in Hucbald's treatise, which according to the current scholarship previously cited predates and is related to *Musica enchiriadis*, could very well have been drawn from the same source.

The rather strange analogy drawn by Aurelian between the ninth Muse charged with gathering and discerning the differences for each of the eight modes and the adverb, which partakes of several parts of speech, was probably inspired by one of the late Latin or Carolingian grammar texts. For example, Donatus writes, "Adverbia aut a se nascuntur, ut heri hodie nuper, aut ab aliis

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[53] For no one has yet explained their origin, but we talk as if people knew what fire and each of the others are, and treat them as elements of the universe, whereas they really ought not to be compared even to syllables by anyone with the least sense.

[54] See the Dupont-Roc--Lallot edition of *Poetica* for a discussion of the identification of *stoikhos* (element) and letter in *Philebus*, *Cratylus*, and *Timaeus*.

partibus orationis veniunt."[55] (*Grammatici Latini* 4.385) This idea is expanded in Donatus ortigraphus: "Haec ergo pars apud Grecos duo nomina habet: 'eperema' quod interpraetatur 'adverbium,' and 'pandecten' quod interpraetatur 'omne dictum,' quod, ut grammaticus dixit: omnis oratio, quando desinit esse quod est, in adverbium transit."[56] (Chittenden 161)

The analogies drawn by Aurelian to distinguish a musician from a mere singer and to establish the importance of the study of music illustrate the high regard for the grammatical arts within the Carolingian intellectual community, described above with particular reference to Alcuin.[57]

Finally, the second analogy from *Musica enchiriadis* establishes the connection between writing and reading and notating and singing which is at the heart of this monograph. The

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[55] Adverbs either are original, as *heri hodie nuper*, or come from other parts of speech.

[56] Therefore, this part of speech was given two names by the Greeks: *eperema* which means adverb and *pandecten* which means "all speech," because, as the grammarian said, "All speech, when it ceases to be whatever it is, becomes an adverb."

The grammarian to whom Donatus Ortigraphus refers is Charisius, but the excerpt has not been located.

[57] Aurelian provides direct evidence of his knowledge of Priscian: "Ita docet Priscianus nominativum fieri." (Gushee, 104)

presumed pedagogical advantages of musical notation, to which the anonymous theorist refers, will be discussed in detail in a subsequent chapter.

Having indicated the transmission of certain late Latin grammarians to the Carolingians, sketched the pedagogical, exegetical, and socio-political uses which the Carolingians found for these texts, and elaborated certain explicit grammatical analogies in Carolingian musical theory treatises, we are now in a position to undertake a detailed examination of particular topics of grammatical theory that relate directly to the potential for a written representation of musical sound.

CHAPTER 2

GRAMMATICAL THEORY: THE REPRESENTATION OF MUSICAL SOUND

The treatment by late Latin grammarians of four subjects--*vox*, *littera*, *syllaba*, and *interiectio*--will be examined in detail in this chapter. Generally, grammatical treatises from this period open with a brief definition of *ars grammatica* and then turn immediately to a physical explanation of *vox*, followed in turn by an explanation of its subclassifications or species, an expositional procedure developed by Aristotle. *Littera*, as the element of a species of *vox* known as *articulata*, is discussed next, followed by an exposition of the theory of *syllaba*, a grammatical entity formed by a concatenation of letters according to certain rules. This fundamental material is generally followed by detailed treatments of the parts of speech: *nomen*, *pronomen*, *verbum*, *adverbium*, *participium*, *conjunctio*, *praepositio*, and *interiectio*. Final sections on barbarisms and solecisms are often included.

2.1 *Vox*

The discussion of voice in Probus's *Instituta artium* provides a convenient basis for discussion:[58]

"Vox sive sonus est aer ictus, id est percussus, sensibilis auditu, quantum in ipso est, hoc est quam diu resonat. Nunc omnis vox sive sonus aut articulata est aut confusa. Articulata est, qua homines locuntur et litteris conprehendi potest, ut puta 'scribe Cicero', 'Vergili lege' et cetera talia. Confusa vero aut animalium aut inanimalium est, quae litteris conprehendi non potest. Animalium est ut puta equorum hinnitus, rabies canum, rugitus ferarum, serpentum sibilus, avium cantus et cetera talia; inanimalium autem est ut puta cymbalorum tinnitus, flagellorum strepitus, undarum pulsus, ruinae casus, fistulae auditus et cetera talia. Est et confusa vox sive sonus hominum, quae litteris

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[58] In the discussion of grammatical topics that follows, I will in most cases accept the attributions as stated. That is, for example, I will take the work contained in the *Instituta artium* to be that of Probus and will consider only in special cases the sources from which he has drawn his material.

conprehendi non potest, ut puta oris risus vel sibilatus, pectoris mugitus et cetera talia."[59] (*Grammatici Latini* 4.47)

For Probus, the ability to comprehend the sound of a voice by means of letters provides the fundamental dichotomy, which is based on his assumption that voiced or pronounced words can be broken down into their component parts or elements, the letters. Thus he argues that all non-human sounds are undifferentiated, as well as some which are human but inarticulate, that is, not reducible to a concatenation of individual letters. He is referring, by the way, to the sounds of individual letters, not to their written representations. Probus makes only passing reference to

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[59] Voice or sound is struck or beaten air, which is audible and has an extended resonance. Every voice or sound is either articulate or undifferentiated. Human speech is articulate and can be expressed in letters, for example, 'Cicero writes,' 'Vergil reads,' etc. Undifferentiated voice is either animate or inanimate and cannot be expressed in letters. The whinnying of horses, the snarling of dogs, the roaring of the wild beast, the hissing of snakes, the singing of birds, etc., are all animate; on the other hand, the ringing of cymbals, the crack of the whip, the pounding of waves, the crash of debris, the sound of the flute, etc., are inanimate. Man's voice or sound is undifferentiated when it cannot be expressed in letters, for example, laughter or whistling, coughing, etc.

the sound of musical instruments, making no distinction between the unpitched, undifferentiated sound of cymbals and the sound of a flute or reed pipe .

Diomedes, who agrees with Probus's description of vocal production, proposes a slightly different classification of voice, giving special attention to the voices of musical instruments:

"Omnis vox aut articulata est aut confusa. Articulata est rationalis hominum loquellis explanata. Eadem et litteralis vel scriptilis appellatur, quia litteris conprehendi potest. Confusa est inrationalis vel inscriptilis, simplici vocis sono animalium effecta, quae scribi non potest, ut est equi hinnitus, tauri mugitus. Quidam etiam modulatam vocem addiderunt tibiae vel organi, quae, quamquam scribi non potest, habet tamen modulatam aliquam distinctionem. Unde quidam vocis tria officia designant, eloquium tinnitum sonum. Eloquium est humanae pronuntiationis expressa significatio facilem mentibus efficiens intellectum; tinnitus est fabricatae materiae inlisio tenui sono auditionem acuens; sonus est corporalis conlisio repentinum auribus inferens fragorem."[60] (*Grammatici Latini* 1.420)

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[60] Every voice is either articulate or undifferentiated. Articulate voice is rational, clearly pronounced in the speech of men. It is called both literate and writable, because it can be comprehended by means of letters. Undifferentiated voice is irrational and unwritable, present in the natural sounds of the voices of animals,

Diomedes, taking a strikingly philosophical approach to the definition of voice, has made several important points. First, he has extended the meaning of articulate voice. Not only is it literate; it can also be represented in writing. Further, his definition of eloquence or speech has a semantic component; that is, it is human utterance that produces an understandable mental image or state of mind, which for Diomedes is the meaning of comprehensibility.[61]

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for example, a horse's whinny or a bull's lowing. Some writers have also placed in this category the modulated voice of a flute or an organ, which, although it cannot be written, can nonetheless be differentiated in a measurable way. For this reason, some writers give three categories of voice: eloquence, ringing or tinkling [the sound of musical instruments], and sound [noise]. Eloquence is the clear meaning of human speech that triggers the appropriate state of mind. Ringing is produced by striking fabricated materials and stimulates the hearing by means of a delicate sound. Sound is a physical concussion producing a sudden noise in the ears.

[61] This semantic principle, which will be discussed in some detail in chapter 5 of this monograph, is drawn from the work of Aristotle, who writes, for example, "Not every sound, as we said, made by an animal is voice (even with the tongue we may merely make a sound which is not voice, or without the tongue as in coughing); what produces the impact must have soul in it and must

Finally, he mentions the rationality or measurability of instrumental music (in other words, it is pitched), a property that he clearly feels should separate it from the sounds of animals and from undifferentiated noise. In so doing, he indicates some knowledge of Greek musical theory and touches on an extremely interesting question, namely, the epistemological status of individual musical pitches. However, his statement that the sound of musical instruments cannot be written ("scribi non potest") is puzzling and will require some additional interpretation, given the fact that Diomedes must have been aware of the existence of a Greek letter notation for the individual pitches of the gamut.[62]

On the topic of the epistemology or knowledge of individual instrumental voices, it is worth mentioning at this point a related text written by the fourth-century Latin grammarian Marius Victorinus. Discussing voice, he writes: "Vocis formae sunt duae, articulata et confusa. Articulata est quae audita intellegitur et scribitur et ideo a plerisque explanata, a non nullis intellegibilis dicitur. Hanc Graeci quid appellant? *Enarthron phonen.* Huius

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be accompanied by an act of imagination, for voice is a sound with a meaning, and is not merely the result of any impact of the breath as in coughing." (McKeon 196)

[62] This point will be clarified further on in the context of a discussion of Isidore of Seville's use of the phrase, "scribi non potest."

autem species quot sunt: Duae. Quae? Nam aut musica est, quae tibiis vel tuba redditur aut quolibet organo, aut communis, qua promiscue omnes utuntur."[63] (Mariotti 66)

The text continues with a discussion of undifferentiated voice that is very much like that of Diomedes. What is interesting in this material is Marius Victorinus's statement of the separation of articulate voice in Greek grammatical theory into voices of musical instruments and all other voices. None of the other late Latin grammatical texts includes this intriguing distinction, which will be demonstrated to be a proposition of Greek harmonic theory. Furthermore, he seems to imply that the measured, and thus articulate, sounds of musical instruments can be written. If correctly interpreted, this is undoubtedly a reference to the Greek system of alphabetic notation.

The texts of both Diomedes and Marius Victorinus are closely related to that of Varro, who, however, does not mention musical

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[63] There are two forms of voice, articulate and undifferentiated. Articulate voice is understood and written when it is heard, and is thus expressed clearly by most; many call this voice intelligible. What do the Greeks call it? Connected sound. How many species does it have? Two. What are they? [In Greek theory] connected sound is either musical, which is produced by a flute, or a horn, of whatever instrument you wish, or general, which everyone uses in common.

sound: "Omnis vox aut articulata est aut confusa. Articulata est rationalis hominum loquellis explanata. Eadem et litteralis vel scriptilis appellatur, quia litteris conprehendi potest. Confusa est inrationalis quia litteris conprehendi potest. Confusa est inrationalis vel inscriptilis, simplici vocis sono animalium effecta, quae scribi non potest, ut est equi hinnitus, tauri mugitus." (Funaioli 268)

The extremely interesting question of the epistemological status of instrumental voices--both Diomedes and Marius Victorinus say that they are measurable or rational--will be discussed at length in the chapter on harmonic theory.

Discussing voice, Priscian provides a very precise series of dichotomies, but makes no mention of the sound of musical instruments:

"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 proficiscitur mentis. Literata est, quae scribi potest, illiterata, quae scribi non potest. Inveniuntur igitur quaedam voces articulatae, quae possunt scribi et intellegi, ut, 'Arma virumque cano,' quaedam, quae non possunt scribi, intelleguntur tamen, ut sibili hominum et gemitus: hae enim voces, quamvis sensum aliquem significent proferentis eas, scribi tamen non possunt.

Aliae autem sunt, quae, quamvis, scribantur, tamen inarticulatae dicuntur, cum nihil significent, ut 'coax,' 'cra.' Aliae vero sunt inarticulatae et illiteratae, quae nec scribi possunt nec intellegi, ut crepitus, mugitus et similia."[64] (*Grammatici Latini* 2.5-6)

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[64] There are four species of voice: articulate, inarticulate, literate, and illiterate. Articulate voice is attached to, that is connected with, some sensation of the mind, which is revealed through speech. Inarticulate voice on the contrary, does not originate from any state of mind. Literate voice can be written; illiterate cannot. There are certain articulate voices that can be written and understood, as "Arma virumque cano"; certain that cannot be written but can nonetheless be understood, for example, men's whistling and coughing. There are, of course, voices that even though they signify some sensation they reveal, cannot be written. And there are others that are written, but are called inarticulate, as they signify nothing; for example, "coax," "cra." Others are inarticulate and illiterate, which cannot be written or understood, such as rattling, lowing, and similar things.

An example, by the way, of Alcuin's dependence on Priscian is the following excerpt from Alcuin's treatise on grammar: "Quatuor sunt differentiae vocis: articulata, inarticulata; litterata, illitterata. Articulata est, quae copulata atque coarctata cum sensu profertur, ut: *Arma virumque cano* . . . Inarticulata, quae a nullo sensu profiscitur, ut *crepitus*, *mugitus*.

Priscian's classifications are certainly based on those of Probus and Diomedes, but are more clearly stated. The defining characteristic of articulate voice has become its intelligibility. Further, literate voice has been extended to include meaningless or inarticulate words as well meaningful. (As previously mentioned, the Stoic grammarians are thought to have first postulated the existence of sounds that can be written but have no meaning.) However, he has omitted any reference to the sounds of pitched musical instruments. Priscian concludes his discussion of *vox* with a demonstration that each of the four possible classifications formed by the intersection of the two dichotomies (articulate-inarticulate, literate-illiterate) contains observable voices.

Combining examples from Probus, Diomedes, and Priscian, and expanding Priscian's double dichotomy to include Probus's animate-inanimate subgroup and Diomedes's measurable inanimate classification, produces the following table:[65]

I. Articulate and literate: Meaningful human speech, or eloquence.

Litterata, quae scribi potest; illitterata, quae scribi non potest." (PL 101.854)

[65] Marius Victorinus's classification of pitched instrumental sound as articulate is set aside for the moment, as it clearly proceeds from another tradition, that is, Greek harmonic theory.

II. Articulate and illiterate: Human laughter, whistling, coughing.

III. Inarticulate and literate: Nonsense words.

IV. Inarticulate and illiterate:

Animate: Sounds of dogs, horses, cattle, snakes, birds.

Inanimate:

Measurable: the sounds of pitched musical instruments.

Unmeasurable: unpitched sound, whether fabricated or natural.

From the perspective of the potential for the written representation of musical sound, the quadruple classification of the voices or sounds of musical instruments is interesting--inarticulate, illiterate, inanimate, and measurable. Such sounds do not correspond to any human state of mind or emotion (inarticulata); and they cannot be written down (illiterata)--"quae scribi non potest"--even though they are measurable.

The first classification is not surprising. The doctrine of the ethos of music held that certain musical sounds were able to affect changes in the human mental state and thus in human behavior. Isidore, for example, writes, "Musica movet affectus, provocat in diversum habitum sensus. In proeliis quoque tubae concentus pugnantes accendit, et quanto vehementior fuerit

clangor, tanto fit ad certamen animus fortior. . . ."[66] (Lindsay 3.17) The doctrine does not, however, postulate a reverse relationship in which musical sounds express a state of mind or emotion.[67]

The second classification is slightly more puzzling because it is known that the Greeks had defined a letter notation for the individual tones of the gamut, which was transmitted through Nichomachus to Boethius and on to Hucbald of St.-Amand, for example. Indeed, in book II of *De nuptiis*, Martianus Capella describes one of the results of Philology's vomiting up interdisciplinary knowledge as follows: "Erant etiam libri, qui sonorum mela signaque numerorum et cantandi quaedam opera

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[66] Music moves the emotions and stirs the senses in various ways. In battles also the harmony of the trumpet inflames the warriors; the louder the clangor, the stronger becomes the will to fight.

[67] The doctrine of the ethos of music is given a specifically Christian purpose in texts by Augustine and Hrabanus Maurus, among many others. Hrabanus Maurus writes, for example: "Psallere autem usum esse primum post Moysen David prophetam in magno mysterio prodit ecclesia. Hic enim a pueritia in hoc munus a Domino specialiter electus et cantorum princeps psalmorumque thesaurus esse promeruit. Cuius psalterium idcirco cum melodia cantilenarum suavium ab ecclesia frequentatur, quo facilius animi ad compunctionem flectantur." (*De institutione clericorum libri tres* 2.48, Knöpfler 155)

praeferebant."[68] ([138], Willis 43) Remigius's ninth-century commentary on this passage, which draws heavily on that of Johannes Scottus (Lutz 66), is quite revealing: "PRAEFEREBANT id est praemonstrabant, musicam tangit. ET SIGNA id est figuras numerorum, arithmeticam tangit vel astronomiam. ET QUAEDAM OPERA CANENDI Musica enim in uno libro quasi in una imagine describitur per tonos et tropos ceterosque modos et horum singula per notatos numeros et litteras."[69] (Lutz 1:176) It is significant that the use of numbers and letters to represent musical sounds is understood.

Further, as established in the previous chapter, the identification of letters as elements of words with individual notes as elements of melody was a *topos* of music theory treatises that dated back to Calcidius, at least. However, the possibility of assigning letters to the sounds of musical instruments is completely excluded (that is, not even nonsense words can be produced) by every one of these grammarians, with the exception

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[68] There were also books which contained musical melodies, numerical representations of intervals, and vocal pieces.

[69]PRAEFEREBANT, that is, pointed out; this refers to music. ET SIGNA, that is, written numbers; this refers to arithmetic or astronomy. ET QUAEDAM OPERA CANENDI: Music is described in one book, almost in one thought, by tones and tropes and the other modes, each one of them written in numbers and letters.

of Marius Victorinus. The proper interpretation of this material is that, although the concatenated individual sounds of literal components were assumed to produce the sound of a word, the *sounds* of the letters could not produce the musical sounds. This assumed connection between "written" and the "sounded" letters will be developed in the following section on *littera*. A second possible explanation is a lack of clarity arising from an etymological confusion between *articulata* and *scriptilis*.

Implicit in Priscian's scheme is the classification of the sound of the human voice engaged in humming or wordless singing, which is certainly articulate and illiterate, along with human laughter, whistling, and even coughing. It is expressive of a human state of mind, but it is a voice, like the voices of musical instruments, that cannot be represented by the sounds of the letters of the Latin, or any other, alphabet.

These lines of reasoning with regard to the sound of pitched musical instruments and textless human singing throw a new light on the often-quoted remark made by Isidore of Seville near the beginning of his book on music in the *Etymologiae*: "Per Musae . . . carminum et vocis modulatio quaereretur. Quarum sonus, quia sensibilis res est, et praeterfluit in praeteritum tempus inprimiturque memoriae. Inde a poetis Iovis et Memoriae filias

Musas esse confictum est. Nisi enim ab homine memoria teneantur soni, pereunt, quia *scribi non possunt.*"[70] (Lindsay 3.16)

This statement has frequently been understood to mean that at the time that the *Etymologiae* was written, no neumatic musical notation was in existence.[71] According to the interpretation given here, this statement, which could in fact have

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[70] The Muses inquired into the power of songs and the modulation of the voice. The sound of these, because it is an impression upon the senses, flows into the past and is imprinted upon the memory. Hence it was fabled by the poets that the Muses were the daughters of Jove and Memory. Unless sounds are remembered by man, they perish, for they cannot be written.

[71] Isidore's statement is also taken by Fontaine to mean that "l'homme le plus cultivé du royaume wisigothique ne connaissait plus la notation musicale traditionelle des Grecs . . ." (1983, 1.421) And, indeed, the present interpretation of the phrase precludes information about this type of notation as well. It is, in fact, not clear whether Isidore was aware of the Greek system of letter notation, which is not included in *Etymologiae*. According to Fontaine, however, Isidore knew Martianus's *De nuptiis* (1983, 1.413-440). Martianus refers to Greek letter notation, not setting it out in its entirely, but giving two specific examples. See Book IX, section 943 (Willis 363).

been taken directly from Diomedes, provides no information whatsoever about the existence of neumatic musical notation.

The late ninth-century treatise *De harmonica institutione* written by Hucbald of St.-Amand contains an extremely interesting description of the *vox orsonus* that is the basic element of melody: "Sonos, quibus per quaedam veluti elementa ad Musicam prisci aestimaverunt ingrediendum, . . . , id est, non qualescumque sonos, utputa quarumlibet insensibilium rerum, aut certe irrationabilium voces animalium; sed eos tantum, quos rationabili discretos ac determinatos quantitate, quique melodiae apti existerent, ipsi certissima totius cantilenae fundamenta iecerunt."[72] (*Scriptores Ecclesiastici* 1.107b) Since this excerpt immediately precedes an explicit grammatical analogy, it seems extremely likely that Hucbald was referring to the grammatical classification of *vox*, like that of Priscian, for example, and intended to bring the tenets of harmonic theory to bear on the classification of instrumental musical voice in order to remove it

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[72] Those sounds, considered by the ancients to be the basic elements of music, were not just any sounds, as for example, those made by insensible things or the irrational voices of animals, but those which were identified and determined by calculable quantities as being serviceable for melody--the ancients established these sounds as the most certain foundation of all melody.

from a category that contained such things as the sounds of squeaky wheels and squealing pigs. The concept of the rationality of certain musical sounds and its bearing on the written representation of sound will be discussed at length in the chapter on harmonic theory. The interaction, however, of grammatic and harmonic theory seemed worthy of immediate note.

A different classification of *vox* than that given within the strict confines of grammatical treatises can profitably be mentioned here, since it pertains to the uses of the texted human voice and, for that reason, lies in an area of shared interest between the disciplines of grammar and music. In the book devoted to *Harmonia* included in *De nuptiis*, Martianus first dichotomizes and then trichotomizes human *vox*: "Omnis vox in duo genera dividitur, continuum atque divisum. Continuum est velut iuge colloquium, divisum, quo in modulatione servamus. Est et medium, quo in utroque permixtum ac neque alterius continuum modum servat nec alterius frequenti divisione praeciditur: hoc pronuntiandi modo carmina cuncta recitantur."[73] ([937], Willis 360-61)

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[73] Voice is divided into two genera: continuous and discrete. The continuous genus is connected speech; the discrete is used in singing and playing music. There is an intermediate genus, having elements of both, for it neither follows the continuous mode of the first nor is it made discontinuous (*praeciditur*) by the frequent

The same trichotomy is given by Boethius in *De institutione musica* in an expanded version that addresses specifically the relative importance of words and melody: "Omnis vox aut *syneches* est, quae continua, aut *diastematiche*, quae dicitur cum intervallo suspensa. Et continua quidem est, qua loquentes vel prosam orationem legentes verba percurrimus. Festinat enim tunc vox non haerere in acutis et gravibus sonis, sed quam velocissime verba percurrere, expediendisque sensibus exprimendisque sermonibus continuae vocis impetus operatur."[74] (Friedlein 199) The discrete voice, on the contrary, "est ea, quam canendo suspendimus in qua non potius sermonibus sed modulis inservimus, estque vox ipsa tardior et per modulandas varietates quodam faciens intervallum, non taciturnitatis sed suspensae ac tardae potius cantilenae."[75]

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divisions of the second. It is the style used in the recitation of all poetry.

[74] Every voice is either *syneches*, which is continuous, or *diastematiche*, which it is called when it is interrupted by an interval. The voice is continuous when we hurry through the words in speaking or reciting a prose oration. It accelerates through high and low sounds, so as not to linger but to run through the words as quickly as possible; and the impulse of the continuous voice expresses the meaning and articulates the words.

[75] We create discontinuities (*suspendimus*) in the discrete voice in singing when we serve the melody rather than the words. This

(Friedlein 199) The intermediate voice, according to Boethius, is exemplified by that used in the recitation of heroic poetry: "tertia differentia quae medias voces possit includere, cum scilicet heroum poema legimus neque continuo cursu, ut prosam, neque suspenso segniorique modo vocis, ut canticum."[76] (Friedlein 199)

Before drawing conclusions about the possible ways in which the Carolingians might have approached these texts, and their relevance to the written representation of sound, it will be helpful to look at the two Carolingian commentaries on *De nuptiis*. Both Johannes Scottus and Remigius of Auxerre agree that, "Divisum est autem quod dividitur per cola et commata certosque pedes."[77] (Lutz

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voice is slower and makes a certain interval by measuring out differences, not of silence, but rather of suspended and deliberate song.

[76] A third different type, which can include intermediate voices, (used) when we recite heroic poetry neither in the continuous style of prose nor in the suspended and slower style of song.

[77] The division of a text "per cola and commata" refers to the separation of its constituent elements. See Parkes (1993). The division "per certos pedes" refers, of course, to the division of a metric text. The two commentaries are not independent, as Remigius undoubtedly used material from Johannes Scottus's earlier work.

1939, 208; Lutz 1965, 2.336) Remigius provides two significant glosses not given by Johannes Scottus:

"IN MODULATIONE id est cantu. EST ET MEDIUM scilicet carmen."

That is, discrete voice is used specifically for vocal or instrumental musical expression, while the intermediate voice produces the contents or substance of a poem or song. Both commentators agree that "recitantur" should be interpreted as "leguntur," as opposed to "cantantur."

The outer elements of the trichotomy seem clear: human speech opposed to instrumental music or vocal music in which the meaning and expression of the text is less important than the musical content. The written representation of human speech is, of course, the subject of grammar and will be examined fully in the course of the discussion of *littera*. Similarly, the written representation of the pitches and intervals of vocal or instrumental melodies is the matter of harmonic theory, the subject of the fourth and fifth chapters of this monograph. The intermediate category, in my opinion, would have included in the Carolingian mind the chanting of liturgical text--deliberate and melodic utterance in which the meaning and expression of the words are of primary importance. The following excerpt from the anonymous late ninth- or early tenth-century music theory treatise *Commemoratio brevis de tonis et psalmis modulandis*,

whose subject is correct psalmody, serves to illustrate the point:[78] "Verum sive morosius sive celerius dicantur, hoc attendi semper debet, ut honestis et plenis neumis congruo celeritatis pronuntientur modo, ut nec nimiae protractionis taedeat nec eos inreverenti festinantia os ignobiliter canens ebulliat."[79] (Schmid 177)

It follows from this line of reasoning that the potential for the written representation of liturgical declamation is more likely to have been investigated within a grammatical-rhetorical context than within a strictly harmonic or musical framework. In fact, the difficulty of applying harmonic analysis to recitation is illustrated by Hucbald's description of equal voices: "Et de aequalibus quidem vocibus, quoniam ipsae per se patent; nihil aliud

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[78] The great majority of texts used in Gregorian chant are taken from the Book of Psalms. Entire psalms form a regular part of the Office, and individual psalm verses appear in the introits, graduals, alleluias, tracts, communions, and offertories of the Mass. For a discussion of the types of psalmody and the specific ways in which psalm texts are used in Gregorian chant, see Apel (1958).

[79] But whether they are spoken at a slow or a fast pace, care should be taken so that they [the texts] are pronounced at a suitable speed in the beautiful full melodies, neither tediously slow nor irreverently exuberant in tasteless haste.

dicendum, nisi quod communis vocis impetus proferuntur in modum soluta oratione legentis."[80] (*Scriptores Ecclesiastici* 1.104) Hucbald is trying to explain equality of pitch before proceeding to a discussion of the various intervals between two different pitches; however, only the most unnatural and stiff prosody would require that a text be read aloud in monotone.

2.2 *Littera*

Because the elemental status of letters of the alphabet and musical pitches forms the basis of an analogy that is found in Carolingian musical treatises, it will be of some use to explore the grammatical theory on which the comparison is based. In chapter 20 of the *Poetics*, Aristotle writes, "The parts of diction are the following: the element (*stoikheion*), the syllable, the conjunction, the noun, the verb, the article, the case, and the oration. The element is an indivisible sound of a particular kind, one that may become a factor in an intelligible sound" (Dupont-Roc--Lallot 102). From the examples that follow this statement, it is clear that by element Aristotle means the individual sound of each letter.

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[80] Concerning equal voices, the matter is clear; the only thing to say is that they are produced in the customary voice of a person reading aloud in fluent speech.

The structure outlined by Aristotle was expanded by the Latin grammarians, who, as we have seen, discussed voice separately; they also began to make a distinction between the spoken and written letter. For example, Probus writes, "Littera est elementum vocis articulatae. . . . Figura litterae est qua notatur et qua scribitur. Potestas iitterae est qua valet, hoc est qua sonat."[81] (*Grammatici Latini* 4.48-49) An etymology is added: "Quae ideo dictae sunt litterae, quod legentibus iter praebeant, vel quod in legendo iterentur, quasi legiterae."[82] (Servius, *Grammatici Latini* 4.421)

Priscian's discussion is by far the most fully developed and was taken up by Carolingians such as Alcuin and Hrbanus Maurus (*Grammatici Latini* 2.6-7). Priscian agrees that, "Litera est pars minima vocis compositae," specifying that, "Litera est vox quae scribi potest individua."[83] To the possible etymologies of the word, he adds, "Litera a lituris, ut quibusdam placet, quod

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[81] The letter is the element of articulate voice. . . . The figure of a letter is its representation and its written form. The power of a letter is the means of its efficacy, that is, its sound.

[82] Supposedly, they were called "littera" because they guide readers, or because they are repeated in reading, like "legiterae."

[83] A letter is an indivisible voice which can be written.

plerumque in ceratis tabulis antiqui scribere solebant."[84] He goes on to make an important linguistic distinction: "Litera igitur est nota elementi et velut imago quaedam vocis literatae, quae cognoscitur ex qualitate et quantitate figurae linearum. Hoc ergo interest inter elementa et literas, quod elementa proprie dicuntur ipsea pronuntiationes, notae autem earum literae. Abusive tamen et elementa pro literis et literae pro elementis vocantur. . . . Sunt igitur figurae literarum quibus nos utimur viginti tres, ipsae vero pronuntiationes earum multo ampliores."[85] That is, he is aware not only that there is a distinction between an indivisible sound and its written representation, but also that a single written

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[84] "Letter "comes from the word meaning "erasure" or "correction," as some would have it, because the ancients usually wrote on wax tablets.

[85] A letter is a written representation of an element and a mental image of a certain literate voice; it is recognized by its nature and by the form of its written representation. There is, therefore, a difference between elements and letters, for elements properly are called "single articulate sounds," while their written forms are called "letters." It is incorrect to confuse the two. . . . There are twenty-three written letters that we use; the single articulate sounds that they represent, however, are much more numerous.

letter corresponds to many sounds, depending on placement in a word, on custom, etc.

Priscian fails, however, to analyze correctly the substance of the grammatical analogy taken up by music theoreticians: "Literas autem etiam elementorum vocabulo nuncupaverunt ad similitudinem mundi elementorum: sicut enim illa coeuntia omne perficiunt corpus, sic etiam haec coniuncta literalem vocem quasi corpus aliquod componunt vel magis vere corpus."[86] The problem with Priscian's elemental analysis lies in the confusion of linguistic characteristics with those that are extra-linguistic, or purely notational. The approach to grammar that begins with the study of letters as the elements of words, both phonetic and written, ignores the fact that the relationship of the written letter to the written word is not the same as that of the phonetic value of the letter--even admitting a multiplicity of such values--to the spoken word. Simply put, written words do indeed

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[86] Letters are called elements by analogy to the elements of the world. Just as the latter, when they are combined, form all physical bodies; so the former, when they are connected, constitute in the same way as any physical body the literate voice, which is truly a physical entity.

decompose into letters, but spoken words break down into speech sounds.[87]

What is particularly intriguing about the music theorists' use of the analogy between letters as elements of the spoken word and individual pitches as the elements of melody is that the former is based on a false assumption, while the latter is true in an admittedly limited sense. That is, a monophonic melody can be broken down into individual musical sounds, which in turn can reconstitute a melodic outline.

On the other hand, if we restrict our attention to what is written, an intelligible written word can be broken down into its literal components and in turn reconstituted from them, but written signs for individual notes (let us say a letter notation, because it is known that such a procedure existed) have only a derivative meaning--that is, they represent or "stand for" the melody but they are not the melody. Indeed, Hucbald's confusion on this point is evident in the following passage in which he discusses a letter-based musical notation: "Nunc ad notas musicas, quae unicuique chordarum appositae non minimum studiosis melodiae conferunt fructum, ordo vertatur. Hae autem ad hanc

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[87] Given Alcuin's reverence for and dependence on Priscian, it is tempting to conclude that his previously described method for the pronunciation of Latin words letter-by-letter could have been suggested by his reading of Priscian.

utilitatem sunt repertae, ut sicut per litteras voces et distinctiones verborum recognoscuntur in scripto, ut nullum legentem dubio fallant iudicio; sic per has omne melum annotatum, etiam sine docente, postquam semel cognitae fuerint, valeat decantari."[88] (*Scriptores Ecclesiastici* 1.117) In fact, the sounds of words are not, unfortunately, recognized by means of their written forms, even in the most phonetic of languages.

The connection postulated by Latin grammarians between written letters and the functions of memory can profitably be mentioned here, as it must have influenced the way in which the Carolingians considered the benefits of a musical notation. First, a passage from Martianus Capella: "Nam sicut id, quod conscribitur, cera continetur et litteris, sic quod memoriae mandatur, in locis

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[88] The lesson turns now to written signs for musical notes, which placed next to the name of each string bring no small benefit to students of music. These signs have been invented so that (just as the sounds and meanings of words are recognized by means of written letters that do not lead the reader into doubt or misjudgment), once they have been learned, any melody that is written with them can be sung, even without the assistance of a teacher.

tamquam in cera paginaque signatur; imaginibus vero quasi litteris rerum recordatio continetur."[89] ([538], Willis 190)

Isidore expands on this idea, including the idea of communication: "Litterae autem sunt indices rerum, signa verborum, quibus tanta vis est, ut nobis dicta absentium sine voce loquantur. Verba enim per oculos non per aures introducunt. Usus litterarum repertus propter memoriam rerum. Nam ne oblivione fugiant, litteris alligantur. In tanta enim rerum varietate nec disci audiendo poterant omnia, nec memoria contineri."[90] (Lindsay 1.3) It is interesting to note that Isidore, unlike Priscian and Hucbald, does not make the mistake of thinking that written words must be comprehended "audibly," although he seems to have

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[89] For just as what is written is held in wax and letters, so what is entrusted to memory is imprinted in locations just as if it were in wax or on the page. Truly, the memory of things is contained in reminders just like letters.

[90] Letters are the marks of things, the signs of words, and have such power that they can communicate to us messages from persons who are absent, without the need to speak. That is, they introduce words through the eyes, not through the ears. The use of letters was invented for the sake of memory; that is, in order that things do not escape from memory, they are bound by letters. For indeed, given the enormous variety, it was not possible to learn everything by being told or to hold it all in one's memory.

thought that musical notes must be, based on our previous discussion of "soni . . . quae scribi non possunt."

The set of letters was customarily partitioned into vowels, semivowels, and consonants, distinctions that are fundamental to the theory of syllables, which follows this section. Priscian provides the following imagery: "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."[91] (*Grammatici Latini* 2.13)[92] This particular characterization of the vowels and

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[91] As we said, there is a great difference between consonants and vowels, approximately as much difference as there is between body and soul. In the opinion of philosophers, souls move themselves and move physical bodies; indeed, bodies can neither be moved by themselves without the soul nor can they move souls, which move them. In the same way, vowels both move themselves to complete a syllable and move the consonants within that syllable. Truly, consonants are immobile without vowels.

[92] In his study of the origins of writing, Harris writes (110 ff.) that the description of the elements of words as articulatory

movements, which can be found in Plato's *Cratylus*, originated in Greek theory with the introduction of vowels. The Semitic alphabet had only consonants.

The primacy of consonants before Greek theory is pursued in twentieth-century theory as illustrated by the following quotation from Derrida's *De la Grammatologie* (444): "La consonne . . . est le devenir-langue du son, le devenir phonétique de la sonorité naturelle. C'est elle qui, pourrait-on dire, inscrivant le son dans un opposition, lui donne la possibilité d'une pertinence linguistique. Jakobson a montré, contre le préjugé courant, que 'dans l'acquisition du langage, la première opposition vocalique est postérieure aux premières oppositions consonantiques; il y a donc un stade où les consonnes remplissent déjà une fonction distinctive, tandis que la voyelle unique ne sert encore que d'appui à la consonne et de matière pour les variations expressives. Donc nous voyons les consonnes prendre la valeur de phonèmes avant les voyelles.' (*Selected Writings* 1:35)"

[The consonant is sound becoming language, natural sonority becoming phonetic. One could say that the consonant, establishing a sonic contrast, gives a linguistic pertinence to sound. Jakobson has shown, contrary to received knowledge, that "in the acquisition of language, the first vocalic opposition occurs after the first consonantal contrasts. Thus, there is a stage at which consonants already serve to differentiate, while a unique vocalic

consonants as motive soul and inanimate body seems to have originated with Priscian.[93] Alcuin reproduces Priscian's image, but with an interesting addition that betrays his great interest in written representations: "Vocales sunt sicut animae, consonantes sicut corpora. Anima vero et se movet et corpus. Corpus vero immobile est sine anima. Sic sunt consonantes sine vocalibus. Nam scribi possunt per se; edici vero vel potestatem habere sine vocalibus nequeunt."[94] (PL 101.855)

2.3 *Syllaba*

The treatment of the syllable by theoretical grammarians has a particular relevance to a study of the potential for the

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sound merely supports the consonants and supplies the substance of expressive variation. So we see that consonants became phonemes before vowels."]

[93] This concept of the motive force of vowels, along with a syllogism based on a version of Priscian's classification of literate speech, appears in chapter 17 Guido of Arezzo's treatise *Micrologus*. See Sullivan (1989).

[94] Vowels are like souls; consonants like bodies. Souls move themselves and move bodies. A body is immobile without a soul, as are consonants without vowels. Consonants can, for instance, be written by themselves; but they cannot make any sound or have any effect without vowels.

written representation of musical sound, because the syllable became the unit for neumatic notation of liturgical song. Martianus Capella explains the proper and allowable "juncturae litterarum" (cf. Willis 63-69) of which syllables can be formed and then gives the essential characteristics of the syllable: "Syllaba igitur dicta est, quod iunctis litteris sonitum simul accipientibus informetur" ([264], Willis 70).[95]

Pompeius adds an etymological justification, explaining that syllable is Greek for "viniculum litterarum" (*Grammatici Latini* 5.111), while Priscian's definition is similar to that of Martianus Capella, but clarifies the idea of a single sound: "Syllaba est vox literalis, quae sub uno accentu et uno spiritu indistanter profertur" (*Grammatici Latini* 2.44).[96] That is, a syllable is a group of letters bound together in the production of a single auditory event ("sonitus" for Martianus), whose component parts are a single "accentuation" and a single "breath." He is careful to make a distinction between the single sound of a letter and the single sound of a syllable: "Habent etiam syllabae suum elementum, quod productio dicitur. Sed inter elementum litterarum et syllabarum

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[95] A syllable is said to have received its name because it is formed of letters joined together and heard simultaneously in a single sound.

[96] A syllable is a literate voice that is produced without interruption in one accentuation and one aspiration.

hoc distar videtur, quod elementa litterarum sunt ipsae pronuntiationes, syllabarum ipsae productiones" (*Grammatici Latini* 3.519).[97] Nor does it have in general the semantic status of a word, the next largest unit of human speech: "Syllaba enim per se, nisi cum sit dictio, sensum habere non potest" (*Grammatici Latini* 2.51).[98]

Priscian establishes the corporality of the syllable by an extension of the elemental analogy: "Nam si aer corpus est, et vox, quae ex aere icto constat, corpus esse ostenditur, quippe cum et tangit aurem et tripertito dividitur, quod est suum corporis, hoc est in altitudinem, latitudinem, longitudinem, unde ex omni quoque parte potest audiri. Praeterea tamen singulae syllabae altitudinem quidem habent in tenore, crassitudinem vero vel latitudinem in spiritu, longitudinem in tempore."[99] (*Grammatici Latini* 2.6) The

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[97] The element [or smallest individual part] of a [spoken] syllable is called its production, or vocal extension. The difference between the elements of letters and syllables is that the former are pronunciations, while the latter are productions.

[98] By itself, a syllable has no meaning, except in the case of a one-syllable word.

[99] If air has a physical extension or body, then voice, which is produced by hitting a column of air, clearly must itself be corporeal when it touches the ear. Its physical extension or body has three parts, namely, altitude, latitude, and longitude, which

three physical dimensions are clarified: "Tenor acutus vel gravis vel circumflexus. . . . Similiter spiritus asper vel lenis. Tempus unum vel duo . . . ."[100] (*Grammatici Latini* 2.51) Thus, a syllable is a group of letters which are properly joined together to produce a single voice or sound; the physical extension of this voice is a three-dimensional body defined by accentuation (altitude),[101] breath (latitude), and temporality (longitude).

Martianus Capella describes the first of these dimensions in one of his characteristically evocative passages: "Ut nulla vox sine vocali est, ita sine accentu nulla. Et est accentus, ut quidam putaverunt, anima vocis et seminarium musices, quod omnis modulatio ex fastigiis vocum gravitateque componitur, ideoque accentus quasi adcantus dictus est."[102] ([268], Willis 71) It is

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completely explain its audibility. Moreover, by the same line of reasoning, the accentuality (*tenor*) of a syllable corresponds to its altitude, its aspiration to its density or latitude, and its temporality to its longitude.

[100] Accentuation is acute, grave, or circumflex. . . Aspiration is rough or smooth. Time is one or two . . . .

[101] As Isidore of Seville points out, three terms were in common usage for accentuation: "Nam accentus et tonos et tenores dicunt" (Lindsay 1.18).

[102] Just as no voice exists without a vowel, there is no voice without accentuation. The accent, as some have thought, is the

important to avoid a translation of *fastigium* and *gravitas* which overemphasizes the possibility of a purely directional interpretation in simplistic terms such as "up" and "down"; Johannes Scottus's commentary on this passage, however, seems to reinforce that image: "EX FASTIGIIS ex cacuminibus." (Lutz 79)

Servius undertakes his discussion of accentuation along slightly different and very instructive lines: "In accentu materia locus et natura prosodiae brevissime conprehensa sunt. Nam materia esse ostenditur vox, et ea quidem qua verba possunt sonare, id est scriptilis, locus autem syllaba, quoniam haec propria verbi pars est, quae recipit accentum. Natura vero prosodiae in eo est, quod aut sursum est aut deorsum: nam in vocis altitudine omnino spectatur, adeo ut, si omnes syllabae pari fastigio vocis enuntientur, prosodia sit nulla. . . . Altitudinem discernit accentus, cum pars verbi aut in grave deprimitur aut sublimatur in acutum."[103] (*Grammatici Latini* 4.525) Servius is

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soul of the voice and the seedbed of music, because every melodic utterance is composed of vocal "gables" or "highlights" (*fastigiis*) and "weight" or "seriousness" (*gravitate*); and therefore it has been called "accentus" from *adcantus*.

[103] Briefly, matter, place, and prosodic quality are included within an accent. The matter [or physical material] of an accent is voice, specifically, that type of voice by means of which words can be sounded, that is, written. The place or location of an accent is a

careful to stipulate that the concept of vocal accentuation applies only to the syllables of literate (*scriptilis*) voices; and he indicates that a *sine qua non* of prosody is vocal motion. Finally, by using the words *sursum* and *deorsum* he comes close to describing this motion through changes in height instead of attempting to portray the physical or timbral characteristics of low- or high-pitched voices, such as weight, tension, gravity, acuteness, etc. (The spatial representation of pitch and vocal motion in these treatises will be discussed in the chapter on written images of spoken and chanted text.)

The second and third physical attributes of a syllable are its latitude or density (thickness) of aspiration and its longitude or length of temporal extension. Servius gives an etymology of aspiration and attempts a dichotomous classification: "Crassitudo autem in spiritu est, unde etiam Graeci adspirationem appellent: nam omnes voces aut aspirando facimus pinguiores, aut sine

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syllable, because this is the part of a word that receives an accent. Its prosodic quality is either (upward motion) from below or (downward motion) from above. Prosodic quality is observed entirely by means of vocal altitude, for if all syllables were to be enunciated at the same level (*fastigio*), prosody would not exist. . . . Accent differentiates altitude, because parts of words are either lowered or raised.

aspiratu pronuntiando tenuiores."[105] (*Grammatici Latini* 4.526) Priscian, as given above, describes aspiration as rough or smooth. The four--*pinguis*, *tenuous*, *asper*, and *lenis* --are, of course, words that describe the tone quality or timbre of a voice. The temporal extension or duration of a syllable in a metrical text is normally one or two units of time, according to Priscian; in a non-metrical text the process of lengthening and shortening syllables is described by the words *productio* and *correptio*, respectively.

To summarize, a syllable is a simultaneous pronunciation of a group of letters, placed together according to specific rules, that produces a single sound. In general, neither the written nor the spoken syllable has meaning. The spoken syllable is a physical object that creates sound by coming in contact with the ear.[106]

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[105] Thickness or density occurs in the breath, so the Greeks called it aspiration. When voices are aspirated they become thicker [denser]; when they are not aspirated they become thinner [finer, more delicate].

[106] The references to the mechanics of hearing are based on a physical theory like that summarized in the *Timaeus*: "Let us in general terms define sound as a stroke transmitted through the ears by the air and passed through the brain and the blood to the soul. . . . A rapid motion produces a shrill sound, a slower one a deeper sound; regular vibration gives an even and smooth sound,

Corresponding to its altitude, latitude, and longitude are accentuation or melodic motion, vocal character or timbre, and duration. Every syllable must contain a vowel, and just as the soul animates the body, the vowel animates the syllable. That is, no syllable is audible without a vowel, for audibility is based on the vocal motion produced by the vowel.

The importance of the grammatical theory of the syllable to the singing and notation of liturgical song cannot be overstated. In the first place, as a result of the theoretical division of words into syllables, the syllable became the element of musical settings of texts. That is, it was taken as the basic unit in singing a text, and ultimately, as the basic unit for a musical notation of a sung text.

Consider the following examples drawn from Aurelian's *Musica disciplina*. The first three, chosen from many of the same type, illustrate both the dependence of the musical setting upon the syllables of the text and the impossibility of providing a verbal description of a melody without a reference point such as a syllable. The fourth selection shows that the measure of correct performance was the appropriate treatment of each syllable, even when a large number were present.

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and the opposite a harsh one; if the movement is large, the sound is loud; if otherwise, it is slight." (Archer-Hind 247)

1. "Primus siquidem in se idcirco directe fines versuum recipit, quia et in directum inchoat, nec vox sinuosos decurrit per anfractus, atque in tertia tonus invenitur sillaba scilicet in TE, ut 'Gaudete.' In secundo vero ideo sursum pars ultima sublimatur, quia tonus in prima adest sillaba, id est in IUS, ut 'Iustus es, Domine.'"[107] (Gushee 86)

2. "Huic simile, excepto quod in nonadecima syllaba versus responsorii longiusculam melodie habet inflexionem."[108] (Gushee 107)

3. "Quarta est quae tenorem versiculi usque in quinta ante novissimam syllabam ut supra conservat."[109] (Gushee 112)

4. "Interea mos considerandus est veteranorum cantorum, praesertim Gallias degentium, qui non omnem toni sequentes auctoritatem, versus responsoriorum aliter ac aliter quam

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[107] The first (introit) takes the endings of the verses directly, because it begins directly without any elaborate vocal motion and the tone is found on the third syllable, TE, of 'Gaudete.' In the second (introit) the final part goes up, because the tone is on the first syllable, IUS, of 'Iustus es, Domine.'

[108] It is similar to the previous one, except that on the nineteenth syllable the verse of the response has a slightly longer melodic inflection.

[109] The fourth (division) keeps the tenor of the versicle up to the fifth syllable before the final syllable, as above.

sonoritas tonorum sese habeat, prepediente multitudine syllabarum, in diversam mutavere partem."[110] (Gushee 105)

Hucbald's treatise on music is the source of a slightly different example, in which syllables are named to identify equal tones: "Si quaeras, quae vox eiusdem introitus cum prima coaequetur, apparet in prima et in tertia huiusce syllabae."[111] (*Scriptores Ecclesiastici* 1.104) (Again, this example is chosen from many of the same type.)

In *Musica enchiriadis* the anonymous theorist establishes a letter notation, possibly devised by Hucbald, that consists of four signs in various rotations. To demonstrate the method, the signs for the notes are placed next to the syllables of a liturgical song: "Exemplo sit inferius descriptum carmen, quod superscriptae syllabis notae musicae modulantur ipsarum desuper notarum

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[110] Meanwhile, we must consider the custom of the veteran singers, particularly those living in Gaul, who did not following any established rule for the tone but, hindered by the great number of syllables, in many places substantially altered the verses of the responsories in a particular sonority.

[111] If you need to know, in this introit there is another tone (*vox*) that is the same as the first; it appears as the first and third note of the syllable[s *bis* and *ge*].

appellationibus adsignatis ad hunc modum."[112] (Schmid 11) That is, not only are individual notes or short melodic figures assigned to spoken (or in this case, sung) syllables; the written signs for these notes are now associated with the written syllables. This is, of course, a direct application to a practical situation of the grammatical analogy found in this treatise: *soni--canare--notare / litterae-legere--scribere.*

Aurelian discusses and illustrates a type of musical notation, called by him *litteratura*, based on the assignment of syllables--in spoken and written form--to melodic formulas:

"Ceterum nomina quae ipsis inscribuntur tonis, ut est in primo tono NONANNOEANE, et in secundo NOEANE, et cetera queque moveri solet animus quia in se contineant significationis. Etenim quendam interrogavi Grecum: 'In Latina quid interpretarentur lingua:' Respondit se nihil interpretari sed esse apud eos letantis adverbia. Quantoque maior est vocis concentus eo plures inscribuntur sillabe, ut in autentu proto, qui principium est, sex inseruntur sillabe, videlicet he NONANNOEANE."[113] (Gushee 83-84)

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[112] The song written below can serve as an example. The musical notes written above the syllables sing [are sung] with the names of these very notes, previously assigned following this procedure.

[113] The mind tends to wonder whether the names that are assigned to these tones, for example, NONANNOEANE to the first tone and NOEANE to the second, and so forth, have any meaning. I asked a

In this case, the syllables, properly constructed in that each one contains a vowel, are tailored to the melodic formula--the more notes, the more syllables. And not only are the syllables themselves without meaning, as is usually the case; the words that are formed from these syllables have no meaning in either Latin or Greek. Thus, according to Priscian's classification, they are literate and inarticulate voices. They can be written but they are not intelligible; that is, they are connected to no state of the mind. On the other hand, Aurelian's Grecian connection described these words as *adverbia*, a part of speech which Priscian defines as "pars orationis indeclinabilis, cuius significatio verbis adicitur."[114] (*Grammatici Latini* 3.60) In the particular case, the Greek musician claimed that they expressed joy. Thus these are

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certain Greek person, 'How are they translated into Latin?' He answered that they have no meaning in Latin but in Greek they are joyful adverbs. The longer the vocal line, the more syllables are assigned; for example, in the authentic first mode, which is the first one, six syllables are inserted, namely, NONANNOEANE.

For information on the introduction of the Byzantine melodic formulas in the west, see Huglo ("Introduction," 1971)and (*Tonaires*, 1971). Bailey discusses the meaning of the echematic syllables (1974, 20-26).

[114] An adverb is an indeclinable part of speech whose meaning is attached to verbs.

meaningless words that are, however, intelligible as expressions of joy, something akin to the lettering of human laughter or expressions of sorrow. Furthermore, they are bound to, and clearly take their powers of expression from, melodic formulas by means of syllables whose number can be adjusted to fit any particular case.

Regino of Prüm (c. 842-915) in *Epistola de armonica institutione*, a short summary of the music-theoretical doctrines of Martianus Capella and Boethius, as well as Calcidius and Macrobius, that serves to introduce a tonary, specifically mentions the ear as well as the mind in his description of the NOEANE, but says nothing about the cognitive content of these syllables:[115] "NONANNOEANE, et NOEAIS, et NOIOEANE, et his similia, et utrum interpretari eorum sensus possit? Ad quod respondendum, quod omnino nullam recipiunt interpretationem; neque enim quicquam significant: sed ad hoc tantum a Graecis sunt reperta, ut per eorum diversos ac dissimiles sonos tonorum admiranda varietas aure simul et mente posset comprehendi."[116] (*Scriptores Ecclesiastici* 1.247)

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[115] For information on Regino see Bernhard (1978) and Le Roux (1970).

[116] Is it possible to interpret the melodic formulas NONANNOEANE, NOEAIS, NOIOEANE, and so forth, in any meaningful way? The response must be that in general they have no specific

Finally, the unknown theorist of the *Commemoratio brevis de tonis et psalmis modulandis* writes: "Noeane vero non sunt verba aliquid significantia, sed syllabae ad investigandam melodiam aptae."[117] (Schmid 163) The semantic reference of these useful syllables, which are in fact a type of musical notation, will be discussed in the following section on *interiectio*.

The physical attributes of a syllable--accentuation or melodic motion, timbre, and duration--are characteristics of the melodic utterance of text, the intermediate type of vocal delivery discussed in the section on *vox*, and as such apply to the performance of liturgical song, or chant. The chanting of text, according to the grammatical model presented here, is conceptualized as a string of syllables, produced vocally according to certain timbral characteristics, placed in motion by their

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interpretation nor do they signify anything. But they were devised by the Greeks so that through the diverse and dissimilar sounds of these tones (i.e. melodic formulas for the modes), the admirable variety could be perceived simultaneously with the ears and the mind.

Bernhard (1978, 42) claims that Aurelian's *Musica Disciplina* was Regino's source for this material.

[117] The Noeane are not meaningful words, but are syllables that are suitable for the study of melody.

component vowels, and moving in time through a series of melodic inflections.

The application of this theory to chant practice is found throughout Aurelian's treatise, and notably in his chapter 19, entitled "Norme qualiter versuum spissitudo raritas celsitudo profunditasque discernatur omnium tonorum."[118] A few examples chosen from among many in *Musica disciplina* will serve to illustrate his method and to end this section on *syllabae*.[119]

1. Lengthening and shortening of syllables: "Hoc omnimodis ammonentes, ut quantocumque correpta fuerit pars, ut est

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[118] Rules for determining the thickness (density), openness (lack of density), elevation, and depth of the verses of every tone.

[119] Aurelian's use of grammatical terminology in chapter 19 of his treatise has been discussed by many musicologists, most notably Handschin (1950) and Treitler (1984 and 1992). Both Handschin and Treitler argue persuasively that neumatic notation did not originate with the accent marks described by grammarians, except perhaps in the particular case of paleo-Frankish neumes of the type found in the tenth and nineteenth chapters of the oldest extant version of *Musica disciplina*, the ninth-century Valenciennes manuscript.

'Spiritus,' prior elevetur syllaba, quo continuo secunda et tertia corripi facillime possint."[120] (Gushee 121)

2. Lengthening and shortening of syllables: "Est hoc in tono, o prudens cantor, quod plerique non devitantes, sed potius usu improbo consectantes, correptiones producunt et productiones corripiunt."[121] (Gushee 127)

3. Description of a melodic figure using the vocabulary of accentuation: Resp. Iste est qui ante Deum magnas virtutes operatus est, idcirco octavadecima syllaba, scilicet 'est,' circumvolutionem ac circumflexionem recipit, quia inest inter hanc et illam ea quae post circumvolvatur, id est 'et,' atque in ipsa fit acutus accentus quae [h]as duas distinguit modulationes."[122] (Gushee 128)

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[120] In general, whenever a part of a word is shortened, as in 'Spiritus,' the preceding syllable should be raised, so that the second and third syllables can be easily shortened.

[121] It is in this tone, O skillful singer, that many lengthen [syllables] that should be shortened, and vice versa, thus following rather than avoiding an incorrect practice.

[122] In the responsory, "Iste est qui ante Deum magnas virtutes operatus est," therefore, the eighteenth syllable, 'est,' receives a circular melodic figure and a circumflex; between this syllable and the next one that receives this type of figure, there is a

4. Specification of vocal timbre: "Quintadecima vero, videlicet 'Sanc-,' terna gratulabitur vocis percussione."[123] (Gushee 119)

5. Specification of vocal timbre: "Itidem in antiphonis agit quarum prima vinolam gravemque emittit vocem, ut hic, Ant. 'Hec est generatio.' Secunda autem quando in ultima et peneultima et antepeneultima syllabas finis versiculi pinguem reddit sonum, ut in hac: Ant. 'Pulchra es et decora.'"[124] (Gushee 94-95)

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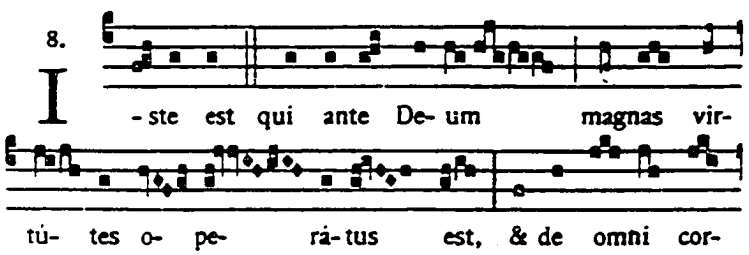
syllable, 'et,' that receives an acute accent, which serves to keep the two melodic figures distinct.

In modern plainchant notation:



[123] The fifteenth (syllable), 'Sanc-,' expresses joy with three beats of the voice.

[124] The practice is the same in the antiphons, the first of which emits a deep, soft, and flexible voice, namely, Ant. "Hec est generatio." In the second antiphon, on the last, the penultimate, and the antepenultimate syllables, the end of the versicle makes a thick sound, as in this case: Ant. "Pulchra es et decora."

In modern plainchant notation:

2.4 *Interiectio*

The Latin grammarians' treatment of the part of speech known as the *interiectio* has a direct application to the study of chanted liturgical text. Diomedes gives a detailed description of the interjection that provides a convenient starting point for this analysis:

"Interiectio est pars orationis affectum mentis significans voce incondita. Interiectioni accidit significatio tantum; quae aliis partibus orationis interiaci et inseri solet. Haec vel consuetudine vel ex sequentibus verbis varium affectum animi ostendit. Exultantem significat, ut evax; aut voluptatem, ut va; aut dolentem, ut vae; aut gementem, ut heu; aut timentem, ut ei attat; aut admirantem, ut babae papae; aut adridentem, ut hahahe; aut hortationem, ut eia, age age dum; aut irascentem, ut nefas, pro nefas; aut laudantem, ut euge; aut vitantem, ut apage; aut vocantem, ut eho; aut silentium ut st; aut ironiam, ut phy hui; aut intentius aliquid demonstrantem, ut em; aut ex inproviso aliquid deprehendentem, ut attat; et siqua sunt simila quae affectus

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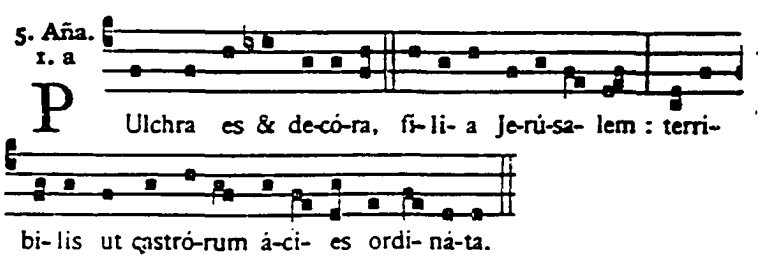

potius quam observationes artis inducant."[125] (*Grammatici Latini* 1.419)

For Diomedes, the important attributes of the interjection are the verbal expression of mental states corresponding to emotions and the "undifferentiated" character of the utterance. The examples that he gives are of two types: conventional literations of voices that have achieved meaning through constant association with some evident emotion (*heu*), and words that have meanings in a non-emotional context but when linked together to

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[125] Interjection is the part of speech that signifies a state of mind or emotion by means of an irregular voice (that is, an irregular vocal expression). Each interjection has an intense or abundant meaning, which is customarily inserted among or mixed with the other parts of speech. It manifests, either by means of an utterance whose meaning has been established by custom or by a sequence of words, the various emotional states of mind. It can signify exultation, *evax*; pleasure,*va*; sorrow, *vae*; sighing, *heu*; fear, *ei* ,*attat*; admiration, *babae*, *papae*; laughter, *hahahe*; encouragement, *eia, age, age dum*; anger, *nefas*, *pro nefas*; praise, *eugu*; dismissal, *apage*; calling to someone, *eho*; a request for silence, *st*; irony, *phy*, *hui*; calling attention to something, *em*; surprise, *attat*; and many other similar expressions which the emotions rather than outward displays of verbal skill bring forth.

form a phrase, have taken on the semantic status of an interjection (*pro nefas*).

Servius demonstrates the second type more clearly than Diomedes: "Et haec pars non potest proprium nomen unius cuiusque significationis tenere, eo quod variae interiectiones sunt: nam o dolentis legitur, ut 'o mihi praeteritos referat si Iuppiter annos,' et irascentis, ut 'o callidos homines' et similia."[126] (*Grammatici Latini* 4.443) Pompeius, aware of the difficulty of definition, writes, "Quidquid potest animi motum exprimere, sive in una re fuerit sive in multis, interiectio dicenda est."[127] (*Grammatici Latini* 5.281) And it is important in the context of this study to note that Probus specifies a certain type of vocal production: "Interiectio est pars orationis ostendens animi motum per suspirationem."[128] (*Grammatici Latini* 4.146)

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[126] It is impossible to provide a list of interjections and their meanings, because many verbal phrases have emotional meanings, that is, meanings appropriate to interjections. For example, reading the following line produces a feeling of pain: "O, if Jupiter brings back to me the years gone by"; and "O, cunning men," a feeling of rage.

[127] Anything that expresses the mind's emotions, whether in one circumstance or in many, should be called an interjection.

[128] An interjection is a part of speech which manifests the mind's emotions by means of sighing.

Priscian, characteristically encyclopedic, explains that in Greek theory interjections had been included with adverbs, but that the Roman grammarians had made a separate category, seeing that interjections had meanings on their own and did not have to be associated with verbs. He recognizes the two categories described by Diomedes, noting that the second consists of what the Greeks called *schetliasmon*, while the first is made up of voices "quae cuiuscumque passionis animi pulsu per exclamationem intericiuntur."[129] (*Grammatici Latini* 3.90) He goes on to congratulate Donatus on a point that he had made: "Optime tamen de accentibus earum docuit Donatus, quod non sunt certi, quippe, cum et abscondita voce, id est non plane expressa, proferantur et pro affectus commoti qualitate, confunduntur in eis accentus."[130] (*Grammatici Latini* 3.91)

Finally, Isidore gives a brief definition, beginning as is his custom with an etymology; he mentions only the first type of interjection, but adds an important restriction: "Interiectio vocata, quia sermonibus interiecta, id est interposita, affectum

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[129] Voices, which are added to exclaim impressively any of the mind's passions.

[130] What Donatus taught about their accentuation is excellent, for that accentuation is not certain. Because interjections are spoken in a concealed voice, that is, not clearly expressed, and as a result of their quality of excited emotion, their accentuation is irregular.

commoti animi exprimit, sicut cum dicitur ab exultante 'vah,' a dolente 'heu,' ab irascente 'hem,' a timente 'ei.' Quae voces quarumcumque linguarum propriae sunt, nec in aliam linguam facile transferuntur."[131] (Lindsay 1.14) That is, these literated emotional outbursts have the status of words in the sense that they are proper to a particular language, although it can be assumed that the emotional states of mind that they represent are universal.

Bringing together the remarks of Diomedes, Pompeius, Servius, and Priscian, we conclude that interjections take their meaning as expressions of emotional states of the mind. They are literations of vocal outbursts or verbal phrases that have an emotional as well as a purely logical content; the component words in another context need not, of course, be interjectory. To an extent, they are performed rather than just spoken; that is, their emotional content is expressed with force or is accompanied by sighing, for example. Finally, the accentuation of a single-word interjection or of an interjectory phrase can be irregular as a result of the level of emotion involved.

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[131] The interjection was given its name because it is interjected or inserted into speech. It expresses the emotional states of the mind; for example, "vah" expresses exultation; "heu," sorrow; "hem," anger; and "ei," fear. These vocal expressions belong to a particular language and are not easily translated into another.

In summary, the grammarians stress two characteristics. First, the semantic status of interjections is based on the true expression of human emotional states, which are located in the mind. Second, this expressivity depends to a great extent on delivery or "performance" and is difficult, therefore, to represent on the written page.

It is immediately evident that the melodic formulas, the NOEANE, etc., described by Aurelian in the section on *syllaba* as "meaningless words that are, however, intelligible as expressions of joy," are musical interjections. It will be remembered that Aurelian's Grecian connection had called them *adverbia*. Priscian, as mentioned above, says that in Greek grammatical theory, interjections had been included in the same category as adverbs; he admits later that, "Possunt tamen esse quaedam dubiae inter adverbia et interiectiones."[132] (*Grammatici Latini* 3.91)

The following excerpt from chapter 19 of *Musica enchiriadis* suggests a second way in which the grammatical theory of interjections applies to the vocal performance of liturgical song: "Nam affectus rerum, quae canuntur, oportet, ut imitetur cantionis effectus: ut in tranquillis rebus tranquillae sint neumae, laetisonae in iocundis, merentes in tristibus; quae dura sint dicta vel facta, duris neumis exprimi; subitis, clamosis, incitatis et ad

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[132] Nevertheless, there is some overlap between adverbs and interjections.

ceteras qualitates affectuum et eventuum deformatis; . . . ."[133] (Schmid 58)

That is, the expressive content of a melodic figure must conform to the expressive content of the text to which it is set. More precisely, the text has a logical meaning as well as the potential for a signification corresponding to an emotional state of mind. When the text is sung, it becomes a meaningful interjectory utterance just so long as the "performance" of the text conforms to its emotional content. According to this analysis, any sung text has an interjectory content that is rendered meaningful by the appropriate union of text and melody.

2.5 Summary

The late Latin grammarians are primarily interested in the articulate voice, a classification that includes, of course, the human voice engaged in recitation or psalmody. With the exception of Marius Victorinus none classifies the sounds of musical

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[133] It is proper that the emotion of a melody should imitate the affect of the things that are being sung. Thus tranquil melodic phrases (*neumae*) are appropriate for tranquil things, as are joyful melodies for happy things, and serious for sad. Whatever is said or done harshly should be expressed by harsh melodies, and the remaining emotions and affects should be expressed by sudden, noisy, or rousing melodies that have been shaped accordingly.

instruments as articulate, although Diomedes admits that the voices of instruments are measurable (pitched) and therefore differentiable, even though they cannot be written. This is interpreted to mean that these sounds cannot be reproduced by the sounds of letters. The sound of the textless human voice, engaged in humming or whistling, is meaningful, but cannot be written.

Letters, as the components of syllables, provide articulation and motion by means of consonants and vowels, respectively. Although the analogy between letters as the elements of words and pitches as elements of melody is false, the syllable, a concatenation of consonants and vowels that produces a single sound, was a useful unit for the description of liturgical song. A physical object, the syllable has altitude in accentuation or melodic motion, latitude in vocal character or timbre, and longitude in duration. These are exactly the characteristics of the melodic utterance of text, the intermediate type of vocal delivery that applies to the performance of liturgical song or chant.

Finally, the theoretical explanation of the part of speech known as *interiectio* applies to the NOEANE syllables described by ninth-century music theorists and provides a criterion for the appropriate performance of liturgical song; that is, the expressive content of the music must coincide with the meaning of the text.

We turn now to a third and final chapter founded on late Latin grammatical theory for an investigation of written

representations of musical sound, and in particular, of chanted text that are based on grammatical models or use grammatical terminology.

CHAPTER 3

GRAMMATICAL THEORY: WRITTEN REPRESENTATIONS OF MUSICAL SOUND AND CHANTED TEXT

In its broadest sense a musical notation is any written representation of a musical event. Further, there is an evident and strong connection between grammatical and rhetorical attempts to describe in writing the delivery of a text, whether prosaic or poetic, and music theoretical efforts to capture in writing performance aspects of the chanting of a liturgical text. Indeed, the connection of chant to speech is explicit in language used throughout the late eighth and ninth centuries, as the following three examples from the anonymous *Commemoratio brevis* illustrate:

1. "quae per duos diversos modos alternatim valent inter choros cantari, ut suo modo unus chorus suum versum pronuntiat et alter alio modo respondeat" (Schmid 164)[134]

2. "In pronuntiatione psalmorum cum antiphonis semper principia versuum protendantur una scilicet longa syllaba, . . ."[135] (Schmid 177)

3. "Psalmi, qui continuatim cum suis antiphonis dicuntur ad vesperam . . ."[136] (Schmid 176)

Four types of notational procedures that are based on grammatical models or use grammatical terminology will be discussed in this chapter: Aurelian's application of syllabic theory to the description of plainchant, a graphic representation of vocal motion, the relation of *positurae* to the written representation of the vocal performance of a text, and the use of the terms *acutus* and *gravis* in the vertical representation of pitch.

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[134] [The melodic formulas] are to be sung by the choirs alternately in two contrasting ways, one chorus pronouncing its verse in one way and the other responding in a different way.

[135] In the recitation of the psalms with their antiphons, the first syllable of each verse should always be extended so that it is long . . .

[136] The psalms, which are spoken in succession with their antiphons at vespers . . .

3.1 Aurelian's application of syllabic theory

In the section on *syllaba* of the previous chapter, a chanted text was conceptualized as a string of syllables--each having a certain timbral characteristic and duration and set in motion by its component vowel(s)--moving in time through a series of melodic inflections or accentuations. Several examples were given of Aurelian's use of grammatical terminology to describe the musical treatment of particular syllables in the performance of liturgical song.

It is useful now to look carefully at several sections of text drawn from Aurelian's treatise, principally from his chapter 5, *De vocum nominibus*. He opens this chapter with a definition of the three types of musical sound; our present concern is with the first: "Igitur ad omnem sonum qui materies cantilenarum est, triformem constat esse naturam. Prima est armonica, que ex vocum cantibus constat. . . . Est etiam armonica modulatio vocis et concordia plurimorum sonorum vel coaptatio."[137] (Gushee 68)

In the preceding chapter Aurelian had said: "Armonica est quae discernit in sonis acutum et gravem accentum, ut est hic: Ant. Exclamaverunt ad te Domine. 'Ex' gravis accentus, 'clama'

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[137] The sound that forms the basic material of melody has three different natures. The first is the harmonic, which corresponds to the singing voice. . . . The harmonic is the melodic movement of the voice and the concord or bringing together of several sounds.

armonica, 'verunt' acutus accentus est."[138] (Gushee 67) The first part of this remark is taken directly from the section on music in Isidore's *Etymologiae* (that is, "armonica" through "accentum"; cf. Lindsay 3.18).[139] The musical example, however, has been provided by Aurelian. It is abundantly clear that no matter what may or may not be true of the connection between the conventional symbols given by grammarians to indicate acute, grave, and circumflex accentuation and the earliest neumatic musical notations, Aurelian conceptualized the motion of a melodic texted

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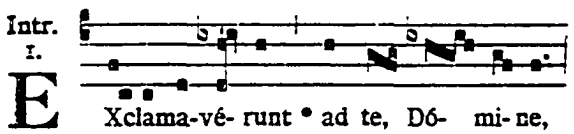
[138] The harmonic is what separates the acute sound from the deep sound. For example, in the antiphon *Exclamaverunt ad te Domine*, *ex* has a deep accentuation, *clama* is the harmonic, and *verunt* has an acute accentuation.

In modern plainchant notation:



[139] Isidore's statement is traditional. Dionysius Thrax writes in the *Technè*, for example: "Accent (*tonos*) is the harmonic (*enarmoniou*) resonance (*apekesis*) of the voice, rising in the case of the acute, uniform in the case of the grave, and inflected in the case of the circumflex." (Lallot 40-41)

voice according to the grammatical theory of accentuation or vocal motion. Therefore when he needed to devise some sort of musical notation, that is, a way of describing in writing the performance characteristics of the chants of the liturgy, he used grammatical language.

Further evidence of the conceptual relationship between chant and accentuation is given in an explicit statement in a tenth-century Frankish treatise on chant, probably written after *Musica disciplina* : "Quid est cantus? Peritia musicae artis, inflexio vocis et modulatio. . . . Ortus quoque suus atque compositio ex accentibus toni vel ex pedibus syllabarum ostenditur. Ex accentibus vero toni demonstratur in acuto et gravi et circumflexo. . . . De accentibus toni oritur nota quae dicitur neuma."[140] (Wagner 482) Without, however, some further detailed

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[140] What is chant (song)? It is skill in the musical art, inflection of the voice, and melody. . . . Its source and composition are revealed by the accentuations of tone and the metric patterns of syllables. Indeed, it is described by acute, grave, and circumflex accentuations of tone. . . . The musical note known as *neuma* originated from the accentual patterns of the tones.

I have translated the extremely slipppery word "nota" as musical note (taking "neuma" to refer in this context to a melodic fragment); cf., for example Quintilian: "Nam nec ego consumi studentem in his artibus volo, nec moduletur aut musicis notis

argumentation, nothing can be said about the relationship of this concept of melodic motion--with elements differentiated by acute, grave, and circumflex accentuation--to a conceptualization of musical space that includes a vertical axis of pitch values, a question that will be returned to later on in this chapter.

Aurelian continues in the next paragraph of his chapter 5:

"Tonus est acuta enuntiatio vocis. Est enim armoniae differentia et quantitas, que in vocis accentu et tenore consistit. Genera autem eius in quindecim partibus musici diviserunt, de quibus et in subsequentibus dicemus. Primus tamen vocum est modus yperlidius, qui est novissimus et acutissimus. Yppodorius secundus, ipse est omnium gravissimus cantus. Tercius modus est inflexio vocis, nam sonus directus est. Precedit autem sonus cantum. Quartus est arsis, id est vocis elevatio, hoc est initium. Quintus tesis, est enim tesis positio, hoc est finis. Sextus modus est, ubi insunt voces suaves. Suaves autem sunt voces subtiles et spisse, clare atque acute. Septimus ubi perspicue voces quae longius protrahuntur ita ut omnem impleant contiguum locum sicut tuba. Octavus est ubi subtiles voces sunt, ut infantium vel nervorum. Nonus, pinguis, ut virorum. Decimus, ubi acuta est vox,

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cantica excipiat . . ." (1.12.14, Butler 196-98). It is possible, of course, that both "nota" and "neuma" refer to written rather than sounded musical notes. In either case, the existence of a connection between chant and accentuation is clear.

tenuis, alta, sicut in cordis. Undecimus, ubi dura est vox, quae violenter emittitur, ut mallei in incude. Duodecimus est modus, ubi aspera est vox. Aspera autem vox est rauca et quae dispergitur per minutos et indissimiles sonos. Terciusdecimus est modus ubi vox caeca consistit. Ceca vox dicitur que cum emissa fuerit, conticescit. Quartusdecimus modus ubi vinnola vox est. Vinnola autem est flexibilis vox. . . . Quintusdecimus est modus ubi est perfecta vox. Perfecta autem est vox alta, suavis et clara."[141] (Gushee 70-71)

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[141] Tone is a raised enunciation of the voice. It is the species and quantity of harmony, which in voices consists of accentuation and tenor. It has fifteen genera, corresponding to fifteen parts of music, which we will proceed to describe. The first of the voices is the hyperlydian mode, which is the newest and most acute. The second is the hypodorian, which is the deepest song of all. The third mode is vocal inflexion, for the sound is given a specific direction. Indeed, sound precedes song. Fourth is arsis, that is elevation of the voice, namely, at the beginning. Fifth is thesis, that is a falling, namely, at the end. The sixth mode is that of sweet voices. Sweet voices are fine and full, loud and acute. Seventh are clear voices, which have a longer resonance, so that they fill an entire space, like a trumpet. Eighth are fine voices, like those of children or strings. Ninth are thick voices, like those of men. The tenth type of voice is acute, tenuous, high, like the

Again, Aurelian drew this text, with very few alterations, from the section dealing with music in book 3 of Isidore's *Etymologies*.[142] But the terminology is very similar to that used in grammatical treatises. The language of accentuation or vocal movement--*accentus*, *acutus*, *gravis*, *tenor*, *inflexio*--appears frequently and, as illustrated, is used by Aurelian throughout his treatise.

Two additional grammatical terms, taken from the study of metric feet--*arsis* and *thesis*--appear as the fourth and fifth categories of voice. A standard definition is that given by Servius:

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voices of strings. Eleventh are hard voices, which are emitted violently, like those of hammers in a forge. Twelfth is a rough voice. A rough voice is hoarse and dispersed in small, dissimilar sounds. The thirteenth mode belongs to the dark voice. The dark voice has no resonance. The fourteenth mode is a sweet, flexible voice; its name comes from the word for a softly curling lock of hair. Fifteenth is the complete voice. The complete voice is high, sweet, and clear.

[142] One amusing change made by Aurelian is found in the description of fine voices, the eighth category. Isidore says that they lack breath (*spiritus*) and gives four examples, the two given by Aurelian and the voices of women and the sick. Aurelian does, however, include the voices of men as examples of the ninth category of voice.

"Pes dictus est eo, quod pedis fungatur officio. Nam sicut nos pedibus incedimus, ita etiam metra per pedes quodam modo incedunt. Arsis dicitur elevatio, thesis positio."[143] (*Grammatici Latini* 4.425) Aurelian uses the terms *arsis* and *thesis* only a few times in his descriptions of chant melodies, but he does use the words *elevatio* and *positio* more frequently. Perhaps his preference for the terminology of unmeasured prosody can be explained by the following remark: "Igitur secundum Nichomacum tertia pars humane musice, que metrica nuncupatur, quoniam non tam speculatione ac ipsius artis ratione quam naturali instinctu fertur ad carmen, ideo a musica quamquam ab ea originem trahat segregandam putat. Rithmus vero, quia totum in ratione ac speculatione positum est, hoc propriae musice deputandum arbitratur."[144] (Gushee 68) At any rate, the anonymous theorist of

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[143] The metric foot was given its name because it has the function of feet. For just as we walk with our feet, so in a sense do the meters walk with the metric feet. *Arsis* is raising; *thesis* is lowering.

[144] According to Nicomachos, the third part of human music, which is called metrics because it is applied to song not so much through reasoning and the application of musical theory as by natural inspiration, should be separated from music, even though its origins lie within this art. But he thinks that rhythm, because it

Musica enchiriadis uses the language of metrics to describe a musical interval: "At ipsa commata per arsin et thesin fiunt, id est levationem et positionem. Sed alias simplici arsi et thesi vox in commate semel erigitur ac deponitur, alias sepius. Discrimen autem inter summam et infimam vocem commatis appelatur diastema."[145] (Schmid 22)

In addition to grammatical terms that describe melodic motion, Isidore's list contains terms that are identical or similar to those used to describe the*spiritus* or timbral characteristics of the syllable: *subtilis*, *spissus*, *durus*, *pinguis*, *raucus*, *lenis*, *caecus*, *clarus*, *suavis*. Further, verbs such as *protrahere* and *conticescere* describe the temporal characteristics, or longitude, of the syllable. What is important is that all these terms are actually used by Aurelian in the written descriptions of chant performance that form the greatest part of his treatise.

In conclusion, Aurelian uses the language of theoretical grammar, notably that pertaining to the corporality of the

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is based on theory and speculation, should be considered proper to music (*propriae musice*).

[145] These divisions are produced through *arsis* and *thesis*, that is, lifting up and lowering. Sometimes within a division the voice rises and falls just once in simple *arsis* and *thesis*; at other times, more than once. The distance between the highest and lowest vocal points is called an interval.

syllable, to accomplish his written representations of chant melody and performance. These representations, or notations, focus on melodic motion, timbre, duration, and, to a certain extent, dynamics. Undeniably, his descriptions of these parameters or components of musical phenomena do not fall into the neat categories that the twentieth-century mind enjoys; that is, the words used to capture on the page dynamics, timbre, and melodic motion are not specific to one property. For example, *clarus* and *raucus* refer to both the loudness and the timbre of a musical tone; *acutus* and *gravis* indicate timbre as well as relative pitch;[146] and accentuation and duration overlap. However, the use of somewhat imprecise words--*con brio*, *langsamer*, *délicatement*, *fortissimo*, etc.-- to describe complex musical phenomena has always been a part of musical notation and, in fact, has taken on additional importance in the twentieth century as conventional systems of notation have become inadequate to describe contemporary musical compositions.[147] In the process of constructing a written representation of melodic movement, timbre, and duration--using the language of theoretical grammar--Aurelian

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[146] For a contemporary treatment of the tonal qualities of gravity and acuity, see Zuckerkandl (1956).

[147] Bergson (1959) and Lippman (1952) discuss at length the physical, psychological, and symbolic components of our perceptions and descriptions of musical phenomena.

never discusses pitch. Clearly, it was not his intention to do so, for he could have, had he wished to, used the Greek letter notation for individual pitches devised in Greek theory and transmitted by Boethius and others. This simple fact emphasizes the extent to which ninth-century liturgical song was a form of ritualized and continuous speech (dependent on syllabic inflection rather than pitch) and thus related more to the trivial than to the quadrivial arts.

Aurelian does include in chapters 10 and 19 of his treatise notational symbols (described by some as "proto-Paleofrankish" neumes) that give a graphic representation of melodic motion and relative pitch.[148] In fact, these symbols seem to be part of a graphic tradition relating accentuation and melody that dates back to Varro and are the subject of the next section of this chapter.

3.2 Graphic representation of vocal motion

Opening a discussion of prosody or vocal movement as part of his exposition of the syllable, Varro carefully establishes a natural level of intonation, the midrange: "Ut enim inter rudem et eruditum, inter calidum et frigidum, amarum et dulcem, longum et brevem est quiddam medium, quod neutrum est, sic inter imam summamque vocem esse mediam, ibique quam quaerimus

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[148] See Treitler (1992) for a discussion of these neumes, drawing on the work of Atkinson and Handschin and Treitler's own research.

prosodiam. Neminem musicum esse, qui mediam vocem in cantu ignoraverit, nec quemquam potuisse dicere in sono chordarum aut voce tibiarum assave voce cantantium *mesen* esse, si non in omni vocis natura esset medium."[149] (Funaioli 301) It is important for this study to realize that Varro's text is reproduced verbatim by Servius (*Grammatici Latini* 4.529).

Arguing that the nature of prosody is vocal movement in and out of the midrange of the voice, Varro makes an explicit correspondence between prosody and music, giving a series of musical examples: "Acuta exilior et brevior et omni modo minor est quam gravis, ut est facile ex musica cognoscere, cuius imago prosodia. Nam et in cithara omnique psalterio quo quaeque chorda acutior, eo exilior, et tibia tanto est voce acutiore, quanto cavo angustiore, adeo ut corniculo aut bamborio addito gravior reddatur,

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[149] Just as between ignorant and learned, hot and cold, bitter and sweet, and long and short there is a neutral middleground; so between the lowest and the highest there is a vocal midrange, and it is there that we try to locate prosody. No one is a musician who is unaware of the midrange of the singing voice; nor could it be said that anyone is in the midrange of the sound of strings, the voices of flutes, or the voices of singers if the natural placement of all voices was not in the midrange.

quod crassior exit in aera."[150] (Funaioli 303) Again the text is taken up in its entirety by Servius (*Grammatici Latini* 4.531-32).

In the following paragraph, Varro describes the customary graphic representations of vocal inflection, relating them, however, directly to music: "Acutae nota est virgula a sinistra parte dextrorsum sublime fastigata; gravis autem notatur simili virgula in ea<m>dem parte<m> depressa fastigio. Quae notae demonstrant omnem acutam vocem sursum esse et gravem deorsum. Ipsum etiam musicorum docetur diagrammate, in quo tropi pro acumine vocum superiores scribuntur, denique summus hyperlydius, quia acutissimum, infimus hypodorius, quo nullus est gravior." (Funaioli 304)[151] Again the text is given in its entirety

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[150] An acute voice is thinner, shorter, and in every respect less than a deep voice, as is easily observed in music, whose image is prosody. In a cithara or a psaltery the tighter or thinner string produces the more acute voice and in a flute the narrowest bore produces the more acute voice. In the same way lengthening a small horn or a bamborium makes its tone deeper, for it produces a thicker column of air.

[151] The sign of an acute accent is a rod ("/") starting at the lower left and rising to a point at the upper right. A grave accent is indicated by means of a similar rod descending from the elevated point. These signs (*notae*) demonstrate [graphically] the upward motion of the acute voice and the downward motion of the grave.

by Servius (*Grammatici Latini* 4.532) Both authors describe a third graphic symbol, the *flexa* , which is called *circumflex* by many authors, a combination of an acute or upward with a grave or downward movement.[152]

The acute and grave musical tones that Varro cites are determined by instrumental characteristics--string tension, length and diameter of horn--and as such make no reference, even implicitly, to a vertical arrangement of pitches. Nor for that matter does the language, or the graphic image, of accentuation, which is conceptualized as continuous motion in time through low, medium, and upper vocal ranges. What is extremely interesting about this text--written by Varro and transmitted by Servius--is that on the basis of an analogy between rising and falling musical voices and the vocal inflections of prosody, it establishes a correspondence between the ordered discrete tones or pitches of

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The same thing is taught by means of the musicians' scale, in which [the names of the] higher tropes are written according to vocal height, the highest being hyperlydian and the lowest hypodorian, the deepest or gravest voice.

[152] Priscian lists ten graphic representations of vocal properties of syllables, corresponding to acute, grave, and circumflex accentuation; long and short temporality; hyphenation or combination; disjunction; apostrophe; aspiration; unpronounced "h": / \ Λ -- u ' , |- -| (*Grammatici Latini* 3.520).

the Greek musical scale and graphic representations of the rising and falling motion of the voice.

Martianus Capella takes up the subject of vocal motion in his final chapter on harmony: "Ut si quemadmodum nobis scribendum sit cogitemus, ita haec virtus pthongi docet, quid vel acuminis exeramus vel leniminis remittamus. Verum ex istis aiia faciunt, alia patiuntur: faciunt intentio vel remissio, patiuntur acumen et gravitas. Productio autem est (hoc est epitasis) vocis commotio a loco graviore in acutum locum, anesis vero contra: nam ab acuminis culmine in grave quiddam seriumque descendit."[153] ([939-940], Willis 361-62)

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[153] If we think about how we should write (a particular tone), the *pthongi* have the capacity to teach whether we must reach out to an acute tone or relax for a softer sound. Now some tones (*pthongi*) are active and some are passive. Tension and relaxation are active; acuity and gravity are passive. Vocal production (*epitasis*)is a movement of the voice from a deeper to a more acute place; *anesis* is the opposite movement, for the voice descends from an acute peak to a deep and serious tone.

For a complete discussion of the problems that this difficult passage presents to the editor and the translator, see Cristante (1987, 298-300). Cristante has significantly changed the text immediately preceding this passage from the readings given by Dick and Willis. The translation I have given is consistent with

Remigius's commentary, based as usual on that of Johannes Scottus, is helpful: "UT SI QUEMADMODUM id est quo accentu, NOBIS SCRIBENDUM SIT, COGITEMUS. Quemadmodum unaquaeque syllaba suum accentum habet, ita unusquisque sonus notam acuminis vel remissionis. EXERAMUS extendamus vel in altitudinem producamus, VEL LENIUS[154] REMITTAMUS gravemus. VERUM EX ISTIS scilicet ptongis, ALIA FACIUNT. INTENTIO scilicet chordae, id est cum tenditur chorda, VEL REMISSIO scilicet chordae, id est quando relaxatur chorda. PATIUNTUR ACUMEN ET GRAVITAS In chorda fit actus in intentione vel remissione. Pasio vero fit in voce quae patitur, id est sustinet, chordae vel arteriarum extensionem vel remissionem."[155] (Lutz 2.337) Remigius

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Cristante's alterations. In the text that I have quoted, however, I have maintained Willis's emendation to "leninimis" of Dick's "lenius" to maintain the parallel construction. Cristante gives "lenius."

[154] Lutz's edition of Remigius's commentary agrees in this case with Dick's reading.

[155] UT SI QUEMADMODUM that is, with what accentuation, NOBIS SCRIBENDUM SIT, COGITEMUS. Just as each syllable has an accentuation, each sound has a figure (*notam*) corresponding to a raising and lowering (of pitch). EXERAMUS we should extend or raise upwards, VEL LENIUS REMITTAMUS and lower. VERUM EX ISTIS that is, the tones (*ptongis*). ALIA FACIUNT. INTENTIO of the

illustrates with accent marks (not found in Johannes Scottus's text) the lemmas VOCIS COMMOTIO A LOCO GRAVIORE IN ACUTUM LOCUM and ANESIS VERO CONTRA.

Remigius, of course, is careful to indicate that Martianus is speaking about the motion of musical voices through acute and grave tones determined by string tension or, almost as an afterthought, the length of a column of air. What is interesting is that he makes an explicit connection between string tension and graphic representations of the patterns of vocal motion.

It is time to say a bit more about the melodic diagrams, present in the oldest extant version of the treatise, that are found in chapters 10 and 19 of Aurelian's *Musica disciplina.*[156] For example (Gushee 122):

"Porro in versibus antiphonarum haec consistit figura notarum.[157]

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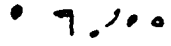
string, that is, when a string is stretched (or tightened), VEL REMISSIO of a string, that is when a string is loosened. PATIUNTUR ACUMEN ET GRAVITAS A string becomes active through tension and release. A passive voice maintains or sustains the (same) extension or relaxation of a string or windpipe.

[156] See Treitler (1984 and 1992) and Handschin (1950) for a discussion of the issues involved.

[157] Moreover, in the verses of the antiphons this is the shape of the written signs.



Et exultavit spiritus meus in Deo salutari meo."

This is musical notation of a type called "Paleofrankish" by Handschin and falls into a class of neumatic notations called "iconic" by Treitler. Handschin has found neumes of this type in numerous other sources; in all cases they correspond consistently to particular melodic figures: an ascending two-note figure drawn as /, a descending two-note figure drawn as \, and an ascending and descending three-note figure drawn as /\. That is, they are the traditional accentual marks of Greek and Latin prosody applied to the vocal inflections of a sung text; in a real sense they are a mapping onto the written page of upward and downward vocal motion through time. As Handschin, Treitler, and others are careful to point out, it is just this iconic characteristic that sets Paleofrankish neumes apart from other early systems of neumatic writing. The texts examined in this section indicate that this defining characteristic of Paleofrankish neumes may well have been influenced by the writings of the Roman grammarian Varro, transmitted by the late Latin grammarian Servius.

3.3 *Positurae* and the representation of vocal performance of text

The late Latin grammarian Servius's expository material on the marks of punctuation--*posituraе*--contains the standard elements: "Posituras oportet vocemus quas Graeci *thesis* appellant, quae in legendo dant copiam spiritus, ne continuatione deficiat. Hae tres sunt, quarum diversitas tribus punctis diverso loco positis demonstratur in distinctione. Ubi enim plenus est sensus, hoc est ubi fit clausula dictionis cuiuslibet, punctum ad caput litterae ponimus: ubi sensus necdum plenus est et respirare oportet, ad mediam litteram damus punctum: ubi suum finem inplendi sensus ita suspendimus, ut statim id quod sequitur subicere debeamus, imam litteram puncto notamus."[158] (*Grammatici Latini* 4.533-34)

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[158] Properly, we call punctuation what the Greeks call *thesis*; it allows one who is reading to catch his breath, so it will not run out as the reading continues. There are three types of punctuation corresponding to three different points placed differently within sections. A point is placed at the top of the last letter at the conclusion of the delivery of a complete thought; where the meaning is not yet complete, but it is appropriate to take a breath, we place a point at the middle of the letter. Where we interrupt the expression of a complete meaning only briefly and immediately go on to what follows, the point is written at the foot of the letter.

The benefits brought by this system of punctuation to the reading aloud of sacred text are praised by Cassiodorus (ca. 550): "Terminos suos modulatae voci competenter affigere, totamque dictionem sic per membra dividere ut suis partibus considerata pulchrescant! Nam si corpus nostrum indiget per membra cognosci, cur lectio cum suis partibus videatur confusa derelinqui? Istae siquidem positurae seu puncta quasi quaedam viae sunt sensuum et lumina dictionum, quae sic lectores dociles faciunt tamquam si clarissimis expositoribus imbuantur."[159] (Mynors 48-49)

In fact, the prereading or preparation of text prior to its being read aloud is a procedure that is mentioned by Quintilian, although he considers the task to be unworthy of a rhetorician's attention: "Et hercule praelectio, quae in hoc adhibetur, ut facile atque distincte pueri scripta oculis sequantur, etiam illa, quae vim

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[159] To mark its points of division suitably with a vocal modulation and to distinguish in this way the components of the entire discourse so that they become more beautiful when examined all together. For if our body must be known through its parts, why does reading appear to have been left in a disorderly state with respect to its component parts? In fact these divisons or points are like the roads of the meanings and the lights of the discourse, which make the readers easily taught as if they were being educated by the most lucid interpreters.

cuiusque verbi, si quod minus usitatum incidat, docet, multum infra rhetoris officium existimanda est."[160] (2.5.4, Butler 1.246)

As part of Alcuin's and Charlemagne's combat against *rusticitas*, an effort was made to enforce proper standards for punctuation, which had come to be ignored or misused.[161] Alcuin urged that monks improve the quality of their public utterances: "Ut, quicumque vos propter nomen Domini et sanctae conversationis nobilitatem ad videndum expetierit, sicut de aspectu vestro aedificatur uisus, ita quoque de sapientia vestra, quam in legendo seu in cantando perceperit, instructus omnipotenti

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[160] And I admit that the prereading that this [method] requires, in order that boys may follow with their eyes the written word with ease and accuracy, and even that which aims at teaching the meaning of rare words that may present themselves, may be regarded as well below the dignity of the rhetorician.

[161] No attempt will be made to discuss in detail what is known of the evolution and characteristics of Carolingian punctuation. For a discussion of Carolingian punctuation, the reader is referred to Parkes (1993), in particular the chapter entitled "Carolingian *Renovatio*: Augmenting Old Notation with New Symbols." Banniard (1992) in the chapter entitled "Alcuin et les Ambitions d'une Restauration," discusses in well-documented detail Alcuin's efforts to correct written and spoken abuses of the Latin language.

Domino gratias agendo gaudens recedat."[162] (Wallach 204) He felt strongly that the improvement of written sources through proper punctuation and orthography would have as a logical consequence the improvement of oral communication in general, and of the reading aloud and chanting of liturgical texts in particular (Banniard 1992, 358). Simply put, the written document would not simply represent a text but would affect its performance. To this end, Alcuin exhorted Carolingian scribes:

"Haec interserere caveant sua frivola verbis
Frivola nec propter erret et ipsa manus.
Correctosque sibi quaerant studiose libellos
Tramite quo recto penna volantis eat.
Per cola distinguant proprios et commata sensus
Et punctos ponant ordine quosque suo
Ne vel falsa legat, taceat vel forte repente
Ante pios fratres lector in ecclesia."[163] (Banniard 1992, 360)

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[162] Whoever may seek to see you for the sake of God's name and the nobility of holy discourse, as it is established by seeing your manner, should in the same way leave having been enriched by your level of knowledge, which he will have observed in your reading as well as your chanting.

[163] Let them be on guard against mixing their frivolities with the words,

An extremely interesting text, evidently occasioned by the general concern about proper standards for vocal performance, is the letter from Hildemar, a monk of Corbie in the ninth century, to Bishop Ursus of Benevento, "Epistola ad Ursum Beneventanum Episcopum de recta legendi ratione."[164] After the formal salutation, Hildemar sets out the purpose of his letter:

"Vestrae igitur dilectionis causa, scientiae officiique mei modum excedens, vestro parere curabo praecepto. Quamvis itaque ars distincte legendi potissimum in posituris consistat, sunt

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frivolities that may cause the hand to stray.

Let them diligently seek corrected texts

So that the pen may willingly follow the proper path.

Let them divide the meanings appropriately by *cola* and *commata*

And place the points appropriately

In order to read correctly without unexpected pauses

When standing before the brothers in church.

[164] For information on Hildemar, see Hafner (1959) and the Mittermüller edition of the *Expositio Regulae ab Hildemaro tradito*.. The text of the letter is excerpted by Parkes and used in this abbreviated form by Treitler in "Reading and Singing" (1984). The reader is referred to the Treitler article for a summary of the arguments for and against the proposition that neumes are in some way related to punctuation marks.

tamen et illi accentus ineruditis lectoribus aliquo modo utiles, quos Donatus enumerat. Nullus nempe ignorat quod pars illa, cujus titulus est de Accentibus, ob enuntiationem syllabarum praecipue fuerit edita: quoniam quidem per accentuum vim ratio sonandi in sermonibus demonstratur. Nescimus enim quomodo sonare debeamus syllabam longam vel brevem, utrum circumflexo an gravi, nisi per accentum, ut Isidorus dicit."[165] (PL 106.395)

Citing Pompeius and Servius, in addition to Isidore, Hildemar gives the same list of eight accents as does Priscian, beginning with acute, grave, and circumflex. He continues with Donatus's system of punctuation by *distinctio*, *subdistinctio*, and *media distinctio*, relying on the additional authority of Isidore and Servius. After supplying a familiar metric example ("Arma

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[165] Therefore, for the sake of your love, exceeding the limits of my knowledge and responsibility, I will undertake to comply with your command. Although the art of clear reading depends chiefly on punctuation, nevertheless those accents that Donatus enumerated are to some extent useful to uneducated readers. Certainly everyone knows that the section entitled "On accents" was primarily concerned with propositions about the enunciation of syllables, for the method of pronouncing a discourse is explained by means of the properties of accents. As Isidore said, we do not know how to make the sound of a syllable, whether long or short, circumflex or grave, without an accent.

virumque cano, Trojae qui primus ab oris"), he turns his attention to prose:

"Nam prosa his tribus punctis hoc modo distinguitur: 'Beatus vir qui non abiit in consilio impiorum, et in via peccatorum non stetit, et in cathedra pestilentiae non sedit.' Non ergo miremini quod in medio sensu notam acuti accentus fecerint, quam, ut ab eruditis didici viris, his tribus punctis tres aptantur accentus, id est usque ad medium totius sententiae sensum, gravis; in medio quoque tantummodo sensu, acutus; deindeque usque ad plenum sensum, circumflexus. Ita ut nec ante acutum sit circumflexus, nec post acutum sit ullo modo gravis. Hoc autem omnino a lectore observandum est, ut in medio solummodo totius dictionis sensu, vox ipsius paulo eminentius elevetur, et ante elevationem per singula subdistinctionis puncta gravetur, atque post praedictam elevationem per singula puncta circumflectatur, salvo illo sensu quem Donatus tractat in accentuum ratione."[166] (PL 106.397)

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[166] Prose is punctuated with these three points as follows: (Opening lines of *Beatus vir*). Do not be surprised that they made the sign (*notam*) of the acute accent at the middle of the idea, for I have learned from scholars how to fit the three accents to these three points: the grave accent up to the middle of the thought, the acute only at the middle of the thought, and then the circumflex to the completion of the thought. In this way neither does a circumflex accent precede an acute nor a grave follow an acute.

Hildemar goes on to elaborate his principles of vocal inflection: "In medio quoque dictionis sensu non ultimam syllabam acuendam, quod ars nonnisi in paucis discretionis causa sinit, sed totam illam partem orationis, quae ultima fuerit, altius enuntiandam vel gravandam vel circumflectendam dicimus, salvo unicuique parti et praesyllabae suo natural sono. In interrogationibus autem atque percontationibus vox legentis necesse est acuatur, sed paulo vehementius quam in acuto accentu."[167] (PL 106.397) His comments are illustrated with

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The procedure must be observed in its entirety by the reader, so that his voice is elevated somewhat more prominently only in the middle of the complete delivery; and that before this elevation it is deepened at individual points of *subdistinctio*; and that after the aforementioned elevation it is circumflected at individual points, observing the meaning that Donatus discussed in [the section on] the method of accentuation.

[167] At the midpoint of the phrase, we speak the last syllable without making it prominent, for artistic utterance allows this at only a few divisions. Rather, we pronounce the entire final section of a division, whether enunciating it at a higher level or lowering or inflecting it, while maintaining the natural sound of each component part and presyllable. In interrogation and inquiry the reading voice must be raised, but less vigorously than for an acute accent.

examples and punctuation marks corresponding to inquiry, interrogation, and negation. For example:

(Inquiry) *Quis accusabit adversus electos Dei~*

(Interrogation) *Deus qui justificat?* [168]

Hildemar's peroration begins as follows: "O domine mi, ecce quod rogastis, nec brevius, nec apertius scribere potui; verumtamen videtur mihi rustico et insipienti, quod quantum ad peritiam legendi attinet, sufficiant haec: tantum sonus vocis deest, qui in variis punctis et notis varius esse debet, idcirco quod scribi non valet."[169] (PL 106.398)

The text is certainly directed toward improving standards of public delivery. Furthermore, Hildemar's inclusion of the psalm

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[168] Hildemar, citing Augustine, explains the difference between inquiry and interrogation: "Ad percontationem multa responderi possunt, ad interrogationem autem, aut *non*, aut *etiam*." (PL 106.397) [Many responses can be given to an inquiry; to an interrogation, only "no" or "yes."]

[169] O my lord, you can see that I have complied with your wishes as briefly and as clearly as possible. Nevertheless, it seems to me, being uneducated and foolish, that as far as skill in reading aloud is concerned, these remarks are sufficient. To the extent that the sound of the voice, which should be represented in the different points and written signs (*notis*), is lacking, it is not worth being written.

Beatus vir qui non abiit indicates its direct application to liturgical performance. His reliance on the proper placement of *posituraе* in the text, to ensure that a psalm is chanted appropriately, reflects the reversal of roles between the written and the oral that was mentioned previously. That is, written text in this case is not charged with the exact representation of utterance; its duty is to assist in the production of a correct utterance.[170]

What is particularly intriguing about this excerpt is that Hildemar relates the process of division of text into component structures, with punctuation marks placed accordingly, to the type of vocal accentuation and movement discussed previously. That is, the punctuation marks enable the reader to regulate his breathing and to give proper prominence to the important subsections of a text. But Hildemar specifies in addition that the performance or oral delivery of a text must be accomplished with the appropriate vocal motion or prosody. Taking an example from psalmody, he stipulates a central highpoint created by means of vocal emphasis, preceded by grave intonation and followed by circumflected movement, a prosodic intonation corresponding to his abbreviated rules stating that an acute accentuation must not precede a grave

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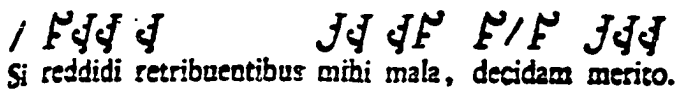
[170] For a discussion of this dichotomy--that is, prescriptive as opposed to descriptive functions of writing--as applied to music notation, see Seeger (1977)

nor follow a circumflex. Graphically represented, the overall melodic contour occupies a fairly constant position in the vocal midrange and rises to a peak after which it falls, possibly through several fluctuations, to end as it began at a point in the vocal midrange. He takes care to mention that while individual words should be correctly pronounced, he is describing overall accentuation or melodic movement.

The term *accentus* appears in the treatise *Commemoratio brevis* in a context that suggests the influence of ideas such as those expressed by Hildemar. "Sunt preterea multa, quae conferri magis quam scribi oportet, quae scilicet in principiis vel in distinctionibus et membris versuum pro accentuum aut euphoniae ratione observanda sunt. Accentuum dumtaxat, ut melo dorio canens dicat. . ."[171] (Schmid 168) The musical example that follows seems to indicate that *accentus* refers to the melodic contour of a Dorian tone:



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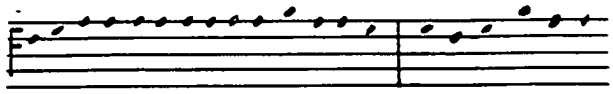
[171] There are, moreoever, many things that can more easily be applied than written, which should be observed at beginnings, major divisions, and parts of the verses according to the theory of accentuation and euphony. Regarding accentuation, the singing of a Dorian melody should be . . . . (A musical example follows.)



Si reddidi retribuentibus mihi mala decidam merito

Although the term *accentus* is used only once in the *Commemoratio brevis*; a great number of the intonations that are presented as examples follow exactly the prototypical melodic contour described by Hildemar.[172] Furthermore, the terminology of punctuation and textual articulation is used throughout. Two additional examples will suffice:

1. "Similiter et medietates seu distinctiones in versibus pro diversa positione verborum diversae habent."[173] (Schmid 166)

2. "Verum omnia longa aequaliter longa, brevium sit par brevitas exceptis distinctionibus, quae simili cautela in cantu observandae sunt."[174] (Schmid 176)

The theorist of the *Commemoratio* identifies his purpose and audience in his opening sentences: "Quamvis enim Deo magis placeat, qui corde quam qui voce canit, utrumque tamen ex ipso est et dupliciter prodest, si utrumque fiat, si scilicet et animo apud Deum dulciter canitur et homines canoris dulcedo sancto affectu

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[172] See, for example, Schmid (159-162).

[173] In the same way, there are places in the middle or divisions of the verses to allow for different arrangements of words.

[174] All long syllables are long and short syllables short, except at points of textual division, which must be sung carefully as well.

commovet. Licet quoque multorum devotio Deo valde placeat, qui in psalmodia nec ipsa verba rite effari queant, nequaqquam tamen integrae est ille devotionis, qui, quod exhibere debet, quam optime et quam reverentissime id possit, Deo non exhibet."[175] (Schmid 157) That is, like Hildemar, he is exhorting the clergy to observe the rules of psalmody so as to please God and to bring forth properly and effectively the sense of a liturgical text.

Finally, it is appropriate at this point to mention again the ninth-century treatise *Quid est cantus*, discussed briefly in connection with Aurelian's use of the grammatical theory of the syllable. The quoted excerpt ends as follows: "Ex accentibus vero toni demonstratur in acuto et gravi et circumflexo. . . . De accentibus toni oritur nota quae dicitur neuma." It is very reasonable to think that Hildemar's conceptualization of *accentus*

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[175] Although God may be more pleased by the one who sings with his heart rather than his voice, nevertheless the effect is doubled if both are present, that is, if it is sung sweetly to God with the mind and excites men to holy passion by means of delightful singing. It is true that the devotion of the many people who are not able in psalmody to pronounce the words properly is nonetheless greatly pleasing to God. But the one who does not display to God what should be displayed in the best way and as reverently as he is able is by no means irreproachable in his devotion.

as a sort of overall or generalized prosodic or melodic movement is appropriate in this case as well and is consistent with the interpretation of both "nota" and "neuma" as a (possibly written) melodic formula.

3.4 "Acutus" and "gravis" and the vertical representation of pitch[176]

The terms "acutus" and "gravis," when applied to the human speaking or chanting voice, describe vocal motion that typically lies within the midrange of the voice but becomes prosodic as it moves in and out of this midrange. It is clear from the texts we have considered that changes of vocal character or timbre as well as new levels of intonation are produced by this movement; that is, the terms acute and grave are primarily qualitative. And it is clear that this vocal motion is conceptualized as a continuous flow of sound in which changes of level are relative, never precisely quantified within a vertical array of pitches. The very nature of the graphic images we have discussed serves to confirm this point. Furthermore, of course, there is the evidence of Hucbald's famous remark about the shortcomings of early neumatic notation (as compared to his new system of notation) to indicate that at some point a more precise indication of pitch within a

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[176] For an interesting study of the vertical representation of pitch in Western musical thought, see Duchez (1979).

vocal continuum became desirable to facilitate learning a melody: "Quod his notis, quas nunc usus tradidit quaeque pro locorum varietate diversis nihilominus deformantur figuris, quamvis ad aliquid prosint rememorationis subsidium, minime potest contingere: incerto enim semper videntem ducunt vestigio . . ."[177] (*Scriptores Ecclesiastici* 1.117; "rememorationis" for "remunerationis" in agreement with Brussels, Bibliothèque Royale, MS 10078/95)

Chartier argues that the neumatic notation that Hucbald actually used in the archetype of his treatise was one of three kinds: Paleofrankish, Breton, or Lorraine (Chartier 1987, 151-52). It is important to note that Treitler has shown that all three have the same iconographic characteristics; that is, they trace vocal motion on the written page (Treitler 1987, 27).

"Acutus" and "gravis" applied to musical instruments are related to instrumental configuration as well as vocal motion: the tension of strings, the length and diameter of a column of air. Again, these are characteristics that affect timbre as well as level of pitch and are not naturally suggestive of a vertical array. Boethius, describing a physics of sound derived from Plato, relates

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[177] But this is not likely to happen, because in this notation, handed down by custom and having different shapes in each different region, the signs guide the reader in uncertain steps, although they can be of some slight value as an aid to memory.

the terms to relative speeds of vibration: "Igitur quoniam acutae voces spissioribus et velocioribus motibus incitantur, graves vero tardioribus ac raris, liquet additione quadam motuum ex gravitate acumen intendi, detractione vero motuum laxari ex acumine gravitatem. Ex pluribus enim motibus acumen quam gravitas constat."[178] (Freidlein 190)

Speed of vibration is a quantifiable determinant of pitch and as such is easily mapped onto a vertical array, but Boethius does not seem to have conceptualized the problem in this way. It is likely, however, that a concentration on the characteristics of individual pitch rather than on the characteristics of vocal flow is what eventually produced the quantification of pitch in the familiar two-dimensional graphic image of melody. The epistemology of sound implicit in a system of individual pitches will be discussed at length in the next chapter, but this seems the appropriate moment to turn to an extraordinary image found in the opening book of Martianus Capella's *De nuptiis*.

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[178] Therefore because acute voices are incited by faster and more frequent motions and grave voices by slower and less frequent motions, it is clear that [vocal] acuity is raised from the deeper tones by some additional motion and that depth [of voice] is a relaxation from [vocal] acuity accomplished by a lessening of motion. Acute sound is made up of more motion than grave sound.

In the first book, Mercury, having decided that he must take a wife, determines to seek the advice of Apollo, who is finally located in a secret cave, engaged in calling up visions of the physical world past and present. Among these is a musical grove:[179]

"Inter haec mira spectacula Fortunarumque cursus [motus] nemorum etiam susurrantibus flabris canora modulatio melico quodam crepitabat appulsu. Nam eminentiora prolixarum arborum culmina perindeque distenta acuto sonitu resultabant; quicquid vero terrae confine ac propinquum ramis acclinibus fuerat, gravitas rauca quatiebat. At media ratis per annexa succentibus[180] duplis ac sesqualteris nec non etiam sesquitertiis, <sesqui>-octavis etiam sine discretione iuncturis, licet

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[179] Shanzer (1986, 87-90) comments in detail on this passage.

[180] Calcidius discusses the meaning of *succentus*: "Quotiens leniores et tardiores pulsus erunt, et accentus quidem existunt ex nimio incitatoque pulsu, succentus vero leni et tardiore, ex accentibus porro et succentibus variata ratione musicae cantilena symphonia dicitur." (Waszink 93) [As there are often softer or slower pulses (and accents in fact arise from a very rapid pulsation, succents from a gentle and slower pulsation), song is called symphony in the diverse theory of music on account of the accents and the succents as well.] Blaise (1954, 789) defines "succentus" as a "lower tone."

intervenirent limmata, concinebant. Ita fiebat, ut nemus illud harmoniam totam superumque carmen modulationum congruentia personaret. Quod quidem exponente Cyllenio Virtus edidicit etiam in caelo orbes parili ratione aut concentus edere aut succentibus convenire. Nec mirum quod Apollinis silva ita rata modificatione congrueret, cum caeli quoque orbes idem Delius moduletur in Sole."[181] ([11], Willis 6-7)

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[181] Among these remarkable spectacles and the movements of the Fortunes, a tuneful melody, caused by the whispering winds in the trees, rustled with a kind of musical vibration. The topmost layers of the tall trees, correspondingly stretched tight, reverberated with an acute sound; but whatever was close and near to the ground vibrated with a low note in the down-turning branches. The middle portions of the trees, coming in contact with each other, sang together in the duple, the sesquialtera, and also the sesquitertia, and even in the sesquioctava accompaniments [*succentibus*] without any separation at the junctures, granted of course that the semitones intervened. In this way the grove sounded all the harmony and song of the gods in melodic concordance. When Cyllenius (Mercury) explained this, Virtue became aware that even in the heavens, according to the same theory, the spheres produce harmonies or combine with the accompanying voices. It is not surprising that the grove of Apollo

Johannes Scottus comments extensively on this intriguing but difficult passage. Although much of his discussion centers on Greek harmonic theory, he does not ignore the striking image of a stand of trees producing music:[182]

"MIRA SPECTACULA FORTUNARUM videlicet imagines. In hoc loco musicas symphonias usu poetico seu rethorico, sub figura Apollinei nemoris flabrorum flatibus commutati, breviter describit, ita ut summitas arborum acutissimos sonos, inclinati autem rami ad radices gravissimos, medii, hoc est inter cacumina arborum et radices extenti, medios efficient. Omnis quippe musica symphonia, id est consonantia, veluti intra tres terminos constituitur, hoc est inter gravissimos et medios et acutissimos sonos. Quorum extremi gravissimi videlicet et acutissimi, dum sibi invicem coaptantur, concentum, id est ratam extremorum concinentiam, reddunt. Dum vero inter graves et extremos

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should be so harmonious, for the same god of Delos in the sun also harmonizes [*moduletur*] the spheres of the heavens.

[182] Discussing the Apolline grove, Shanzer writes (85-86): "There appear to be no parallels at all for a magic grove that echoes the harmony of the spheres, although this particular image of cosmic sympathy may have been drawn by Martianus as a jeu d'esprit on the *reductio ad absurdam* argument of Cic. *Nat. Deor.* 2.22 (the animation of the universe can be deduced from the animation of its parts . . .). The passage is an extremely curious and knotty one."

rationabilibus intervallis medii constituuntur soni, inter se invicem succentus gignunt, ita ut extremi concentus medii autem succentus efficient, et si extremi soni sibi invicem ex dupla proportione iungantur, ut sunt duo ad unum, diapason armoniam, quae in simplicibus simphoniis maxima est, effitiunt. . . ."[183] (Lutz 18)

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[183] REMARKABLE SPECTACLES OF THE FORTUNES, that is, images. In this place, he (Martianus) describes briefly the musical symphonies, using as a poetic or rhetorical device the figure of an Apolline grove affected by gusts of wind, so that the tops of the trees produce acute sounds; the branches near the roots, grave sounds; and the middle ones extending between the tops of the trees and the roots, produce sounds in the midrange. All musical symphonies, or consonances, are contained within three ranges, that is, between the most grave sounds, the midrange, and the most acute. The extremes of these sounds, that is, most grave and most acute, when they are mutually joined together, produce a harmony, that is, an established concord of the extremes. Now intervening sounds, between the lowest and the highest limits, are established by means of rational intervals, producing accompaniments among themselves in turn. In this way the extremes produce harmonies and the intervening sounds accompaniments. If the extreme sounds [i.e., the most acute and most grave] are joined together according to the duple proportion,

Johannes Scottus goes on to make explicit the proportions that produce the octave, the perfect fifth and fourth, and the tone, that is, 2/1, 3/2, 4/3, and 9/8. He explains the semitone, or *leimma*, as follows:

"Communis mensura mediarum vocum quam dicunt totum mox gignitur, et quia non semper integris tonis a se invicem medii cum extremis comparati discernuntur, necesse est ut inserantur emitonia quae etiam limmata nominantur, et hoc est quod ait, OCTAVIS ETIAM SINE DISCRETIONE IUNCTURIS, quamvis intervenirent limmata."[184] (Lutz 18)

Remigius carefully explicates the figurative reference to branches of trees:

"NAM EMINENTIORA CULMINA id est rami altiores vel cacumina ipsarum arborum. . .

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so that two tones sound as one, the harmony of the diapason [octave] is created, which is the largest of the simple symphonies.

[184] The usual proportion of the intervening voices, which they call a whole [tone], is then produced; and because the intermediate tones, when compared with the extremes, are not always separated from one another by whole tones, it is necessary that semitones, which are called *limmata*, be inserted. That is what he says, OCTAVIS ETIAM SINE DISCRETIONE IUNCTURIS, although semitones intervene.

QUICQUID VERO TERRAE CONFINE AC PROPINQUUM FUERAT rami videlicet inclinatiores et humiliores ac terrae viciniores. QUATIEBAT id est impellebat, repercutiebat. RAUCA GRAVITAS Ypallage est pro gravis raucitas. Est autem meson, id est mediae significationis. AT MEDIA RATIS cata cresticos, id est usurpative; ratem pro silva vel arboribus posuit cum proprie RATIS sit trabium vel lignorum incastratura. AT MEDIA neutrum et plurale, MEDIA illius RATIS id est mediae partes ipsius silvae."[185] (Lutz 1.86-87)

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[185] NAM EMINENTIORA CULMINA, that is, the higher branches or the tops of these trees. . .

QUICQUID VERO TERRAE CONFINE AC PROPINQUUM FUERAT, namely, the more bent and lower branches, closer to the ground. QUATIEBAT, that is, pulsed, reverberated. RAUCA GRAVITAS by *hypallage** can be exchanged for *gravis raucitas*, a deep hoarseness of sound. The tone is meson, signifying the midrange. AT MEDIA RATIS by cresticos, that is, making use of; he [Martianus] put "ratis" for the woods or the trees when, strictly speaking, RATIS is a raft made of boards or planks. AT MEDIA is neuter plural, MEDIA RATIS refers to the middle parts of that grove of trees. [* "*Hypallage* is a rhetorical figure by which the relations of things seem to be mutually interchanged (as: dare classibus austros instead of classes austris)." (Lewis and Short 872)]

Remigius continues with his explanation of the octave, perfect fifth and fourth, whole tone, and semitone, clarifying Johannes Scottus's commentary on Martianus's reference to the whole tone: "OCTAVIS ETIAM SINE DISCRETIONE IUNCTURIS. OCTAVIS id est sesquioctavis sive epogdois, IUNCTURIS id est consonantiis, SINE DISCRETIONE id est since intervallo. Epogdous in arithmetica, tonus dicitur in musica."[186] (Lutz 1.87)

A musical practice cited by Remigius as part of his brief commentary on the harmony of the diapason or octave, and not mentioned explicitly by Johannes Scottus, is certainly worth mentioning: "DUPLIS SUCCENTIBUS AC SESQUALTERIS NEC NON ETIAM SESQUITERTIIS quinque musicas consonantias exsequitur. DUPLIS SUCCENTIBUS id est duplicis organis, diapason videlicet et symphoniam. Quod enim in arithmetica duplum, in musica vocatur diapason."[187] (Lutz 1.87) The "duple organum" to which Remigius refers is undoubtedly the procedure for harmonizing a melody

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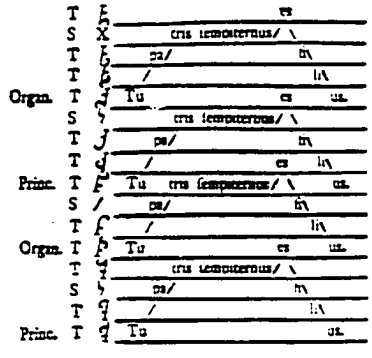
[186] OCTAVIS, that is, in the sesquioctava or *epogdous*, JUNCTURIS, that is, in the consonances, SINE DISCRETIONE, that is, without an interval. An*epogdous* is called a tone in music.

[187] DUPLIS SUCCENTIBUS AC SESQUALTERIS NEC NON ETIAM SESQUITERTIIS. He describes five musical consonances. DUPLIS SUCCENTIBUS, that is, in duple organum, namely, the diapason and a symphony. That which is called a duplex in arithmetic is called diapason in music.

described in both *Enchiriadis* treatises. For example, the theorist of the *Musica Enchiriadis* presents this musical diagram, which he describes as follows:

"Sive namque simplici cantui duplex adiungas organum, quod potest significare primus versus ac tertius, qui ad secundum versum vicem tenent organi, sive ad duplicem cantum simplex organum referatur, quod versus secundus designat et quartus organum in sui medio continentes . . ."[188] (Schmid 39-40)



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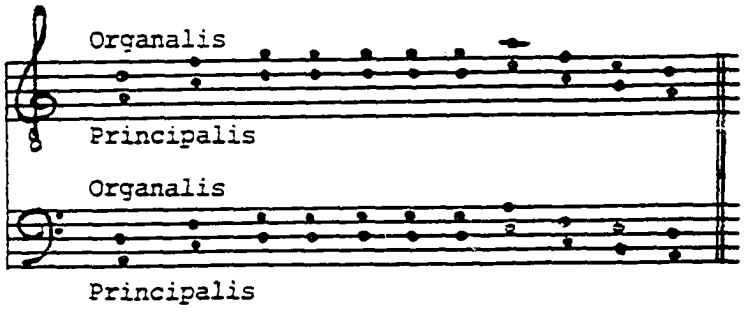
[188] Either you join a duple organum to a simple melody, which the first and the third [lines] show, which accompany (*tenent ad*) the second line for the purpose of the organum; or a simple organum is adjoined (*referatur*) to a duple melody, which the second line and fourth lines demonstrate, containing the organum between them . . .

The reader is referred to Hoppin (1978, 187-193) for a discussion of the examples of parallel organum found in the *Enchiriadis* treatises.



In simplest terms, Martianus's text describes a stand of windblown trees. The force of the wind sets the branches of these trees in motion, and this motion produces sound, in accord with the physical explanation of sound proposed by Plato and others. Using the terms *acutus* and *gravis*, Martianus differentiates the sound; that is, the higher branches give off acute tones, while the lower produce grave. The higher branches, he says, are *distenta*, while the lower ones are *acclinata*; and these adjectives are without doubt descriptive of relative tension, a factor in the production of acute and grave tones on stringed instruments. He completes his analogy to the music of the spheres, a topic that will be discussed in the next chapter, by filling in at the midlevel branches the tones of the midrange, alluding to the perfect consonances of the octave, fifth, and fourth as well as to the whole tone and *leimma* or semitone.

Martianus's reference to motion and tension as factors in the production and quality of sound are traditional, as is his derivation of a celestial gamut of pitches. What is extraordinary is his explicit association of this array of sounds, from most grave to most acute, with the branches of trees, from lowest to highest. It cannot be denied that the image is of a vertical arrangement of pitches in which each pitch is located in either the low, middle, or high range.[189] And as we have seen, the vision is strengthened and expanded in the commentaries of Johannes Scottus and Remigius.

Martianus Capella's grove of musical trees presents to the mind an image that is qualitatively different from the projection

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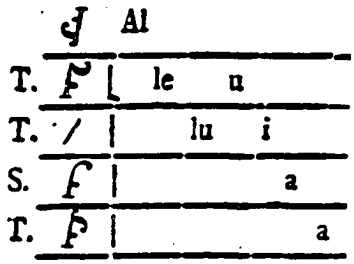
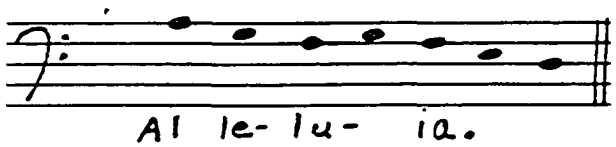
[189] Duchez (1979) does not mention this image and, in fact, seems unaware of it, for she writes: "La notion abstraite de hauteur de son n'existait pas non plus dans la tradition latine de la théorie grecque, dans les textes qui assurèrent les fondements de la théorie musicale occidentale: absente chez Saint Augustin, Martianus Capella, et les commentateurs néoplatoniciens du *Timée* du Platon, elle est seulement implicite chez Boèce" (59). [Neither did the abstract notion of the height of sound exist in the Latin tradition of Greek theory in the texts that fixed the foundations of Western musical theory; absent in St. Augustin, Martianus Capella, and the Neoplatonic commentators on Plato's *Timaeus*, the concept is only implicit in Boethius.]

onto the page of a scale whose components are identified with the strings of an instrument. A good example of the latter is found in *Musica enchiriadis*: "Demonstrandum nunc, quomodo hos quattuor ptongorum vis modos, quos abusive tonos dicimus, moderetur, et fiat dispositio talis: Sternantur in ordine veluti quaedam cordae e sonorum notis singulis e regione positis procedentes. Sint autem cordae vocum vice, quas eae significent notae. Inter quas cordas exprimatur neuma quaelibet, utputa huiusmodi."[190] (Schmid 13-14)

A diagram follows consisting of five parallel horizontal lines, each labelled with a symbol for a specific pitch, on which successive syllables are placed:





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[190] It is time now to show how the strength (nature) of the four pitches [*ptongorum*] regulates the modes, which we incorrectly call tones, according to the proper arrangement: Let them be arrayed in the order of individual strings, corresponding to the sound of individual notes positioned continuously in one direction. The strings of individual voices should correspond to the notes that they represent. Between these strings, any melodic fragment [*neuma*] can be described, perhaps as follows.

Although it may indeed be graphic representations of this sort that eventually led to Guido's staff notation in the first half of the eleventh century, a vertical arrangment is at most implicit, not explicit as it is in the extraordinary image provided by Martianus Capella.

3.5 Summary

Four written representations of musical sound that are based on grammatical models and use grammatical terminology have been discussed. Three--Aurelian's use of syllabic theory, the graphic representation of vocal motion found in the texts of Varro, and the importance of *positurae* to the representation of vocal performance described by Hildemar of Corbie--apply to chanted text. The fourth--Martianus Capella's musical grove--places the grammatical terms *acutus* and *gravis* in a vertical arrangement of textless musical sounds. Caused by the force of the wind, the sound is continuous, but is represented at discrete levels defined by the branches of the trees. The image, which combines a continuous flow of melodic motion with a vertical disposition of distinct musical sounds, provides an excellent symbol to mark our change in focus from the theory of grammar to that of harmony.

CHAPTER 4

HARMONIC THEORY: THE KNOWLEDGE OF MUSICAL SOUND

4.1 Philosophical background

Martianus Capella, in book 3 of *De Philologiae et Mercurii nuptiis*, completes his painstaking discussion of the origins and individual properties of the letters of the Latin alphabet with a remark about the harmony of nature: "[Litteras] quae tamen cum supervacuis reiectisque cunctis ex unius vocis sonitu conformatae diversas naturalis harmoniae causas sub oris concinentia reppererunt."[191] ([260], Willis 68)

A similar idea, expressed in more detail, motivates the following passage from the *Scolica enchiriadis*: "Igitur quicquid in modulatione suave est, numerus operatur per ratas dimensiones

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[191] [All these letters], however, including those that are unnecessary and rejected, are formed from the sound of a single voice and have revealed the different laws of natural harmony within the musical harmony of speech.

vocum, quicquid rithmi delectabile prestant sive in modulationibus seu in quibuslibet rithmicis motibus, totum numerus efficit. Et voces quidem celeriter transeunt, numeri autem, qui corporea vocum et motuum materia decolorantur, manent."[192] (Schmid 113-14)

The metaphysical status of number as the first principle of the universe is a philosophical tenet first formulated, in all probability, by the Pythagoreans. None of the writings produced by the members of the Pythagorean school, which flourished at Croton in southern Italy in the latter years of the sixth century before Christ, are extant; but their beliefs and discoveries are often referred to by later philosophers.[193] Aristotle writes for example, in the *Metaphysica*:

"The Pythagoreans say that there is but one number, the mathematical, but things of sense are not separated from this, for they are composed of it; indeed, they construct the whole heaven

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[192] Thus number, in the measured dimensions of the voice, works at producing whatever is pleasant in a melody. And whatever rhythms stand out delightfully, whether in melodies or in any rhythmic motion, owe their whole effect to number. Voices pass by quickly, but numbers, which are defaced by the corporality of voices and the materiality of motion, remain.

[193] For information on Pythagoras and his followers, see, among others, Nahm (1947) and Russell (1945).

out of numbers . . . . The Pythagoreans, because they see many qualities of numbers in things perceived by the senses, regard physical objects as numbers, not, however, as separate numbers, but as derived numbers. And why? Because the qualities of numbers exist in the harmony of the heavens and in many other things." (Nahm 74)

The beginnings of Pythagorean metaphysics can probably be found in Pythagoras's discovery that certain mathematical ratios--1/2, 2/3, 3/4 and 2/2--realized in the lengths of sections of a vibrating string, correspond to musical consonances: the octave, perfect fifth, perfect fourth, and unison, respectively.[194] What seems to have been particularly suggestive to Pythagoras is the fact that these ratios, when expressed in terms of their lowest common denominator, can be represented by their new numerators, 6, 8, 9, and 12 (i). But these numbers in turn form ratios in which the products of the means equal the products of the extremes. That is, they form equal ratios (ii):

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[194] A mythological treatment of this discovery, the story of Pythagoras and the hammers, although scientifically inaccurate, was transmitted widely and continued to appear in music theory treatises throughout the Middle Ages. See Veyne (1983) for a discussion of the uses of myth that explores possible interpretations of this transmission.

(i) 1/2 = 6/12 2/3 = 8/12 3/4 = 9/12 2/2 = 12/12

(ii) 6 x 12 = 9 x 8 thus 6/9 = 8/12

The impact that the simplicity and exactness of these relationships had on Platonic cosmology and aesthetics cannot be overstated, but before we discuss certain aspects of Plato's cosmological dialogue, *Timaeus*, another important aspect of Pythagoreanism must be at least mentioned. Pythagoras and his followers were strongly influenced by the cult of Orpheus and advocated a process of purification by which man could hope to regain his lost divinity. Orpheus was, of course, a skilled musician, and the injection of Pythagorean mathematical cosmology into the Orphic myth is evident in an interesting example drawn from the final chapter of *Musica enchiriadis*:

"Fictum est ab antiquis Aristeum Euridicem nympham Orphei coniugem adamasse. Quemque dum illa se sequentem fugeret, a serpente extincta sit. Orpheum, cuius nomen oreo phone, id est optima vox sonat, in cantore perito seu dulcisono cantu intellegimus. Cuius Euridicem, id est profundam diiudicationem, si quis vir bonus, quod Aristeus interpretatur, amando sequitur, ne penitus teneri possit, quasi per serpentem divina intercipitur prudentia. Sed dum rursus per Orpheum, id est per optimum cantilenae sonum, a secretis suis acsi ab inferis evocatur,

imaginarie perducitur usque in auras huius vitae dumque videri videtur, amittitur, scilicet quia inter cetera, quae adhuc ex parte et in enigmate cernimus, haec etiam disciplina haud ad plenum habet rationem in hac vita penetrabilem."[195] (Schmid 57)

According to a strictly Pythagorean interpretation of this myth, the deep and finally impenetrable knowledge of the world is the ultimate nature of its mathematical structure. Observation, such as that accomplished by Pythagoras and his followers, is extremely useful and laudable, even though its results must

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[195] The ancients say that Aristeus had fallen in love with the nymph Eurydice, the wife of Orpheus. As she fled from the pursuing Aristeus, she was killed by a serpent. We interpret Orpheus, whose name is *oreophone* , that is, the sound of the best voice, as a skillful singer or sweet-sounding song. If a good man, in this case Aristeus, falls in love and pursues Eurydice, who represents Orpheus's profound knowledge, he is intercepted by divine prudence in the form of a serpent, so that Eurydice cannot be completely comprehended. But now she is again summoned from her secret place, as if from the underworld, by Orpheus, that is, by the finest sound of song, and is introduced by the imagination into the upper world of this life, but is lost again just as she seems to be visible. That is to say, this discipline, in common with others that we understand only partially and figuratively, is based on principles that cannot be fully understood in this life.

necessarily fall short of complete knowledge. In other words, Aristeus's attempts to educate himself (his pursuit of Eurydice) are unsuccessful; the best he can do is observe musical excellence (Orpheus) and endeavour to draw the right conclusions.

Pythagorean mathematical cosmology and mysticism was easily adapted to a Christian cosmology, as seen in this example from the last chapter of Aurelian's *Musica disciplina*: "Etenim et ipse mundus et caelum supra nos iuxta philosophorum dogma gestare insemet dicuntur armonie sonoritatem. . . . Angeli quoque, quod Deo laudes more huiusce discipline in arce referunt sidereo, lector Apocalipsi nemo qui dubitet."[196] (Gushee 132) Aurelian continues with the story of a monk of St. Victor who was taught to sing a certain responsory by a choir of angels.

A second story concerning a priest of Auxerre who was taught an alleluia by a choir of angels has a revealing conclusion:[197] "Quo autem liquido cunctis appareret veritas rei,

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[196] This very world and the heavens above it, according to the teachings of the philosophers, are said to carry within themselves the sonorities of harmony. . . . No one who has read the Apocalypse can doubt that the angels as well, among the stars, praise God by the practice of this discipline.

[197] Ekenberg (1987) writes that choirs of angels, such as those mentioned in Aurelian's stories of the monk of St. Victor and the priest of Auxerre, were interpreted by Carolingian writers, in

convocatis post matutinorum sollempnia clericis, memoriae eis contradidit. Atque ei ita a cordis recessit gremio, ut nisi vocabulum laudis tantum remansisset, et merito, ut [is] cui revelata sunt celestia et aliis tradidit quamquam amore boni ductus zeli tamen ad Deo referendas laudes aliis maneret, et isti a memoria recederet."[198] (Gushee 133-34)

Even more dire consequences befall the subject of Aurelian's next anecdote, who is forced to kill himself to avoid revealing privileged knowledge. Pythagoras was himself driven out of Croton, possibly because of unpopular prophecies; at any rate, the conceit that the highest knowledge of the universe is beyond the reach of man unless through divine intervention, in which case it

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particular Amalarius of Metz, as an eschatological sign. This is certainly an example of Orphic mysticism turned to a Christian purpose.

[198] In order that the truth of the matter would be clear to everyone, after the matutinal service when the clergy were assembled, he delivered it to them by memory. Then it left his innermost heart, so that not so much as the word of praise [alleluia] remained. This was proper, because heavenly things had been revealed to him, which he transmitted to others. Although this was done with the best of intentions, nonetheless it disappeared from his memory but remained with the others, so that they could give praise to God.

is privileged, is common to Pythagoreanism, Platonism, and certain interpretations of Christianity. As Plato would have it, "Rectae opinionis omnis vir particeps, intellectus vero dei proprius et paucorum admodum lectorum hominum."[199] (Waszink 50)

4.2 The role of measurable sound in Platonic cosmology

Plato's cosmological theories are contained in the late dialogue *Timeaus*. In this dialogue, which was transmitted in a Latin translation prepared by Calcidius (ca. 356-357 A.D.) along with an extensive commentary, Timaeus, a man trained in Pythagorean doctrine, describes the origin and nature of the physical world.[200] Central to the cosmological drama is the Demiurge, a kind of primary arranger, interpreted by Calcidius as the first principle, *Deus*.

Initially, the Demiurge finds formless matter, *hyle*,[201] in a state of primitive chaos; he introduces order by using a certain set of numbers to construct the soul of the world from a mixture of

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[199] Any man can hold a true belief, but intelligence is a faculty of the gods and of a few men in the roles of readers.

[200] Klibansky (1982) discusses the transmission of Platonic cosmological doctrine to the early Middle Ages.

[201] The Greek *hyle* is translated by Calcidius as *silva*, while Demiurge is *Fabricator* or *Opifex*.

metaphysical first principles:[202] "Unam sumpsit ex universo primitus portionem, post quam duplicem eius quam sumpserat, tertiam vero sescuplam quidem secundae, triplam vero primitus sumptae, at vero quartam sumpsit duplicem secundae, quintam triplam tertiae, sexta fuit assumptio partibus septem quam prima propensior, . . ."[203] (Waszink 27) In fact, the numbers used by the Demiurge are the harmonic ratios discovered by the Pythagoreans, permitting an analogy between the formative principles of the universe and the foundations of harmonic theory.[204]

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[202] The material used to construct the soul of the world is a mixture of indivisible and divisible existence, sameness, and difference. Cf. Archer-Hind 103-115.

[203] First he took a section of the whole, after which he took a second section twice as long as the first. Then he took a third that was one and one-half times the second and three times the first; next a fourth section that was twice the second, and then a fifth three times the length of the third, and a sixth seven times the first . . .

[204] The procedure for locating pitches on a monochord is directly analogous to Plato's construction of the soul of the world. See, for example, Guido of Arezzo's description of the procedure in chapter 6 of *Micrologus*. Mathiesen (1976) discusses the use and significance of the Greek word *harmonia* in Greek music theory treatises.

Plato bases an argument for the existence of intelligent purpose in the universe on man's possession of the senses of sight and hearing. Sight enables man to observe rational movement in the heavens and in this way to guide movements of his intellect, which is formed according to the same principles as the soul of the world but less perfectly accomplished. Sound, hearing, and speech have similar purposes, while "quantumque per vocem utilitatis capitur ex musica, totum hoc constat hominum generi propter harmoniam tributum, harmonia vero, id est modulatio, utpote intentio modificata, cognatas et velut consanguineas habens commotiones animae nostrae circuitionibus . . ."[205] (Waszink 44-45)

According to this passage, the laws of harmony correspond to the motions of man's soul and, functioning as a paradigm for the cosmological principles, can effect order and harmony in man's nature. That is, Pythagorean mysticism and numerology have been systematized by Plato as cosmological principles and used as a

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[205] All that is useful is obtained from music through the voice; all this endures as a contribution to mankind by means of harmony--harmony, that is, modulation as regulated tension, having motions similar and, as it were, related to the revolutions of our soul . . .

Here Calcidius translates the Greek *phone* as *vox*.

basis for the doctrine of the ethos of music, previously but less systematically formulated in *The Republic*[206]

Aristotle accepted the rational and mathematical nature of voice and hearing, while suppressing the explicitly harmonic paradigm. For example, he writes in *Peri psyches*, his treatise on the nature of the soul (426a-426b), "If voice (*phone*) is always a concord (*symphonia*), and if the voice and the hearing of it are in some sense one and the same thing, and if a concord always implies a ratio (*logos*), hearing as well as what is heard must also be a ratio. (Cf. Rodier 134-135)

Before examining the conception of the special character of each measured sound, two examples of the doctrine of the harmony of the spheres adapted to a Christian framework are interesting; both are found in Carolingian treatises. The first, given by

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[206] Martianus, a neo-Platonist, has Harmony acknowledge the wisdom of the Pythagoreans in these matters: "Pythagorei etiam docuerunt, ferociam animi tibiis aut fidibus mollientes, cum corporibus adhaerere nexum foedus animarum. Membris quoque latentes interserere numeros non contempsi; hoc etiam Aristoxenus Pythagorasque testantur." (Willis 354) [The Pythagoreans have demonstrated, soothing the ferocity of emotion with pipes and strings, that the soul is bound to the body indissolubly. I allowed numbers to underlie human limbs, a fact attested by Aristoxenus and Pythagoras.]

Aurelian in his third chapter, includes a quotation from the Book of Job: "Et si ad nostras aures sonus ille non pervenit, tamen novimus quia quedam armonia modulationis inest huic caelo, maximi, cum dicat Dominus ad Iob: 'Aut concentum caeli quis dormire fecit?'"[207] (Gushee 65)

The second example is found at the end of the eighteenth chapter of *Musica enchiriadis*: ". . . quodque isdem numerorum partibus, quibus sibi collati inaequales soni concordant, et vitae cum corporibus et compugnantiae elementorum totusque mundus concordia aeterna coierit."[208] (Schmid 56)

4.3 The individual character and position of each measured sound

In the section of *Timaeus* immediately following his narration of the mixture of the soul of the world by the Demiurge,

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[207] And if that sound does not reach our ears, nevertheless we know that a certain melodic harmony is present in the heavens, especially because the Lord says to Job, "Or who has caused the harmony of heaven to sleep?" (Job 38.37)

[208] . . . and because in the same sections of the verses (*numerorum*), in which unequal sounds that have been brought together harmonize, the whole world will be united in the eternal harmony both of life with the flesh and of the conflict of the elements.

Plato turns to the construction of the physical universe, which cannot be eternal because it exists in time, "a moving image of eternity" defined by the movement of the sun, moon, and planets. (Lee 51) These are created and placed in their various orbits determined by the mathematical relationships used to construct the soul of the world:

"As a result of this plan and the purpose of the Demiurge for the birth of time, the sun and moon and the five planets as they are called came into being to define and preserve the measures of time. And when he had made a physical body for each of them, the Demiurge set the seven of them in the seven orbits of the circle." (Cf. Lee 52)

Plato's concept of celestial harmony, according to which the planetary bodies are located in orbits determined by the same ratios used to construct a musical scale, certainly has its roots in the doctrine of Pythagorean theory that places the sun, Sol, at the midpoint or *mese* of two conjunct tetrachords. In the myth of Er, found in the last book of the *Republic*, Plato uses striking imagery rather than precise mathematics to describe the musical universe:

"The seven inner circles [corresponding to Saturn, Jove, Mars, Sun, Venus, Mercury, Moon] move slowly in the other direction . . ., and on the upper surface of each circle is a siren, who goes round with them, hymning a single tone or note. The eight [including the

outermost sphere] together form one musical scale . . ." (*Rep.* 10.617B; Bakewell 420)

At some time, the sirens were replaced by Muses, possibly in Porphyry's lost commentary on the *Republic*.[209] Certainly the most striking transmission of the later version of the vision is that found in the first book of *De nuptiis*. Martianus writes:

"Superi autem globi orbesque septemplices suavis cuiusdam melodiae harmonicis tinnitibus concinebant ac sono ultra solitum dulciore, quippe Musas adventare praesenserant; quae quidem singillatim circulis quibusque metatis, ubi suae pulsum modulationis agnoverant, constiterunt. Nam Uranie stellantis mundi sphaeram eximam continatur, quae acuto raptabatur sonora tinnitu, Polymnia Saturnium circulum tenuit, Euterpe Iovialem, Erato ingressa Martium modulatur, Melpomene medium, ubi Sol flammanti mundum lumine convenustat, Terpsichore Venerio sociatur auro, Calliope orbem complexa Cyllenium, Clio citimum circulum, hoc est in Luna collocavit hospitium, quae quidem graves pulsus modis raucioribus personabat."[210] ([27-28], Willis 12-13)[211]

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[209] For a discussion of the transmission of this passage to the Middle Ages, see Shanzer 115.

[210] The upper planets and the sevenfold spheres produced together the clear harmonies of a certain sweet melody in a sound even more pleasant than usual, undoubtedly because they knew that the

Muses were approaching. Passing through all the spheres one by one, each Muse stopped when she recognized the pitch that was familiar to her. Urania occupied the most distant sphere of the starry universe, which was carried along resonating an acute clear tone. Polymnia took the circle of Saturn; Euterpe that of Jupiter. Erato, once she had entered the sphere, sang the pitch of Mars. Melpone took the middle orbit where the Sun makes the sky beautiful with his flaming light. Terpsichore was united with the gold of Venus. Calliope took possession of the sphere of Mercury, and Clio the innermost circle; that is, she resided in the Moon, which resonated a deep pitch in a harsher tone.

According to Platonic astronomy, there are seven planets--Moon, Mercury, Venus, Sun, Mars, Jupiter, Saturn--plus an outer sphere that bounds the universe. Martianus solves the problem of placing nine Muses in eight spherical orbits by leaving Thalia, the Muse of Comedy, sitting by herself on Earth.

[211] Johannes Scottus glosses SUPERI GLOBI with a précis of Platonic theory: "Phisica docet planetarum singulos motus singulas voces gignere, ex quibus veluti diversis organi fistulis omnium symphoniarum certis rationibus armonia coaptatur; singulis quoque planetarum circulis proprias Musas attribuunt, veluti quadam vocum similitudine coaptatas." (Lutz 30) [The physics of the planets teaches that single motions produce single voices, by means of which the harmony of all the symphonies is joined by

The vision created by Martianus is a scale of Muses, each associated with the particular timbral character of her own pitch and with the mythological identity of a heavenly body.[212] The pitches are ordered from deepest (Moon-Clio) to most acute (Urania-outermost sphere),[213] not vertically, as in the image of the Apolline woods discussed in the previous chapter, but spatially in concentric spheres.[214] In the second book of *De nuptiis*,

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certain ratios to the distinct pipes of the organ. Also, the individual Muses associate with single circuits of the planets, joined by a kind of similarity of voices.]

[212] Regino of Prüm in *De harmonica institutione* describes an arrangement, which he attributes to Cicero's *Somnium Scipionis* (cf. Willis 161), whereby the planets, ranging from Moon to the outermost sphere, are given names of the notes in the Greek gamut. That is, *proslambanomenos* is identified with the Moon, *hypate hypaton* with Mercury, . . ., and finally *mese* with the outermost sphere. Cf. *Scriptores Ecclesiastici* 1.234-235. See also Macrobius's commentary on Cicero's text (Willis 100-110).

[213] Thalia is placed on motionless Earth. Regino summarizes Martianus's vision and offers an etymological interpretation of silent Thalia; see *Scriptores Ecclesiastici* 1.245.

[214] Seznec (135-143) discusses the tradition of the vision, which appears in an engraving illustrating the *Practica musice* by Gafurio, appearing in Milan in 1496.

Martianus describes Philology's journey from earth to the outermost sphere, giving the length of each leg in terms of a specific musical interval; the entire musical distance from Earth to the outermost sphere is equal to an octave, that is, six whole tones or twelve semitones.[215] Later, in the ninth book *De harmonia*, Harmony refers directly to the gamut, describing her existence among the celestial bodies. Once again, Aristotelian (and ultimately Boethian) acoustical theory is evident in the use of *pulsus*: "cum melodiam omnisonis convenientem pulsibus modulorum machinae obeuntis ipsa rapiditas et concinat et agnoscat." (Willis 353)[216]

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[215] That is, it can be assumed that Martianus intended the musical distance between Earth and the outermost sphere to be equal to an octave, the gamut covered by the branches of the musical trees in the Apollonian grove. However, Martianus's measurements seem to be in error, producing one semitone too many. Neither Johannes Scottus nor Remigius attempts to clarify the problem, but Shanzer's modern commentary (90-94) presents several possible explanations for Martianus's miscalculation.

[216] For that same velocity of the cosmos, as it spins around, harmonizes with and recognizes the melody that is in accord with the pulsations of every kind of sound produced by the arrangement of the modulations (i.e. musical scale).

Martianus describes a two-dimensional realization of the vision of concentric spheres near the opening of his book nine. Harmony enters, carrying an unusual shield: "Dextra autem quoddam gyris multiplicibus circulatum et miris ductibus intertextum velut clipeum gestitabat quod quidem suis invicem complexibus modulatum ex illis fidibus circulatis omnium modorum concinentiam personabat. . . . Verum ille orbis non chelys nec barbiton nec tetrachordon apparebat, sed ignota rotunditas omnium melodias transcenderat organorum.[217] ([909-910], Willis 347) Clearly, the concentric circles that decorate Harmony's shield are two-dimensional representations of Martianus's concentric spheres.

These passages are significant in at least two ways. First, along with the correspondence established between cosmological and harmonic principles comes a conceptualization of the individual character and identity of each pitch in the musical gamut. That is to say, harmonic theory postulates discrete and

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[217] In her right hand she carried a kind of circular shield, containing many circles and interwoven with strange designs. It was attuned to its own inner circles in turn and from the circular strings it resonated a concordance of all the modes. . . . In truth, that circular [shield] did not seem to be a lyre or lute or tetrachord; however, that strange rounded object had surpassed the melodies of all musical instruments.

identifiable sonic entities. Furthermore, these units of organized sound are computed according to immutable rational principles, the Pythagorean-Platonic ratios. As will be demonstrated, it is exactly this point that provides a basis for the different epistemological status of grammatical and harmonic theory.

Second, the visual models presented by Plato and Martianus Capella, among others, have important implications for the measurement and ultimately the graphic representation of sound. For example, Plato's description of the construction of the soul of the world according to certain ratios provides a model for subsequent descriptions of the calibration of a monochord.[218] The process that underlies this procedure is the projection of musical pitches determined by rational or geometric measurement onto a linear or arithmetic space, enabling these pitches to be represented graphically on the two-dimensional page. The same holds true for Martianus's visual model of concentric spheres, a complicated three-dimensional process that is realized in two dimensions, and therefore potentially on the written page, on the shield that Harmony carries in her right hand.

The type of musical diagram found in *Musica enchiriadis* serves to illustrate the practical application of this type of

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[218] An excellent description of this process, which can, of course, be found in any number of sources, is book 4 of Boethius's *De institutione musica*, chapters 5 through 13.

procedure. That is, parallel line segments drawn on the page represent different pitches of the gamut projected onto two-dimensions and the blank spaces between these lines segments represent the intervals between the pitches:

"Primam namque descriptionem, quae a sono *F* inchoat et finitur primoque deputatur modo, si toto ductu spacio uno feceris altiorem, ut inter cordam et cordam paginula interiecta designant, mox in modum mutatur deuterum." (Schmid 36)[219]

The interchangeability of the words *spatium* and *intervallum* is attested by Varro;[220] what is particularly striking in this example is the representation of *spatium* by a bit of blank page, a concrete visual representation of the discrete nature of the objects of harmonic theory.

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[219] If you should move the first diagram, which begins and ends on pitch (*sono*) *F* and is considered to be in the first mode, up one interval, represented by the bit of page between the lines, it will have been changed to the second mode.

[220] "Varro dicit intervalla esse spatia, quae sunt inter capita vallorum id est stipitum, quibus vallum fit; unde cetera quoque spatia <ita> dicuntur." (Funaioli 295-96) [Varro says that intervals are the spaces between the tips of the stakes, that is, the posts that make up a palisaded rampart; thus, all other spaces are also denoted this way.]

Before examining the nature of grammatical and harmonic knowledge, it will be useful to address once more the topic of *vox*, this time from the perspective of Greek theoretical writings.

4.4 Musical *vox* according to Greek grammatical and harmonic theory

A restatement of Marius Victorinus's remarks on *vox* (above, p. 00), including his reference to the Greek division of articulate voice into two categories, provides a convenient starting point:

"1. Vox est aer ictus auditu percipibilis, quantum in ipso est. . . . 2. Vocis formae sunt duae, articulata et confusa. Articulata est quae audita intellegitur et scribitur et ideo a plerisque explanata, a nonnullis intellegibilis dicitur. 3. Hanc Graeci quid appellant: *Enarthron phonen.* Huius autem species quot sunt? Duae. Quae? Nam aut musica est, quae tibiis vel tuba redditur aut quolibet organo, aut communis, qua promiscue omnes utuntur. 4. Confusa autem est quae nihil aliud quam simplicem vocis sonum emittit, ut est equi hinnitus, anguis sibilus, plausus, stridor et cetera his similia. . . ." (Mariotti 66)

It will be remembered that this subclassification of articulate voice into the sounds of musical instruments and general human speech, attributed by Marius Victorinus to Greek grammatical theory, was unique among the late Latin grammarians. Diomedes, to be sure, showed an awareness of the problem of

classifying pitched or modulated instrumental voices, but none of the other authors took it up.[221] What is significant about the text is its explicit recognition of the differentiability of measured (untexted) musical sound, the basis of harmonic theory.

Aristotle makes a similar point in book II (420b) of his treatise on the soul, *Peri psyches*: "Voice (*phone*) is a type of sound made by animate beings. Nothing that is inanimate truly can be said to have a voice, and it is only metaphorically that we speak of the voice of the pipe or the lyre or, generally, of anything that is able to produce a succession of sounds that can be differentiated with respect to registration, inflection (*melos*), and character or timbre (*dialecton*). These [musical instruments] seem

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[221] It is not certain exactly what Greek source Marius Victorinus is referring to. Some Greek grammatical texts begin with a discussion of *phone*, although others proceed directly to the treatment of letters. Mariotti writes (103): "A *voce* iniziava conogni probabilità Diogene di Babilonia, conformemente al suo punto di vista: la sua *Techne* era infatti *peri phones*, e da questo angolo era descritta la struttura della lingua." He adds that the example of Diogenes of Babylonia was probably followed by Diocles of Magnesia and Diogenes Laertes. At any rate, Mariotti was not able, nor have I been, to locate this exact definition in extant Greek sources.

to have voices because their sounds have the same characteristics as voices." (Cf. Rodier 118-119)

It is clear that in this passage Aristotle admits the differentiability of the voices or sounds of pitched musical instruments, although the thrust of his argument is based on a distinction between animate (having a soul or lifegiving principle) and inanimate entities.[222] So for him, as well as for Diomedes and the Greek sources of Marius Victorinus's chapter on *vox*, the discrete sounds of pitched musical instruments are difficult to classify. They are not the sounds of human speech, but a sufficient number of similarities exist to preclude their being placed in categories with physical noise and the sounds of animals, for example.[223]

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[222] For an extremely interesting discussion of the distinctions and confusions in Greek grammatical texts and commentaries between the words *enarmoníou* (harmonious or musical) and *enárthrou* (articulate), see Lallot's commentary on his edition of the grammatical treatise of Dionysius of Thrax (87-89).

[223] Isidore of Seville takes Virgil to task for a metaphorical use of *vox*: "Proprie autem vox hominum est, seu inrationabilium animantium. Nam in aliis abusive non proprie sonitum vocem vocari, ut 'vox tubae infremuit,' (Virg. Aen. 3, 556)." (Lindsay 3.20) [In the strict sense, the word "voice" refers to the human voice or the irrational voices of living beings. However, in [the works of]

It is likely that the source of the proposition, referred to by Marius Victorinus, that musical sound, like the sound of human speech, is differentiable or articulate can be located in Greek harmonic theory. For example, the Greek music theorist Aristides Quintilianus writes near the beginning of his chapter on meter (I.20) in *De musica*:[224] "Stoikeion mèn ouv esti phones enarthron méros elakiston."[225] (Winnington-Ingram 41) He defines the elements of articulate sound--vowels, semivowels, and mutes--and then continues with a discussion of the syllable, all this in exact parallel with the conventional order of topics found in grammar treatises. But the smallest element of musical sound has already been defined (I:6): "Phthongos mèn ouv esti phones emmelous méros elakiston."[226] (Winnington-Ingram 7) The fact that the definitions are exactly parallel, referring respectively to the sound of human speech and to musical sound, leads one to

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others, a sound is called a voice, incorrectly, not in the strict sense; for example, "the voice of the trumpet sounded."]

[224] See the introduction to T. Mathieson's translation of *De musica* for information on the life of Aristides Quintilianus (10-14). Mathieson argues that this Greek theorist was active in the late third or early fourth century A. D.

[225] An element is the smallest part of articulate sound.

[226] *Phthongos* is the smallest element of musical sound.

believe that Marius Victorinus drew his composite definition from a similar text, if not this very one.

It is convenient at this point to discuss in some detail the Greek term, *phthongos*, used by Homer to indicate a clear and distinct sound, including that of certain human voices. In the works of Plato, it can refer to a non-human sound, used in opposition to *phone*, the sound of the human voice.[227] The word finds its way into Martianus Capella's ninth book, in a passage that is an almost exact translation into Latin of material drawn from chapter 6 of the first book of Aristides Quintilianus's treatise (cf. Winnington-Ingram 9). Describing the notes of the musical gamut, Martianus writes: "Horum igitur sonorum, id est *phthongon*, sunt alii, quos consistere et perseverare necesse est, alii vero sunt vagi."[228] ([945], Willis 364)[229] Earlier in the book on harmony he

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[227] See, for example, Liddell and Scott, *Greek-English Lexicon*.

[228] Some of these sounds, that is *phthongi*, are necessarily fixed and steady, while others are movable.

[229] Johannes Scottus limits his commentary to a grammatical observation: "PHTHONGON genitivus pluralis est." (Lutz 209) [PHTHONGON is genitive plural.] Remigius provides more information, but says nothing directly about usage of the term: "HORUM IGITUR SONORUM, ID EST PTONGON genitivus pluralis, id est sonorum, CONSISTERE id est manere in sono suo, ET PERSEVERARE NECESSE EST. VAGI id est varii, quia saepe acuuntur et saepe

had introduced the term, drawing a comparison with the smallest elements of arithmetic and geometry: "Sonus quippe tanti apud nos loci est, quanti in geometricis signum, in arithmeticis singulum. Phthongos sonos dicimus . . . ."[230] ([939], Willis 361)[231]

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remittuntur et ideo vocantur licanae, a digito videlicet post pollicem qui chordas illas pulsat atque movet." (Lutz 2.340) [HORUM IGITUR SONORUM, ID EST PTONGON genitive plural, that is, of sounds, CONSISTERE, that is, to persist in its sound, ET PERSEVERARE NECESSE EST. VAGI, that is, changeable, because often they are made more acute and often they are loosened; and therefore they are called *licanae*, after the finger next to the thumb, which strums and moves the strings.] (*Lichanos* is a Greek word meaning "forefinger.")

[230] An individual musical sound has the same value to us as does the point to geometers and the unit to mathematicians. We call *phthongos* sounds.

My translation is based on Remigius's commentary: "SONUS QUIPPE TANTI LOCI EST id est tanti valet, APUD NOS id est musicos, QUANTUM IN GEOMETRICIS SIGNUM id est punctus, IN ARITHMETICIS SINGULUM id est unitas." (Lutz 2.22) [SONUS QUIPPE TANTI LOCI EST, that is, has the same value, APUD NOS, that is, musicians, QUANTUM IN GEOMETRICIS SIGNUM, that is, point, IN ARITHMETICIS SINGULUM, that is, unit.]

The explicit meaning of the term as measured musical sound is preserved in Boethius's treatise: "Sonus igitur est vocis casus emmeles, id est aptus melo, in unam intensionem. Sonum vero non generalem nunc volumus definire, sed eum, qui graece dicitur phthongos, dictus a similitudine loquendi, id est *phthengesthai*."[232] (Friedlein 195)

The transmission of the term to Carolingian music theory is illustrated by the following excerpts from treatises of that period:

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[231] Martianus gives at this point a secondary definition of *phthongos* --"Verum phthongus dicitur vocis modulatae particula una intentione producta"--that is related to that given by Aristoxenus in *Elementa harmonica* (I:15). (Cf. Rios 20-21) As will be demonstrated, it is the primary definition of the term that was transmitted in Carolingian treatises. [A particle of modulated voice produced at a single tension is called *phthongos*.]

[232] Sound is a type of melodic voice, that is, a voice at one tension that is suitable for melody. We do not want at this point to define sound in general, but the sound that is called *phthongos* by the Greeks, because of its similarity to speaking, the word for which is *phtheggesthai* in Greek.

It should be noted that in addition to *pthongos* Boethius uses the Greek words *emmeles*, harmonious or orderly, and *melos*, melody.

1. *Musica enchiriadis*: "Sicut vocis articulatae elementariae atque individuae partes sunt litterae, ex quibus compositae syllabae rursus componunt verba et nomina eaque perfectae orationis textum, sic canorae vocis ptongi, qui Latine dicuntur soni, origines sunt et totius musicae continentia in eorum ultimam resolutionem desinit. . . . Soni vero prima sunt fundamenta cantus."[233] (Schmid 3)

2. *Scolica enchiriadis*: "D: Hi soni qui sunt: M: Sonos hic ptongos dicimus, id est voculas in canore concordes, quae sunt armoniae elementum. Etenim sicut loquela litteris, ita constat ptongis armonia."[234] (Schmid 61)

3. Hucbald, *De harmonica institutione*: "Sonos, quibus per quaedam veluti elementa ad Musicam prisci aestimaverunt ingrediendum, graeco nomine phthongos voluerunt appellare, id est,

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[233] Just as the elementary and individual parts of articulate speech are letters, of which syllables are composed, and in turn nouns and verbs, and finally the complete text of a discourse, so the *pthongi*, which are called *soni* in Latin, are the source of musical sound (*vox*), and the content of all music ends in their final resolution. . . . *Soni* are the principal foundations of song.

[234] D: What are these sounds? M: We call these sounds *pthongi*, that is, the harmonious sounds used in melody, which are the elements of harmony. Just as speech is composed of letters, so harmony is composed of *pthongi*.

non qualescumque sonos, utputa quarumlibet insensibilium rerum, aut certe irrationabilium voces animalium; sed eos tantum, quos rationabili discretos ac determinatos quantitate, quique melodiae apti existerent, ipsi certissima totium cantilenae fundamenta iecerunt. Unde et elementa vel phthongos eosdem nuncupaverunt."[235] (*Scriptores Ecclesiastici* 1.107-108)

These texts agree on the following characteristics of *phthongos*:

1. It is a rationally determined or measured musical sound.

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[235] The ancients chose to call these sounds, which they considered to be the elements by means of which [the study of] music should be initiated, by the Greek name *phthongi.* They were not just any sounds, as for example, those made by insensible things or the irrational voices of animals, but those that were identified and determined by calculable quantities as being appropriate for melody. These extremely exact [sounds] established the foundations of all melody. Thus they called them "elements" or "*phthongi.*"

A minor, but interesting point, is Hucbald's use of Isidore's phrase "irrationabilium voces animalium," which, it will be recalled, were correctly called "voces," although the sounds of trumpets were not.

2. It is the smallest differentiable element of musical sound.

3. It is equivalent in meaning to the Latin *sonus*.

Hucbald provides an additional, extremely significant comment: "Dicti autem phthongi *apo tà phthengesthai* quasi a similitudine loquendi: quod, quemadmodum locutione intelligibilia verba redduntur, ita his sub intellectum decidunt soni, etiam et ipsos interdum irrationabiles sonos horum diiudicat exercitata sagacitas. Quocirca huiusmodi sonum, non generalem scilicet, taliter diffinire voluerunt. Sonus est vocis casus emmelos, id est, melo aptus, una intensione productus, utputa cum quilibet sonus voce depromitur, ut A vel cum chorda semel tensa sonuerit."[236] (*Scriptores Ecclesiastici* 1.108)

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[236] They are called phthongi from *phthengesthai*, by an anology to speaking, for just as words are understood through speech, in the same way sounds sink into [enter] the mind by means of these [phthongi]. Furthermore, the practiced wisdom of the ancients sometimes distinguishes among certain unmeasured sounds. For these reasons, of course, the ancients wanted to define sound, not in general, but in this way: Sound is a type of melodic voice, that is, it is suitable for melody and produced by a constant tension, as when a single sound is produced by the voice, for example [the sound of] the letter A, or the sounding at any time of a single tuned string.

Hucbald's passage is doubly significant. First, it establishes the link between rationally measured pitches and intelligibility: Just as the spoken word is meaningful, so is the sounded ratio; furthermore, rational pitches can be distinguished from irrational sounds just as, by implication, spoken meaningful words can be distinguished from nonsense words. Second, he has extended the material borrowed from Boethius ("Sonus est vocis casus emmeles . . .") with an example that makes a correspondence between what the grammarians considered to be the smallest distinguishable element of human speech and what the music theoreticians considered to be the smallest distinguishable element of melody.[237] What is important here is not just the elemental status of letters and pitches, but their individuality and special character within their respective disciplines.

A similar analogy can be drawn from the work of Martianus Capella. In the passage cited at the opening of this chapter,

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[237] The smallest distinguishable element of human speech is what is called a phoneme in modern linguistics; the sound of the letter A is no longer considered to be a phoneme. Nor is the word considered to be the smallest meaningful unit of human speech, the morpheme, according to current linguistic theory. Hucbald describes the rational pitch as both "phoneme" and "morpheme" of melody. Implications of the concept of distinguishability will be examined at length in the final chapter of this monograph.

Martianus writes that each letter of the Roman alphabet can be identified with a single sound (cf. [260]); he goes on to describe the physical production of each of the twenty-three alphabetic voices. For example, "Namque A sub hiatu oris congruo solo spiritu memoramus; B labris per spiritus impetum reclusis edicimus; . . ."[238] ([261], Willis 68) In much the same way, he begins his exposition of the individual notes of the Greek musical scale, "Nunc de prima voce velut de sonitus totius parente dicemus."[239] ([936], Willis 360) He proceeds to name and to locate within the gamut, using intervals based on mathematical ratios, each one of the special twenty-eight musical notes that has been selected from the infinite number of possibilities: "Sunt innumerabiles soni, sed specialiter per singulos tropos viginti octo tantum poterunt convenire . . ."[240] ([940], Willis 362)[241] That is, similarly

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[238] We speak A in a single breath through a suitable opening of the mouth; we pronounce B by means of a explosion of breath through open lips; . . .

[239] We will now speak about the first voice, that is, the parent of all sound.

[240] The sounds are innumerable; in a particular instance, however, only twenty-eight can combine in the individual tropes.

[241] Previously [931] he had listed 18 individual notes. Remigius explains the discrepancy: "XXVIII TANTUM POTERUNT CONVENIRE. Omnia ista in cantilena deprehendi possunt. Si volueris diatonicum

to the letters of the Latin alphabet, each of the musical notes in the Greek gamut has a name, a physical means of production, and a sound with a special identifiable character.

As demonstrated in the writings of Martianus Capella and Hucbald of St.-Amand, the correspondence established between cosmological and harmonic principles gives rise to a conceptualization of the individual character and identity of each pitch in the musical gamut that can be seen as analogous to the identification of the individual sounds of human speech. However, there are important differences. First, the units of organized musical sound are computed according to immutable rational principles, the Pythagorean-Platonic ratios, not reproduced on the basis of inexact physical descriptions of tongue, mouth, and

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tantum commemorare, tunc XVIII habebis; si autem cromaticum vel enarmonicum intromiseris, X supra habebis et erunt XXVIII, sub uno tamen nomine V cromatici et V enarmonici adduntur, id est pro una chorda, sed iste subtiliter et obscure dixit. In boetii vero *Musica* hoc clarius potest pervideri." (Lutz 2.338) [All these can be perceived in song. If you wish to recount only the diatonic, then you will have 18. If you admit the chromatic or the enharmonic, you will have 10 more for a total of 28. Nevertheless, 5 chromatic and 5 enharmonic (pitches) are added under a single name, that is, on one string; but he said this subtly and obscurely. This can be seen more clearly in Boethius's *Musica*.]

breath. It is exactly this point that provides a basis for the different epistemological status of grammatical and harmonic theory. And second, the individual sounds of the letters are obscured or altered in the continuous flow of human speech, contrary to what the grammarians postulated, a point that was mentioned as part of the discussion of *littera* in a previous chapter. In melody, however, the individual notes of the gamut remain identifiable.

We have looked at the ways in which musical voice was defined, ending with a Carolingian treatise--drawing its material, to be sure, from established authorities--that establishes rational pitch as the smallest meaningful and distinguishable element of melody by analogy to word and letter as elements of human speech. It is appropriate at this point to examine the epistemological distinctions that had been made between knowledge derived from the study of grammar and knowledge derived from the study of music.

4.5 The epistemological status of grammar and harmony

The philosophical framework for the hotly contested issue of the epistemological status of grammar and for the less controversial status of harmony was established by Plato in the *Gorgias* and expanded and formalized by Aristotle in the *Nichomachean Ethics*, where he undertakes the investigation of the

ways in which the mind possesses truth by defining five categories of knowledge, of which the first three are relevant to this discussion: scientific knowledge, art, empirical judgment, philosophic wisdom, and intuitive reason.

Within this context, Aristotle describes scientific knowledge (*epistéme, scientia*): "We all suppose that what we know is not even capable of being otherwise; of things capable of being otherwise we do not know, when they have passed outside our observation, whether they exist or not. Therefore the object of scientific knowledge is of necessity. Therefore it is eternal; for things that are of necessity in the unqualified sense are all eternal; and things that are eternal are ungenerated and imperishable." (VI: 3, 1139b; McKeon 426)

"All art (*téchne, ars*)," on the other hand, "is concerned with coming into being, i.e. with contriving and considering how something may come into being which is capable of either being or not being, and whose origin is in the maker and not in the thing made; for art is concerned neither with things that are, or come into being, by necessity, nor with things that do so in accordance with nature (since these have their origin in themselves). (VI:4, 1140a; McKeon 426-428) In addition, according to Aristotle, "Art arises when from many notions gained by experience one universal judgment about a class of objects is produced." (*Metaphysics* I: 1, 981a; McKeon 244)

Defining empirical knowledge (*empeiría, experientia, peritia*) as a capacity for deliberation about actions that are both variable and possible, Aristotle writes, "Empirical knowledge cannot be scientific knowledge or art; not scientific or invariable because that which can be done is variable and not art because action and making are different kinds of things. The remaining alternative, then, is that it is a true and reasoned state of capacity to act with regard to the things that are good or bad for man." (VI.5, 1140b; McKeon 428)

The scientific status of harmony, the musical discipline, follows from its basis in arithmetic principles. Aristotle writes in the *Metaphysics*: "The most exact of the sciences are those which deal most with first principles; for those which involve fewer principles are more exact than those which involve additional principles, e.g. arithmetic is more exact than geometry." (I.2, 982a; McKeon 246). Aristides Quintilianus applies Aristotelian epistemological distinctions directly to the study of music, as follows (I.4): "Mousiké estin epistéme mélous. . . : gnosis tou prépontos en somatikais kinesesin. Epistéme mèn oun estin, e gnosis asphales oparkei kaì adiaptotos. . . ."[242] (Winnington-Ingram 4)

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[242] Music is the science of the melodic . . . : knowledge of what is suitable in bodies and motions. It is a science in which unchangeable and infallible knowledge exist.

This doctrine was transmitted in the Middle Ages by Augustine, for example, who in *De musica* gives the well-known definition, "Musica est scientia bene modulandi." Isidore of Seville elaborates the idea near the beginning of his book on music: "Itaque sine Musica nulla disciplina potest esse perfecta, nihil enim sine illa. Nam et ipse mundus quadam harmonia sonorum fertur esse conpositus, et caelum ipsud sub harmoniae modulatione revolvi."[243] (Lindsay 3.17)

In the Carolingian period, both Aurelian of Réomé and the theorist of *Scolica enchiriadis* include Augustine's definition of music. (Gushee 61 and Schmid 61) The former includes, as well, the following passage on the nature of a musician: "Is vero est musicus qui ratione perpensa canendi scientiam non servitio operis sed imperio adsumpsit speculationis."[244] (Gushee 77)

Before investigating the epistemological status of grammar, thoroughness requires mentioning that both Aristides Quintilianus and Augustine, among others of course, write that although the

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[243] Thus no discipline, nor any thing, can be complete without music. For this very world was constructed according to certain harmonic principles of sound, and the heavens revolve in harmonic modulations.

[244] A musician is one who, after careful consideration of theory, has achieved the science of singing not by the servitude of practice but through the exercise of the speculative faculty.

primary nature of music is scientific, its realization in practice is an art. Thus Aristides adds to the previously quoted text (I:4): "Kaì mèn kaì téknen auten eulógos an apokaloimen. : ."[245] and proceeds to elucidate the idea that what is appropriate in practice is based on astute observation, that is, exactly the inductive component of art. Augustine elaborates the same idea in an exchange in which *magister* and *discipulus* discuss the degree to which imitation, or induction, is an element of science. (cf. *De musica* I: 4, 6-9) This theme of the proper constitution of a musician is given an elegant statement by Regino of Prüm, who opens a paragraph of his treatise with Aurelian's statement about *musicus* just quoted, and continues:

"Quisquis igitur harmonicae institutionis vim atque rationem penitus ignorat, frustra sibi nomen cantoris usurpat, tametsi cantare optime sciat. Neque enim ille, qui lectionem legit, sed qui lectionem exponit, magister appellatur. Et licet pueri psalmorum verba memoriter decantent, ab eorum tamen scientia alieni existunt, quia eorum sensus mysticos penetrare nesciunt. Itaque sicut non sufficit in visu eruditis viris, colores formasque conspicere, nisi etiam, quae sit horum proprietas, investigaverint: sic non sufficit cantilenis musicis animum oblectari, nisi etiam,

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[245] We might also correctly call it an art . . . .

quali inter se iunctae sint sonorum vel vocum proportione, discatur."[246] (*Scriptores Ecclesiastici* 1.246b)

The debate about the epistemological status of grammar turned on the issue of whether it should be considered empirical knowiedge or art. Dionysius of Thrax (2nd century B. C.), using Aristotelian terminology, confuses the issue and perhaps initiates the controversy when he writes that, "*Grammatiké estin empeiría*," but uses the word *techné* when elaborating the functions of grammar. Diomedes, one of the fourth-century Latin grammarians, uses the term *ars*, opening his treatise, "Artis grammaticae auctores exordium scribendi varium diversumque

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[246] Therefore, whoever is completely unaware of the power of harmonic principles and theory will take on in vain the title of singer, even though he may know how to sing extremely well. In the same way, the one who explains a text, not the one who reads it, is called a teacher. And even if boys sing through to the end from memory the words of the psalms, they are nevertheless strangers to a knowledge of them, because they do not appreciate their mystical sense. Just as it is not enough for educated men visually to perceive colors and shapes, unless they have examined their qualities, in the same way it is not enough for the mind to be delighted by musical song, unless it is known which proportions join the sounds or voices together.

sumpserunt."[247] (*Grammatici Latini* 1.300). On the other hand, Isidore two centuries later makes no clear distinction, writing for example, "Prima grammatica, id est loquendi peritia," and "Primordia grammaticae artis litterae communes existunt." (I.1 and I.3)

The hinge of the distinction was the evaluation of the inductive content of grammar, exactly in line with the distinction made by Aristotle between empirical knowledge and art. What is important for this study, however, is not this distinction but rather the one between science and either art or empirical knowledge. That is, in whichever one of the latter two categories grammar was properly classified, it most certainly did not have the status of scientific or certain and unchanging knowledge accorded to music.

We are now in a position to bring the epistemological status of the musical discipline to bear on the semantic investigation of the written image of measured pitch to be undertaken in the next chapter.

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[247] The authors of the grammatical art took up the varied and diverse origins of writing.

CHAPTER 5

A SEMANTIC THEORY FOR THE WRITTEN REPRESENTATION OF HARMONIC SOUND

5.1 *Nota* and *notula*:

The semantic investigation to be undertaken in the following sections of this chapter will be centered on the uses and meanings of the Latin words *nota* and *notula*. Examples of Martianus's use of these terms in the various contexts of *De nuptiis* will serve to introduce the problems that the variety of meanings presents for such an analysis:

Book I.

"Insidebat autem ex pavonum pennis intertextae oculataeque pallae, ex qua multicoloribus **notulis** variegata pictura vernabat; . . ."[248] ([66], Willis 20)

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[248] He sat on a mantle embroidered and patterned with the eyes from the feathers of peacocks, on which a variegated tapestry was designed with flowers made up of multi-colored **lines**.

Book II.

"Erantque quidam sacra nigredine colorati, quorum litterae animantum credebantur effigies, quasque librorum **notas** Athanasia conspiciens . . ."[249] ([137], Willis 42)

Book III. *De arte grammatica*

"*h* aspirationis **notam** esse certissimum est. Quae quando vocalibus accedit, ut *hospes* et *heres*. Transit in *x*, ut *traho traxi*. Hanc Graeci diviserunt; nam pars eius dexterior aspirationis **nota** est, sinistra contrariae significationis. *k* vero nunc **nota** putatur esse, nunc littera."[250] ([252], Dick 93)

Book V. *De rhetorica*

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[249] There were some [books] written in a sacred black [ink], whose letters were believed to be likenesses of living things; Athanasia, seeing these **writings** in the books, . . .

Remigius's gloss is helpful: "ERANTQUE QUIDAM COLORATI id est descripti, SACRANIGRIDINE hoc est incausto." (Lutz 1.174)

[250] It is absolutely certain that *h* is a **written indication** of aspiration, which when [it appears] is an addition to vowels, as in *hospes* and *heres*. It becomes *x*, as in *traho traxi*. The Greeks divided it in two: its right part is an **indication** of aspiration, while its left part signifies the opposite. *k* is sometimes thought to be a **written indication**, sometimes a letter.

"In ipso tum totum, tum pars eius, tum **nota**, quam Graeci etymologiam dicunt."[251] ([474], Willis 166)

"A **nota** vel etymologia, ut Graeci dicunt, . . ."[252] ([483], Willis 168)

"tum apponere **notas** rebus singulis oportebit his, quae volumus maxime retinere."[253] ([539], Willis 190)

Book VI. *De geometria*

"Circulus est figura planaris, quae una linea continetur. Haec linea *periphereia* appellatur, ad quam ex una **nota** intra circulum posita omnes directe ductae lineae aequales sunt; punctum autem est circuli media **nota.**"[254] ([711], Willis 252)

Book VI. *De arithmetica*

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[251] In any matter [*negotium*], there is an argument from the entire proposition, then from a part of it, and then from its **origin and derivation**, which the Greeks call etymology.

Translation was assisted by Johannes Scottus: "TAM TOTUM id est argumentum a toto." (Lutz 122)

[252] From **derivation** or etymology, as the Greeks say. . .

[253] Then it is useful to put **written marks** next to those individual things that we want most of all to retain.

[254] A circle is a two-dimensional figure contained within a single line called its periphery, which is the locus of all points equidistant from a fixed point. That fixed point is the **point** at the center of the circle.

"Geometriae vero **nota**, linea, figura, soliditas."[255] ([746], Willis 270)

Book IX. *De harmonia*

"Verum post mediam extendentem hemitonium coniunctarum erit tertia, quae in eodem modo, id est Lydio, lambda supinum pro **nota** habebit."[256] ([943], Cristante 142)

"Sed nunc de tonis. Tonus est spatii magnitudo qui ideo tonus dictus quia per hoc spatium ante omnes prima vox quae fuerit extenditur, hoc est de **nota** qualibet in **notam**, ut a media in

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[255] [The subjects] of geometry are the **point**, the line, the [two-dimensional] figure, and the solid.

[256] After the *mese*, with the addition of one semitone, comes the third [member] of the conjunct [tetrachords], which in this mode, that is, the Lydian, which has as its **written indication** a supine lambda.

Johannes Scottus writes: "MEDIA ipsa est *mese* erit tertia, id est coniunctarum a fine connumeratur." (Lutz 209)

Remigius adds: "CONIUNCTARUM ERIT TERTIA id est trite synemmenon. TERTIA CONIUNCTARUM a fine connumeratur TERTIA et est hemitonii spatium inter tertiam coniunctarum et mesen." (Lutz 2.339) [CONIUNCTARUM ERIT TERTIA, that is, *trite synemmenon*. TERTIA CONIUNCTARUM is counted from the end TERTIA and an interval of a semitone is between the third [member] of the conjunct [tetrachords] and the *mese*.]

paramesen, ut est in Lydio si a iota directo, in [sigma] <zeta et pi> iacens signa concurrant."[257] ([960], Cristante 150)

The word *notula* is found only once in Martianus, in the quoted excerpt from Book I. Shanzer claims that he is the first to have used this diminutive of *nota* (147), and indeed the standard dictionaries--Lewis and Short, Oxford, and Torcellini--give no earlier citation. A search was conducted using the Packard Humanities Institute CD-Rom 5.3 index of 233 classical Latin authors, revealing no use of the term among the authors contained in that collection.[258] Therefore, to this time, the attribution to Martianus Capella remains unchallenged.

Remigius provides the following gloss of *notula*: "MULTICOLORIBUS NOTULIS id est figuris multorum colorum."[259] (Lutz 1.123) That is, in this context, Remigius assumed,

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[257] And now about tones. A tone is a magnitude of space that is called tone because the first voice that was produced before any other was extended through this space, that is, from any one **note** to another **note**, for example, from the *mese* to the *paramese*, as in the Lydian mode when the signs go from an upright iota directly to a zeta and a supine pi.

[258] The great majority of the authors cited in the Packard index flourished before 200 A. D. Notable exceptions are Porphyrio, Zeno, Servius, and Justinian.

[259] MULTICOLORIBUS NOTULIS, that is, in designs of many colors.

undoubtedly with good reason, that Martianus had used a diminutive form of *nota* to describe designs--images composed of lines--woven into the fabric of Apollo's robe. (To be sure, Remigius was aware of Boethius's use of the term in the context of a technical discussion of musical notation, a practice based on semantic assumptions that will be examined thoroughly in the next section.)

Martianus's uses of *nota* cited above illustrate the extent to which its meaning depended on context. Its signification in the first two examples taken from Martianus's discussion of rhetoric is part of a tradition that can be traced to Cicero and Quintilian. The latter writes (I.vi.28): "Etymologia, quae verborum originem inquirit, a Cicerone dicta est **notatio**, quia nomen eius apud Aristotelem invenitur *symbolon*, quod est **nota**; nam verbum ex verbo ductum, id est veriloquium, ipse Cicero, qui finxit, reformidat."[260] (Butler 123-124) That is, in this context, *nota* derives its meaning from *notatio*, one of whose meanings is etymology.[261]

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[260] Etymology, which inquires into the origins of words, was called *notatio* by Cicero, because Aristotle used the word *symbolon*, which is *nota* in Latin. Its literal meaning is rendered by *veriloquium*, a term that even Cicero, who contrived it, avoided.

[261] Arbusow (67) quotes Cornificus, the alleged writer of *Rhetorica ad C. Herennium* mentioned several times by Quintilian:

Both Johannes Scottus and Remigius are aware of this tradition. The former provides the gloss (Lutz 122), "NOTA id est argumentum a nomine"; and Remigius writes (Lutz 91): "TUM NOTA id est a nota et a nomine. AETHIMOLOGIAM Aethimon Graece proprium, inde aethimologia dicitur origo vel proprietas vocabuli."[262]

The third example from *De rhetorica* illustrates the use of *nota* to designate written marks. Here, memory, one of the five tasks involved in the preparation of a speech, is related to writing, a connection that will be explored in the final chapter of this monograph.[263] In the excerpt taken from Book II, it is beyond doubt that Martianus is also making a reference to written marks, this time specifically to a system of writing contained in a book.[264]

"Notatio est, cum alicujus natura certis describitur signis." [*Notatio* occurs when anything is described in writing by means of fixed signs.]

[262] TUM NOTA from *nota* and *nomen*. AETHIMOLOGIAM is taken from the Greek word *Aethimon*, so that the origin or particular quality of a name is called its etymology.

[263] The traditional five rhetorical tasks are *inventio*, *dispositio*, *elocutio*, *memoria*, and *pronuntiatio*.

[264] It seems reasonable to assume that the writing to which Martianus refers, "letters believed to be likenesses of living

The geometrical use of the term illustrates one of its principal ambiguities; that is, it can refer both to an abstraction and to a written representation of an abstraction. Remigius is evidently aware of the problem, but does little to resolve it (Lutz 2.165): "NOTA id est puncto. Punctum Grece vocatur. MEDIA NOTA id est signum." His first gloss clearly refers to the first element of geometry, while the second, relating *nota* to signum, indicates his understanding of *media nota* as a written mark designating the center of a circle. The usage of *nota* as the name of an abstraction is confirmed by the excerpt taken from *De arithmetica* listing the elements of geometry; and indeed Remigius writes (Lutz 2.199), "UT NOTA id est punctus, scilicet in geometria."

Martianus uses*nota* within the context of his lengthy description of the letters of the Latin alphabet in a very specific sense. That is, it is a mark that is not the written representation of the sound of a letter, but an indication of an element of

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things," is the Egyptian system of hieroglyphics. Remigius, however, interprets the passage in a different way (Lutz 1.174): "LITTERAE CREDEBANTUR EFFIGIES ANIMALIUM. Hoc dicit propter cosmographiam, id est mundi descriptionem et zoographiam. Zoo Grece animal, hinc zoographia dicitur descriptio de naturis animalium, sive ipsorum animalium pictura. LITTERAE ergo illae ANIMALIUM EFFIGIES CREDEBANTUR quia sapientia de mundo disputat et de naturis animalium philosophatur."

pronunciation that is not a letter. This tradition is illustrated by Quintilian: "An rursus aliae redundent, praeter **notam** aspirationis, (quae si necessaria est, etiam contrariam sibi poscit) ut K, quae et ipsa quorundam nominum **nota** est . . . "[265] (1.4.9, Butler 66)

As indicated, Martianus uses *nota* twice in *De harmonia*. The first citation seems fairly straightforward in meaning; the tone in question has as a written form the Greek letter lambda in supine position. Quite possibly this is the meaning of the term in the passage from Quintilian that was quoted in chapter 3: "Nam nec ego consumi studentem in his artibus volo, nec moduletur aut musicis notis cantica excipiat. . ." (1.12.14, Butler 197-198) That is, Quintilian may well be referring to the Greek notational system for instrumental music based on letters of the Greek alphabet in customary and rotated orientations.

The second passage from *De harmonia* is considerably more ambiguous, for it is not clear whether *nota* refers to a musical tone itself or to its written representation. Remigius's commentary on this passage is worth quoting in its entirety, as it provides clarification, obfuscation, and intriguing terminology,

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[265] On the other hand, others [of the letters] may be redundant, in addition to the mark of aspiration (which, if it is necessary, requires a mark that has the opposite meaning), such as K, which is a **shorthand indication** of certain nouns . . .

and functions well as a transition to the next section of this chapter:

"SED NUNC DE TONIS scilicet dicamus. TONUS EST SPATII MAGNITUDO id est intervalli inter chordam et chordam et vocem et vocem, QUI IDEO TONUS DICTUS scilicet est, QUIA PER HOC SPATIUM ANTE OMNES scilicet voces vel divisiones vocum sive chordarum, PRIMA VOX QUAE FUERIT EXTENDITUR, HOC EST DE NOTA QUALIBET IN NOTAM id est de chorda in chordam. Singulae enim chordae habent suas notulas sicut habetur in Boetio. UT A MEDIA scilicet chorda, id est a mese, IN PARAMESEN id est in illa quae est prope mediam, UT EST IN LYDiO scilicet sono, SI A IOTA DIRECTO id est a mese, IN SIGMA IACENS id est in paramese, SIGNA id est notulae, CONCURRANT."[266] (Lutz 2.347-348)[267]

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[266] TONUS EST SPATII MAGNITUDO, that is, of an interval between two strings and two voices, QUI IDEO TONUS DICTUS, that is, which is, QUIA PER HOC SPATIUM ANTE OMNES, namely, voices or divisions of voices or strings, PRIMA VOX QUAE FUERIT EXTENDITUR, HOC EST DE NOTA QUALIBET IN NOTAM, that is, from string to string. Individual strings have their *notulas*, as it is given in Boethius. UT A MEDIA, namely, the string, that is, from the *mese*, IN PARAMESEN, that is, to that which is near to the middle, UT EST IN LYDIO, namely, sound, SI A IOTA DIRECTO, that is, from the *mese*, IN SIGMA IACENS, that is, to the *paramese*, SIGNA, that is, *notulae*, CONCURRANT.]

On the one hand, Remigius clarifies the status of *nota*. In the case of both voice and stringed instrument, *nota* is not written, but sounded. Obfuscation arises, however, in the identification of *nota* with chorda, although it is reasonable to assume that*chorda* in this context is meant to refer to the sound made by a particular string of a stringed instrument rather than to the string itself. His reference to Boethius's use of *notula* to name the Greek letters assigned to the tones (or strings) indicates a superficially correct reading of *De institutione musica* 4.3, while his identification of *notula* with *signum*, although perfectly consistent with Martianus's meanings, betrays a lack of sensitivity to Boethian semantics, the subject of the next section.

5.2 Boethius's theory of signification

5.2.1 *De institutione musica*

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[267] The recension of Remigius's commentary on which Lutz based her edition evidently includes a different reading of the last clause of this excerpt from Martianus than that given by Cristante and Dick. Willis gives, "ut est in Lydio, si a iota directo in sigma iacens signa concurrant." (370) The readings presented by Dick and Cristante agree with Boethius's transmission of the Greek notational system (*De institutione musica* 4.3), while that of Willis does not.

The text of *De institutione musica* 4.3, probably written around 505 A.D., contains Boethius's first use of *notula* within the context of the study of music. The important opening sentences of this section are given in their entirety:

"Restat nunc quoniam sumus nervum secundum praedictas consonantias, per regulam divisuri, quoniamque necessarios sonos tribus generibus cantilenae exhibebit ista partitio, musicas interim notas apponere, ut, cum divisam lineam isdem notulis signaverimus; quod unicuique nomen sit, facillime possit agnosci. Veteres enim musici propter conpendium scriptionis, ne integra semper nomina necesse esset apponere, excogitavere notulas quasdam, quibus nervorum vocabula notarentur, easque per genera modosque divisere, simul etiam hac brevitate captantes, ut, si quando melos aliquod musicus voluisset adscribere super versum rythmica metri compositione distentum, has sonorum notulas adscriberet, ita miro modo repperientes, ut non tantum carminum verba, quae litteris explicarentur, sed melos quoque ipsum, quod his notulis signaretur, in memoriam posteritatemque duraret."[268] (Freidlein 308-309)

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[268] Now the task remains to divide a string by means of a rule, according to the consonances previously mentioned. Because this partition will exhibit the requisite sounds in the three genera of melody, during this process we are going to place musical signs, so that when we mark the divided line with these written

After the first use of *nota*, Boethius is completely unambiguous.[269] That is, a *notula* (his term for *musica nota*) is a written indication of a measured musical sound or pitch, just as letters are written indications of spoken words. Furthermore, it is a form of abbreviated writing, or shorthand, for the written name of a pitch; hence, perhaps, the use of the diminutive form.[270]

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indications (*notulae*), the name of any tone can be very easily recognized. Ancient musicians, for the sake of brevity (that is, so that it would not always be necessary to put down the complete names), devised certain written indications (*notulae*) with which to mark the names of the strings and arranged them throughout the genera and the modes. They were attempting at the same time, with these abbreviations, to allow a musician who wanted to write out a melody over a line of verse, set out in the rhythmic structure of a meter, to write out these indications of the sounds (*notulae*). In this remarkable way, they discovered that not only the words of the songs, which were set forth in letters, but also the melody, which was indicated by these written musical markings (*notulae*), would endure in memory and in posterity.

[269] For a detailed discussion of Greek genera and scales, see Chailley (1979).

[270] In fact, Lewis and Short (1217) gives "shorthand characters" as one of the possible meanings of *nota*, citing Probus: "Apud veteres cum usus notarum nullus esset, propter perscribendi difficultatem

Boethius's remark that the *notulae* allow a musical composition to endure forever, not just in the memory, is an aspect of literacy in general, not just music notation, to be addressed in the final chapter of this monograph.

Boethius's use of *notula* is consistent throughout *De institutione musica*.[271] For example, in a section entitled *Ratio superius dispositae modorum descriptionis*, in which he explains a diagram of the modes, he writes:

"Nunc illud est considerandum, quod hae paginulae, quas inter se rectus linearum ordo distinguit, aliae quidem habent notulas musicas, aliae vero minime veluti in eo modo, qui inscribitur hypermixolydius, prima quidem paginula *w*, tertia ø litteris

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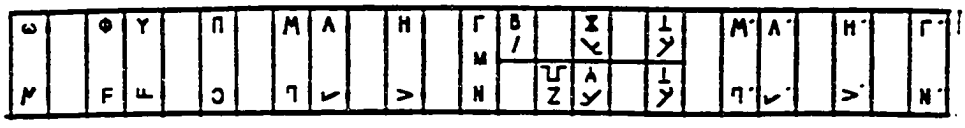
. . . quaedam verba atque nomina ex communi sensu primis litteris notabant. . . [Our ancestors when the use of shorthand (*notarum*) was non-existent, because of the difficulty of writing at length . . . notated certain verbs and nouns, conforming to their customary meanings, using their first letters . . .]

[271] Investigation of Boethius's use of *notula* in *De institutione musica* was greatly facilitated by the use of Bernhard's *Wortkonkordanz zu Anicius Manlius Severinus Boethius De institutione musica*. Bernhard lists (423-424) eighteen occurrences of *notula* in some form, all of which have been carefully examined.

adnotatur, secunda notulis vacat. In hac igitur intercapedine notularum tonus interesse monstratur."[273] (Friedlein 344)



Furthermore, Boethius uses the word in a similar sense--that of an abbreviated written representation of a physical phenomenon--in his treatises on arithmetic and geometry. For example:

De institutione arithmetica "Ut enim quinarii subiectam notulam fingant de V . . ."[274] (Friedlein 87)

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[273] Now it should be considered that these little sections of page (*paginulae*), which the vertical arrangement of the lines delineates between the lines, sometimes contain musical notation (*notulas musicas*), and sometimes nothing at all. For example, in the mode labeled "Hypermixolydian," the first and third sections are written with the letters *w* and ø; the second is unoccupied by letters. In this way, a tone is shown to be present in this space between the written notes (*notularum*).

[274] So that they form the adjacent written sign (*notulam*) of a group of five by "V."

De institutione geometrica. "Habebant enim diverse formatos apices vel caracteres. Quidam enim huiuscemodi apicum notas sibi conscripserant, ut haec notula responderet unitati 1, . . ."[275] (Friedlein 397)

Before proceeding to an investigation of Boethius's treatise on the theory of meaning, his translation and commentary on Aristotle's *Peri hermeneias* (*De interpretatione*), it will be helpful to look carefully at the text of *De institutione musica* to determine what language Boethius uses in connection with *notula* in order to identify its semantic content, if any. For example, in the passage from book 4.3 given above, the verbs *explicare*, *signare*, and *notare* each appear at least once. The first, whose customary meaning is to display or set forth, seems in this context, and in its other occurrences in the treatise, to make a visual reference only. *Signare* consistently refers to a written indication of some sort, while *notare* in its several appearances sometimes has the sense of notate in writing and at other times means to denote or designate, not necessarily in writing. Its sense in the passage given above, connected directly to *notula*, is an example of the former, while the following excerpt

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[275] They had differently shaped written forms or marks. Certain ones of this type had written the signs of the written forms for themselves, so that the written sign (*notula*) "1" corresponds to the unit, . . .

demonstrates the latter: "Atque ut clarius omnis in hac forma respiciatur ordo nervorum secundum tria genera, V tantum notantur esse tetrachorda."[276] (4.12, Friedlein 334) Thus, of the three verbs, only *notare* in certain instances seems to have a semantic reference.

The word *signum* appears only once in *De institutione musica*: "Superior descriptio inferiora signa quae continet eius sunt descriptionis, ubi chordis notulas apposuimus, quoniam earum nomina longum fuit adscribere."[277] (Friedlein 316) In this excerpt *signum* is evidently meant to be taken as a synonym for *notula*, a written mark of some sort. It is not, however, clear whether *notula* should be understood to have the semiotic dimension that Augustine, in *De doctrina Christiana*, for example, attributes to letters as signs of words: "Sed quia verberato aere statim transeunt nec diutius manent quam sonant, instituta sunt

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[276] So that the entire array of string in the three genera be clearly seen in this diagram, only five tetrachords are designated.

[277] The diagram given above contains signs below it from the diagram in which we put written marks (*notulas*) next to the strings, as it would be tedious to write out the names in their entirety.

per litteras signa verborum. Ita voces oculis ostenduntur, non per se ipsas, sed per signa quaedam sua."[278] (Green 35)

Circumstantial evidence, at least, would indicate a negative response. Aside from this one example, Boethius has avoided the use of *signum*, which could very well have served in the place of *notula*, thus avoiding the need to coin a term. Indeed, what Boethius intended the semantic content of *notula* to be is not entirely clear in *De institutione musica*. Additional evidence, however, is located in a second Boethian treatise, *Anicii Manlii Severini Boetii Commentarii in librum Aristotelis Peri hermeneias*.[279]

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[278] But because vibrations in the air pass by quickly and remain no longer than they sound, signs of words have been constructed using letters. In this way, words are shown to the eyes, not in themselves, but through what might be called signs of words.

[279] In *De musica*, a treatise that Boethius certainly knew, Aristides Quintilianus uses *semeion* (*signum*) at least once to refer to a musical tone (1.8): "Surely this is apparent from our having supposed the same initial tone (*semeion*), which is named each time by a different function of note (*phthongou*); it happens that the quality of the harmonia becomes apparent from the sequence of the notes (*phthongon*) one after another." Cf. Mathieson 83 and Winnington-Ingram 15.15-19.

5.2.2 In Peri Hermeneian

Aristotle wrote three treatises on logic collectively known as the *Organon*: *Aristotelous Kategoriai* (*Categoriae*, *Aristotle's Categories*), *Peri Hermeneias* (*De interpretatione, On Interpretation*), and *Analytikon Proteron* (*Prior analytica, Prior Analytics*).[280] The first is a complete treatment of all predications that can be made about any given subject; the second relates language to thought and defines noun, verb, sentence, and

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[280] In the twelfth century, Latin translations of a select body of work on logic (*dialectica*) came to be known as the *logica vetus*: Porphyry's *Isagoge*, Aristotle's *Categoriae* and *De interpretatione*, Cicero's *Topica*--along with the Boethian commentaries on these works--as well as the Boethian treatises *De topicis differentiis*, *De categoricis syllogismis*, *De hypotheticis syllogismis*, and the *Liber divisonum*, and Marius Victorinus's *Liber definitionum*. The most complete synthesis of the *logica vetus* is the *Dialectica* of Peter Abelard, compiled during the 1130s. For additional general information, see P. O. Lewry's "Dialectic" in *A Dictionary of the Middle Ages* (168-171).

Martianus Capella's book on rhetoric draws on Aristotle's *Peri Hermeneias*, as well of that of Apuleius, and Porphyry's *Isagoge*. See, for example, Stahl's commentary on his translation of book 4 of *De nuptiis*.

proposition; and the third contains Aristotle's theory of the syllogism.

Peri Hermeneias, the second of the three treatises of the *Organon*, was translated by Boethius prior to his writing two separate commentaries on the work. It is not certain exactly when Boethius made his translation and commentaries, but current research indicates that the translation was completed around 505 (the year of *De institutione musica*), the first commentary finished sometime around 513, and the second commentary completed ca. 515-516.[281] Within this body of work, Boethius develops a theory of cognition based on signification in which he postulates a specific structure for the triadic set of relations between what is spoken, written, and understood. Applied directly by Boethius to human speech, the theory has a secondary application of great significance for this monograph; that is, the relation between the sounded musical pitch and the written representation and cognition of its physical manifestation.

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[281] For information on chronology, see Chadwick and De Rijk. Magee summarizes what is known about previous Latin translations of this work, including the evidence for the existence of a translation by Marius Victorinus, as well as what is known of the circumstances surrounding Boethius's translation and commentaries.

Aristotle opens the *Peri Hermeneias* with a discussion of the relation of language, both written and spoken, to thought. Boethius's translation of the second and third sentences of the opening paragraph, with occasional indications of the original Greek words, follows:[282]

"Sunt ergo ea quae sunt in voce (*phone*) earum quae sunt in anima (*psyche*) passionum (*pathematon*) notae (*symbola*), et ea quae scribuntur eorum quae sunt in voce. Et quemadmodum nec litterae omnibus eaedem, sic nec eaedem voces; quorum autem hae primorum notae (*semeia*), eaedem omnibus passiones animae sunt, et quorum hae similtudines, res etiam eaedem."[283] (Minio-Paluello 5)

Particularly interesting are Boethius's use of *notae* as a translation of both *symbola* and *semeia* and his avoidance of the

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[282] The Loeb edition contains the complete text in Greek. Magee gives most of the opening paragraph of the treatise in the original Greek (8).

[283] Spoken sounds are *notae* (symbols) of mental impressions, and written expressions are *notae* (symbols) of spoken sounds. And just as not all men have the same letters, so not all men have the same spoken sounds; but the mental impressions of which these [letters and spoken sounds] are primarily *notae* (signs) are the same for all men. And the reality [the thing] is the same for all men as well.

Latin words *symbolus* and *signum*. Boethius provides no explanation in either commentary, but it is possible that he avoided using *symbolus* because of the word's use in the Christian religion to refer to the *Credo*. *Signum* also has a special sense as a technical term in logic, the name of the minor premise in a syllogism (cf. Magee 50-59).[284] In any case, Boethius evidently thought that both words could correctly be translated with a single Latin word, and for that purpose he chose *nota*: spoken sounds are *notae* of mental impressions and written expressions (letters) are *notae* of spoken sounds.[285]

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[284] For example, in the syllogism

(a) All bachelors are unmarried

(b) Peter is a bachelor

(c) therefore, Peter is unmarried

(b) is the minor premise, or *signum* of the general or major premise.

[285] As previously mentioned, Marius Victorinus may have translated *Peri Hermenieas* into Latin, but his translation, if it did exist, is not extant; thus there is no way of knowing for sure whether Boethius followed an existing tradition or not in his use of *nota* for both *symbola* and *semeia*.

Magee discusses the implications for later medieval commentary of Boethius's Latin version of the Aristotelian text that suppressed some of Aristotle's possible meanings. He also

In the discussion of the various uses and meanings of *nota* in Martianus Capella's treatise, Quintilian's (and Cicero's) identification of the Latin *nota* with the Greek *symbolon* was cited. In *In Topica Ciceronis Commentariorum* (dated by De Rijk to some time before 522), discussing the relevant passage from Cicero, Boethius writes: "Nota vero est quae rem quamque designat. Quo fit ut omne nomen nota sit, idcirco quod notam facit rem de qua praedicatur, id Aristoteles *symbolon* nominavit."[286] (PL 64.1111b)

It is clear from this passage and its reference to *res nota* that to Boethius the word *nota* had an important sense as the past

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examines modern translations of the original Greek into English. Cf. chapter 1, 7-48.

It is possible that Aristotle had in mind a distinction between the two words that is based on the antithesis between the natural and the conventional. For example, a horse's whinnying is a natural sign (*semeia*) of its feelings, but a word such as "sorrow" is a conventional symbol (*symbola*) for an emotion. At any rate, even if this is the correct interpretation of Aristotle's text, Boethius chose not to make or failed to understand the distinction in the particular case.

[286] A *nota* is that which designates each thing, so that every name is known. In this way, what Aristotle called *symbolon* makes known the thing that is said.

participle of *noscere*, to get a knowledge of or to come to know. Magee observes that, given this connotation of *nota*, its use in a text that relates *res*, *intellectus*, *vox*, and *littera* conveys the idea of communication of something that is in the mind, something that is known--a signification rather than a signal (cf. 63). [287]

Boethius's formulation of a theory of signification, presented in his first commentary on the opening paragraph of Aristotle's treatise, places *intellectus* between *res* and *vox - littera* (1.1):

"Tota autem ratio sensus huiusmodi est: tria sunt ex quibus omnis conlocutio disputatioque perficitur: res, intellectus, voces. Res sunt quas animi ratione percipimus intellectuque discernimus, intellectus vero quibus res ipsas addiscimus, voces quibus id quod intellectu capimus significamus. Praeter haec autem tria est aliud quiddam quod significat voces, hae sunt litterae, harum enim scriptio vocum significatio est. Cum igitur haec sint quattuor: res, intellectus, vox, littera, rem concipit intellectus, intellectum vero voces designant, ipsas voces litterae significant."[288] (Meiser 1.37)

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[287] Magee argues carefully and convincingly, using many examples, that for Boethius the word *signum* has no specifically semantic force (61-63).

[288] The complete theory of meaning is the following. There are three things by means of which all conversation and debate is

Combining the language from Boethius's translation of Aristotles's opening paragraph and from this excerpt from his commentary, we conclude that spoken words are *notae* that designate or describe mental impressions, and written words are *notae* that signify spoken words. The words *significare* and *designare* are interchangeable, as illustrated in this paragraph from the second commentary (1.1): "Cum igitur tria sint haec per quae omnis oratio conlocutioque perficitur, res quae subiectae sunt, intellectus qui res concipiant et rursus a vocibus significentur, voces vero quae intellectus designent; quartum quoque quiddam est, quo voces ipsae valeant designari, id autem sunt litterae."[289] (Meiser 2.20; punctuation has been revised.)

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accomplished: the actual thing, mental processes, and speech. Actual things are what we perceive through a physical faculty and we discern using our mental processes; indeed, we learn these things with our minds. Speech signifies what we conceive by means of our mental processes. In addition to these three, there is something that signifies speech, the letters, meaning written speech. Thus there are four: the actual thing, mental processes, speech, and writing. The mind understands or conceives the actual thing; speech represents thought; and writing signifies that speech.

[289] Thus there are three things by means of which all conversation and debate are accomplished: actual things, which are submitted to

It is worth mentioning that the word *significare* is used only once in *De institutione musica*, in its substantive form (1.24): "Sed in his ita dispositis constitutisque tetrachordis synaphe est, quam coniunctionem dicere Latina significatione possumus . . ."[290] (Friedlein 217) *Designare*, however, is used on several occasions, all consistent with its use in the commentaries on *De interpretatione.* The following excerpts serve to illustrate the point:

1. (1.1) "Hinc est quod modi etiam musici gentium vocabulo designati sunt, ut lydius modus et phrygius."[291] (Friedlein 180)

2. (4.8) ". . . quae est mese, quam O littera designavimus."[292] (Friedlein 325)

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judgment; mental processes, which conceive actual things and are in turn signified by human speech; and human speech, which designates or describes thought. There is also a fourth thing, by which human speech can be designated, that is, letters [or written words].

[290] In this tetrachordal placement and arrangement there is a *synaphe*, which we can signify in Latin with the word *coniunctio.*

[291] It is for this reason that musical modes were designated by the names of peoples, such as the Lydian mode and the Phrygian.

[292] . . . that is the mese, which we designated with the letter O.

3. (5.6) " . . . continuae quidem tales sunt, ut inter se earum differentia communi fine iungatur, nec habeat locum designatum vox acuta gravisque, quem teneant."[293] (Friedlein 357)

Before using Boethius's theory of cognition and signification to construct a model for musical knowledge, perception, and notation, it is necessary to look briefly at an excerpt from Boethius's commentary on Aristotle's doctrine of natural and conventional properties. Immediately following his first formulation of the relations between actual thing, mind, spoken word, and written word, Boethius writes (1.1):

"Intellectus vero animae quaedam passio est. Nisi enim quandam similtudinem rei quam quis intellegit in animae ratione patiatur, nullus est intellectus. Cum enim video orbem vel quadratum, figuram eius mente concipio et eius mihi similitudo in animae ratione formatur patiturque anima rei intellectae similitudinem, unde fit ut intellectus et similitudo sit rei et animae passio. Horum autem rursus quattuor duae sunt naturales, duae secundum hominum positionem. Voces namque et litterae secundum positionem sunt, intellectus autem et res naturaliter. Hoc illo adprobatur, quod apud diversas gentes diversis vocibus utuntur et litteris, idcirco quoniam ipsi sibi voces quibus

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[293] . . . continuous [voices] are such that the interval between them is completely filled, and neither the acute nor the grave voice has a designated place [range] that it maintains.

uterentur et litteras quibus scriberent conposuerunt. Intellectus autem et res nullus posuit, sed naturaliter sunt."[294] (Meiser 1.37)

Res and *intellectus*--actual things and their mental images--are natural, the same for all people. *Vox* and *littera*--speech and writing--are conventional rather than universal. Furthermore, Boethius is careful to distinguish *vox* and *littera*--the spoken and the written: "Littera est inscriptio atque figura partis minimae

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[294] Thought is a certain type of mental event. Indeed, unless an image of the actual thing that someone perceives occurs in the processes of the mind, thought cannot exist. When I see a circle or a square, I conceive its shape in my mind; its image is formed for me by a mental process; and my mind experiences the image of my conception of the actual thing. Thus thought is both a resemblance to the actual thing and an activity of the mind. Of the four things mentioned previously, two are natural and two depend upon men's circumstances. Speech and letters are determined by circumstance; thought and actual things occur naturally. This is proved by the fact that different people use different languages and letters, because they have their own language and compose letters for writing it. Nobody formed thought and actual things; they occur naturally.

vocis articulatae, elementum vero sonus ipsius inscriptionis."[295] (Meiser 2.23) This precision in his approach to the status of what is written was already evident in his use of a specific word *notula* to designate a written representation of *nota* or *sonus*, a musical pitch.

Boethius's theory of signification can be summarized as follows: *Intellectus* (thought processes, mental images) stand(s) between *res* (actual thing(s), existing independently of perception) and *vox* (speech, a meaningful acoustical phenomenon). *Vox* signifies (is a *nota* of) *intellectus*, and *littera* (what is written) signifies (is a *nota* of) *vox*. *Res* and *intellectus* are universal, the same for everyone; *vox* and *littera* are specific, determined by circumstance.

This theory of signification has the following application to musical theory and notation. *Res*--those things that exist and do not depend upon perception--are the principles of harmonic theory that permeate and govern the universe, according to Pythagorean--Platonic--neo-Platonic philosophy. These principles are understood as fixed and unchanging mathematical ratios--the products of intelligent thought processes, the *intellectus*. Both

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[295] A letter is an inscription and a figure for the smallest part of articulate voice, the written image of the smallest component of physical sound.

the harmonic principles and the ratios are natural, universal, the same for everyone.

Vox in this case corresponds to a measurable sounded musical pitch--a *nota* or *sonus*. Its acoustical characteristics depend on circumstance; that is, it can be the sound of a human voice, of a lyre, of a flute, or of any musical instrument. But no matter what the timbre, or any other particular characteristics of a measurable musical sound may be, the mind forms an image of the ratio that determines its pitch or harmonic identity. Different peoples devise different musical systems and within these systems use different *notulae* to represent in written form the *notae* of a particular system. These *notulae* correspond of course to *litterae* and are conventional, determined by particular circumstance.

Finally, *nota* or *sonus*--a measurable musical sound, *vox*--signifies (*significat, designat*) a mathematical ratio produced in the mind and is in turn signified by a *notula.* Schematically:

HARMONIA <-------> INTELLECTUS <------- NOTA <------- NOTULA

The model works two ways; that is, the process can move from right to left or from left to right. In the first case, a *nota* is heard (or possibly read and then heard). A ratio corresponding to

its pitch is formed in the mind, permitting the identification of a harmonic principle. In the second case, a ratio is conceived and then played or sung as a measured musical pitch, which can be written as a specfic *notula*.

It is important to realize that the model depends in every way on the properties of Platonic harmonic theory: the universality of the laws, the discreteness and special character of each musical pitch, and a process of intellection involving fixed mathematical ratios, that is, the scientific status of musical knowledge.

5.3 *Nota* and *notula*: the evidence for a Boethian theory of signification in Carolingian treatises

Both Boethius's general theory of signification and its specific application to musical notation are present in Carolingian grammar and music theory treatises. Alcuin's *Grammatica*, for example, contains in the section that precedes the definition of four species of *vox* (drawn directly from Priscian) a paragraph that is an almost exact duplication of the passage given above from Boethius's first commentary on the *Peri Hermeneias*. The treatise is written in the form of a dialogue between two *discipuli*, a Saxon and a Frank, and the *magister*. One of the *discipuli* speaks: "Et a te, magister, suppliciter rogamus exponi. Nam nos nescire confitemur quibus modis constet disputatio." The

magister replies: "Tria sunt quibus omnis collucutio disputatioque perficitur, res, intellectus, voces. Res sunt, quae animi ratione percipimus. Inteliectus, quibus res ipsas addiscimus. Voces quibus res intellectas proferimus; cujus causa, ut diximus, litterae inventae sunt."[296] (PL 101.854)

Although the text has a different purpose, namely, that of justifying the existence of the elements of speech, it certainly indicates that Boethius's work in semantics was known and admired. And indeed, in *De dialectica*, his treatise on logic (in this case, a dialogue between Charlemagne and Alcuin), Alcuin uses the language of signification. For example, Charlemagne asks, "Nomen quid est?" Alcuin's reply: "Vox significativa secundum placitum, sine tempore, diffinitum aliquid significans . . ."[297] (PL 101.973)

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[296] D: We humbly ask that it be explained by you, master. For we confess that we do not know the modes of debate. M: There are three by which all conversation and debate is accomplished: the actual thing, mental processes, and human speech. Actual things are what we perceive through a physical faculty. Intellectual processes are the means by which we learn these actual things. Human speech is the means by which we reveal the things that are understood, for whose sake, as we said, letters were invented.

[297] C: What is a noun? A: A part of speech (*vox*) that is significative according to some principle, without tense, signifying something that has been defined.

Examining first the terminology of the Carolingian music treatises, we find that the word *notula* is used twice in one paragraph of *Scolica enchiriadis*. The *Magister* states: "Quae super his dicenda sunt, commodius conferemus, si prius proprias sonorum notulas describamus: Decem et octo namque sonis notas ponimus, id est tetracordis quattuor et dimidio tetracordo. Primum quod est humilius, grave tetracordum nuncupantes. Secundum finale. Tertium superius. Quartum excellens. Sane illas voculas quas finales vocamus, eis notulis designamus, quas supra descripsimus."[298] (Schmid 83)

This is certainly evidence of a Boethian sensitivity to a distinction in terminology between the sounded and the written musical note. Furthermore, the verb *designare* is used. However, the terminology is not consistent, as the following excerpt, a

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[298] We can more conveniently present the things that need to be discussed, if we first write out the particular written representations (*notulae*) of the musical notes (*sonorum*). We select eighteen notes from [all] the musical notes (*sonis*), that is, four and one-half tetrachords. We call the first tetrachord deep, because it is lower than the others. The second is called the tetrachord of final [notes]. The third is called the higher. The fourth, the superior. Of course, we designate those soft tones that we call finals by means of the written marks (*notulis*), which we described above.

continuation of the *Magister*'s exposition, demonstrates: "Residuas binas voces iacentibus notis exprimimus *F f* , qui in ordine disponantur ita."[299] (Schmid 84) In this example, *nota* is used for the written marks.

In another example, again from the *Magister*, the words *signum* and *nota* are both used in the sense of written marks standing for musical tones:

"Ecce canam. Indita sunt eis antiquitus nomina. Primo, id est gravissimo, protos vel archoos. Secundo deuteros, qui tono distat a proto. Tertio tritos, qui semitonio distat a deutero. Quarto tetrardus, qui rursus a trito tono disiungitur. Signis quoque huiusmodi notantur. Primo est nota |- dasian inclinum S ad caput ita *F*."[300] (Schmid 62)

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[299] We portray the remaining two tones (*voces*) with the reclining written marks *F* and *f*, placed in this order.

[300] Listen and I will sing. The names were given to them in former times. First, the deepest, is called *protos* or *archoos*. The second, *deuteros*, a tone away from the *protos*. The third, *tritos*, a semitone from the *deuteros*. The fourth, *tetrardus*, which in turn is separated from the third by a tone. Also they are notated with these types of signs. First is the Dasian mark, an S bent at the top, thus, *F*.

However, in this example, the distinction between written and sounded is certainly maintained, and it can be argued that *signum* is used in the generic sense of any written mark.

The word *notula* is not used at all in *Musica enchiriadis*. The passage that corresponds to the first excerpt from *Scolica enchiriadis* given above uses no term for an individual written mark, but calls the entire array a *descriptio*. (Cf. Schmid 5) The passage corresponding to the second citation begins with a sentence in which *signum* is used rather than *nota*: "Duo residui signa habent *F f* iacentis proti et deuteri." However, the rest of the passage makes it clear that *notae* are *signa sonorum*, that is, a specific type of sign: "Sunt omnes XVIII, quo videlicet singuli extremam suam symphoniam attingant, id est quindecimum sonum, unde post dicetur. Sunt et alia plura plurium sonorum signa inventa antiquitus, sed nobis a facilioribus ordiendum."[301] (Schmid 6-7)

The passage in *Musica enchiriadis* corresponding to the third citation from *Scolica enchiriadis* uses *nota* to refer to the marks

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[301] The remaining two have the signs of the reclining *F* and *f* of the first and the second. In all there are eighteen, in which their outermost consonant interval is attained, that is, the fifteenth, which will be discussed later. Many other signs of more musical sounds were discovered formerly, but we must begin with what is easier.

of Daseian notation (Schmid 4); and this usage is quite consistent throughout the treatise. That is, the distinction between sounded *sonus* or *phthongos* and written *nota* is maintained.

One additional passage, mentioned previously in another context, is worth recalling before taking up Hucbald's *De harmonica institutione*. Describing a graphic display in which individual horizontal lines represent pitches, the anonymous theorist writes in fine Boethian terminology: "Sint autem cordae vocum vice, quas eae significent notae."[302] (Schmid 14)

Our examination of Hucbald's treatise will direct its focus toward the passages in which he undertakes his discussion of musical notation (*Scriptores Ecclesiastici*1.117a-118b). He opens with the previously cited analogy between letters and musical marks, using the phrase *musica nota* to denote the individual signs of the Greek alphabetic notation for measured pitches in the gamut, whose names and locations he has just presented.

Using just the word *nota*, he deplores the lack of universality of the customary written musical marks, saying that their written appearance is determined by circumstance, in much the same way that Boethius describes the specificity of letters or written indications of words. Furthermore, these *nota* are unclear; they

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[302] The strings [lines] should be like the voices that these notes signify.

cannot be understood: "Incerto enim semper videntem ducunt vestigio, utputa, si ad subjectam formulam respicias":[303]

(*Scriptores Ecclesiastici* 1.117b)

He is referring, of course, to a type of neumatic notation; the nature of this lack of clarity is specified in the following sentences, in which *notula* is used to refer to neumatic marks:

"Primam enim notulam cum aspexeris, quae esse videtur elatior, proferre eam quocumque vocis casu facile poteris. Secundam vero, quam pressiorem attendis, cum primae copulare quaesieris, quonam modo id facias, utrum videlicet uno vel duobus aut certe tribus ab ea elongari debeat punctis, nisi auditu ab alio percipias, nullatenus sic a compositore statutam esse pernoscere potes. Idem et de caeteris constat"[304] (*Scriptores Ecclesiastici* 1.117b).

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[303] They guide the one who is looking at them on an uncertain path; for instance, if you consider the following melodic contour.

[304] When you look at the first mark, which seems to be somewhat high, you are free to produce [sing] it with ease, in any vocal register. When you try, however, to connect the second, which you consider to be lower, to the first, and wonder how you should

Hucbald is saying that the neumatic *notulae* do not signify the measured pitches of the chant that has been notated. Therefore, these written marks are not understandable according to a theory of signification based on the harmonic model of the universe, whose elements are measurable and discrete--that is, individually distinguishable--musical sounds. Hucbald continues:

"Si vero, quas subsequens ratio demonstrabit, chordarum notulis eandem formulam consignatam videris, mox procul dubio, qualiter procedat, advertas utique hoc modo."[305] (*Scriptores Ecclesiastici* 1.117b)

A description of this system of notation by letters corresponding to strings follows. Briefly, each one of the Greek string names has been assigned a letter; and the appropriate

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accomplish it--whether it should be at a distance of one or two or even three points [tones or semitones, presumably] from the first--by *no means are you able to get an accurate knowledge of what* the composer meant the mark to be, unless you hear it [sung] by someone else. And the same thing is true of the rest [of the neumatic notation].

[305] If, however, you see the same melodic contour recorded using the *notulae* of the strings, which the following example will demonstrate, you will soon observe with complete certainty, by means of this method, how the chant should continue.

letters have been written above each syllable of the word "Alleluia" in order to indicate specific pitches:

I M p M p cf

AL LE LU IA

where, as Hucbald explains, I corresponds to *mese*; M to *lichanos meson*; p to *parhypate meson*; M to *lichanos meson*; p to*parhypate meson*; c to *hypate meson*; f to *lichanos hypaton.*

These pitches are, of course, the entities that can be understood in a theory of meaning based on the harmonic discipline, and therefore they can be signified by specific distinguishable marks.

Following the example, Hucbald makes a surprising proposal: "Hae autem consuetudinariae notae non omnino habentur non necessariae; quippe cum et ad tarditatem seu celeritatem cantilenae, et ubi tremulam sonus contineat vocem, vel qualiter ipsi soni iungantur in unum, vel distinguantur ab invicem, ubi quoque elaudantur inferius vel superius pro ratione quarumdam litterarum, quorum nihil omnino hae artificiales notae valent ostendere, admodum censentur proficuae. Quapropter si super, aut circa has per singulos phthongos eaedem litterulae, quas pro notis musicis accipimus, apponantur, perfecte ac sine ullo errore indaginem veritatis liquebit inspicere: cum hae, quanto elatius quantove pressius vox quaeque feratur, insinuent: illae vero

supradictas varietates, sine quibus rata non texitur cantilena, menti certius figant."[306] (*Scriptores Ecclesiastici* 1.118ab)

What Hucbald concedes in this passage falls exactly in line with the previously cited views of Aristides Quintilianus and Augustine, two examples chosen from many, that although the primary nature of music is scientific, based on eternal and unchanging laws, its realization in practice is an art, based on

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[306] This customary notation, however, is not held to be completely unnecessary, but is considered to be beneficial in indicating the following things: when a melody should be taken slower or faster, where a note should be sung with a tremulous voice, or how the notes are joined into one or distinguished from each other, and also where they are raised or lowered according to the sense of certain words. The notation according to [harmonic] theory (*artificiales notae*) is of no use in indicating these things. Therefore, if these same little letters, which we accept as musical notation, are placed above or near the customary notation, measured pitch by measured pitch, it will be clear that we are observing, perfectly and without any error, an indication of the truth. For this one [the letter notation] shows how much higher or lower each voice should be taken; and that one [the neumatic notation] fixes more surely in the mind the above-mentioned varieties [of performance] without which correct melody is not created.

inductive hypotheses (about correct performance, in this case) formed after careful observation of custom and practice.

Hucbald's description of Greek letter notation as *artificialis* and neumatic notation as *consuetudinaria* calls to mind a passage from Martianus Capella with which he was certainly familiar:

"Verum in litteris gemina quaestio diversatur. Namque aut naturales sunt aut effictae. Natura enim insinuante earum nomina in loquendi substantiam procreata; artificiosa vero formatio earum lineas quas scribimus designavit ad hoc, ut praesentes una uti, absentes alia potuissent."[307] ([232], Willis 62)

Admittedly, *naturalis* does not have the same meaning as *consuetudinaria*, and Hucbald is making a distinction between two systems of writing, not between speech and writing, as is Martianus. In this context, however, the adage, "Consuetudo est secunda natura," would seem to apply. Furthermore, Hucbald's objection to the customary systems of notation--those that have not been devised but have arisen as adjuncts of practice--is

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[307] A twofold inquiry into letters arises. For they are either natural or artificial. Nature, having produced their essence, places their names in speech; but their written forms that we use were designated artificially, so that people could use the former when speaking directly to each other and the latter when communicating in writing.

founded exactly on their failure to capture what he considers to be the most important dimension of music, namely, pitch.[308]

Throughout his intriguing discussion of notation, Hucbald is careful, as Boethius before him, to distinguish the written from the sounded. He consistently refers to the former with the words *notula*, *nota musica*, *nota*, and even *litterula*. The latter is *sonus* or *vox*. Furthermore, as indicated in the course of this examination of excerpts from *De harmonica institutione*, Hucbald's semantic theory is implicitly congruent to Boethius's.

We close the discussion of Hucbald with an excerpt that contains an explicit semantic statement that could have been

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[308] See Weakland (1956), Wingell (1976), and Chartier (1987) for descriptions of the musical notation found in Hucbald's treatise. Both Weakland and Wingell stress the importance of Hucbald as a practical theorist; Weakland goes so far as to praise what he takes to be Hucbald's misunderstanding of Boethius:

> "Nor is he to be censured--as he has been by some--because he misunderstood and misrepresented Boethius, since it is precisely in this new understanding and representation that his own genius comes to light. Had he repeated the long explanations of the 'genera diatonica, chromatica, et enharmonica' as Remi had done, and had he correctly understood and repeated Boethian mathematics, the rational explanation of musical practice would have been at a perpetual standstiil." (84)

Chartier discusses Hucbald's "solutions" to notational problems by comparison to modern musical notation (146-150).

directly derived from Boethian theory. Speaking of the measurable sounds, or *phthongi*, that are suitable for melody, Hucbald writes: "Dicti autem phthongi quasi a similitudine loquendi: quod, quemadmodum locutione intellegibilia verba redduntur, ita his sub intellectum decidunt soni."[309] (*Scriptores Ecclesiastici* 1.107b-108a)

5.4 *Scientia--artificialis notula || Experientia--consuetudinaria figura*

To bring this chapter to a close, we consider again the Paleofrankish neumatic notation, a species of the class of notations that Hucbald calls *consuetudinariae notae*, referred to and used in chapters 10 and 19 of Aurelian's *Musica disciplina*.[310]

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[309] They are called *phthongi* by analogy, as it were, to speaking; because, in the same way that intelligible words are produced in speech, these sounds enter the mind.

[310] The neumatic notation under discussion appears in the oldest extant version of this treatise (the ninth-century manuscript Valenciennes, Bibliothèque Municipale, 148) and is Paleofrankish. On the other hand, the addition of notation to this chapter seems to have been left unfinished, as there are several places where musical notation is indicated by the text, but does not actually appear.

Aurelian's language, in every case occurring within descriptions of short melodic formulas, is instructive:

1. "En figura melodie sicut subiecta notarum demonstrat formula: NONAN NOEANE."[311] (Gushee 119)

2. "Plagis proti melodia in sua littera huiusmodi habet notarum formas: NOEANE."[312] (Gushee 121)

3. ". . . secundum supra insitas canetur notarum figuras . . ."[313] (Gushee 121)

4. "Porro in versibus antiphonarum haec consistit figura notarum."[314] (Gushee 122)

5. "Adest litteratura plagis deuteri cum sonoritatis figura: NOEANE."[315] (Gushee 123)

6. "Versus introitui notatur ita:"[316] (Gushee 124)

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311 This is the shape (*figura*) of the melody, as the form of the neumes (*notarum*) added below demonstrates: NONAN NOEANE.

312 The melody of the first plagal has in its lettering these shapes (*formas*) of the neumes: NOEANE.

313 . . . it will be sung according to the shapes (*figuras*) of the neumes introduced above . . .

314 On the other hand, the shape of the neumes (*notarul*) depends on the verses of the antiphons.

315 Here is the lettering of the second plagal with the shape of the sound: NOEANE.

316 The verse of the introit is notated in this way:

It seems reasonably clear that the phrases *figura notarum* and *forma notarum* are used here, and in their other appearances in this chapter, to indicate a written representation of a melodic phrase, rather than the sounded melody, although a degree of uncertainty is introduced by the fifth example--the only one of its kind--in which *figura sonoritatis*, an unmistakable reference to sound, is used in exactly the same way as *figura* and *forma notarum* in the first four examples. On the other hand, the use of *notare* in the sixth example is reassuring.

Granted the premise that *figura* and *forma notarum* refer to musical notation rather than to the melody itself, it is interesting to compare these terms with Hucbald's *artificialis musica nota* and *notula*. While the latter signify distinct measured pitches within the gamut, the words *figura* and *forma* connote species, character, and nature, as well as shape and contour. That is, these *figurae notarum* in no sense signify the pitches themselves, but only suggest what might be called the unmeasured visual and audible characteristics of a melodic gesture.[317] Hucbald's *artificiales notulae*, produced within *harmonica institutio*, signify the certain knowledge of science; whereas the *figura notarum* of

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[317] In fact, *figura* is a Latin translation of *schema*, meaning, in the singular, the form or characteristic property of a thing, and in the plural, gestures (cf. Liddell and Scott, 787). See also *Thesaurus Linguae Latina* 6.1, 722-738.

Musica disciplina--Hucbald's *consuetudinariae notulae*, produced within *ars grammatica*--connote the inductive knowledge of experience.

CONCLUSION:

Artificiales notae vel consuetudinariae notae

In the five chapters of this monograph, we have examined Carolingian music theory treatises against the background of two intellectual traditions, the disciplines of grammar and of music or harmony. The point of focus has been the complex and puzzling issue of the written representation of musical sound; and we have seen the two traditions come together in *De harmonica institutione*. Indeed, Hucbald's proposal to combine *consuetudinariae notae*--systems of neumatic notation--with *artificiales notae*--Greek letter notation--is a somewhat awkward attempt to resolve a fundamental distinction between the two disciplines that is eloquently expressed by Regino of Prüm:

"Septem quippe sunt liberales disciplinae, quarum tres, id est, grammatica, Rhetorica et Dialectica, ratione et naturali sensu colliguntur, non oculo videntur, aut digito monstrantur, quia earum vis in sermone est, sermo autem, id est, humano locutio, audiri potest, videri non potest. Reliquae quatuor, id est, arithmetica,

geometrica, musica, et astrologia nequaquam animo ad liquidum percipiuntur, nisi oculo videantur, et digito demonstrentur."[318] (*Scriptores Ecclesiastici* 1.240ab)

Knowledge of the musical discipline, says Regino, is acquired with the eyes and demonstrated with the fingers.[319] In Aristotelian terminology, the propositions and theorems of *scientia* do not have to be heard to be understood. The essence of music is proportional measurement in motion, as Aurelian writes: "Sed earum vis et causa omnis in numeris est. Arithmetica quippe de illis constat numeris qui stabiles sunt et intelligibiles. . . Musica autem equae intelligibiles, mobiles tamen, et ad aliquid

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[318] There are, of course, seven liberal disciplines, of which three--grammar, rhetoric, and dialectic--are grouped together because of procedure and fundamental meaning. These disciplines are neither seen with the eyes nor demonstrated with the fingers, for their power lies in discourse, that is, in human speech. They can be heard, but they cannot be seen. The remaining four--arithmetic, geometry, music, and astrology--are not in any sense understood with certainty unless they are seen with the eyes and demonstrated with the fingers.

[319] Regino's phrase "digito demonstrentur" seems to refer to the gestures made by an instructor or orator. See, for example, Quintilian 1.10.35 (Butler 1.176).

pertinentes.[320] (Gushee 80-81) Thus, a measured pitch, or proportion, of the gamut can be signified completely and accurately by a written symbol, such as 2:3, *nete hyperbolaeon*, _/_, *F*, or G.

An intriguing extension of letter notation is that found in the *Enchiriadis* treatises, in which four basic written symbols signify both pitches of the gamut and tetrachordal relationships. As the *Musica enchiriadis* theorist writes: "Igitur quia, ut dictum est, eiusdem conditionis quattuor et quattuor natura statuit, ita et notae pene sunt eaedem. Solummodo tetracordorum differentia versis in varium caracteribus indicatur."[321] (Schmid 6) That is, the written mark both signifies a pitch and functions as an iconic representation of the relationships within groups of pitches.

A sung, intoned, or chanted text is an altogether different matter. In Regino's words, the force and meaning of the spoken cannot be seen; they must be heard. Writing about the NOEANE

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[320] But their entire strength and reason is in numbers. Arithmetic deals with numbers that are motionless and intelligible. . . Music deals with numbers that are equally intelligible, but are nevertheless in motion and are related to something.

[321] Because, as it has been said, nature establishes the successive groups of four pitches of the same configuration, similarly their written forms are almost the same. Only the change of tetrachord is indicated by rotated characters.

melodic formulas, for example, he refers to simultaneous comprehension by the ears and the mind: "Ad quod respondendum, quod omnino nullam recipiunt interpretationem; neque enim quicquam significant: sed ad hoc tantum a Graecis sunt reperta, ut per eorum diversos ac dissimiles sonos tonorum admiranda varietas aure simul et mente posset comprehendi."[322] (*Scriptores Ecclesiastici* 1.247)

Thus, the potential of spoken or sung text for a flawless and complete written representation, completely independent of the hearing, must remain unrealized. It is the difference between writing down a certainty, in the case of a measured musical tone, and recording a practice that includes the nuances, gestures, and accentuation, to mention only a few of the characteristics of the prosody of chanted text that are not included in the indication of levels of pitch, even were they the discrete and certain pitches of a melodic outline.[323]

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[322] He replied that they have no interpretation at all; nor do they signify anything. But so much has been learned from the Greeks about this, that through their diverse and dissimilar sounds the admirable variety of the tones can be comprehended simultaneously with the ears and the mind.

[323] Lévi-Strauss (1993) discusses the significance and representational characteristics of a musical score from a structuralist point of view. Cf., in particular, 153 ff. He writes

Hucbald, to be sure, admits that neumatic notations, although of an impractical variety, were not completely useless for indicating prosodic characteristics, such as rate of utterance, vocal quality, and accentuation, all ignored by the Greek letter notation for pitches. So he proposed a combination of the two systems in an attempt to solve the problem that Regino describes. Duchez (1983, 48) writes: "La note n'est signe du son que si musique et sons concrets restent dans les cadres de la théorie qui sous-tend la notation; le système de signes de la notation correspond au système de sons que décrit la théorie."[324] Her statement clearly supports the idea that the various systems of

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evocatively of the supernatural dimension of music, recalling both Regino's distinction between music and the trivial arts and Orphic mysticism (155): "A la différence du langage articulé, la musique n'a pas un vocabulaire connotant les données de l'expérience sensible. Il en résulte que l'univers auquel elle se réfère échappe à la figuration et qu'il a pour cette raison--mais au sens littéral cette fois--une réalité surnaturelle: fait de sons et d'accords qui n'existent pas dans la nature, et que les Anciens mettaient en rapport étroit avec les dieux."

[324] The written note is a sign for a pitch only if music and physical sound remain within the bounds of the theory that underlies the notation; the system of notational signs corresponds to the system of pitches that the theory describes.

letter and neumatic notations arose from two distinct traditions, harmony and grammar, given the complex intonational structure of spoken and chanted text.

Dwight Bolinger's recent book on intonation (1989) is relevant to this discussion. Bolinger identifies the elements of prosody as pause, rate, and intonation or pitch. He defines the latter to be all uses of fundamental pitch that reflect inner states, and asserts that within a language, intonational configurations are the same, prosodic differences being attributable to frequency and modulation (9). Intonation, in Bolinger's view, is by far the best indicator of meaning, presenting in evidence a number of reading errors that may occur when intonation is not heard (68-70). His results apply, of course, to the levels of intonation of speech, not of diastematic song, but as such can be applied to the intonation of Latin liturgical chant in the ninth century. If Bolinger is correct about the structure of intonation within a language and its singular degree of significance, then graphic neumatic notations (using the terminology of Levy 1987), such as the Paleofrankish, were an extremely good attempt to represent the prosodic characteristics of psalmody, at least.[325]

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[325] See Stevick (1967) for an account of scribal notation of prosodic features in a ninth-century manuscript of English provenance.

The truth of Regino's statement remains. That is, the problem of representing human discourse, including all its extratextual dimensions, accurately and completely in written form has no obvious solution, never mind the additional complications introduced when the discourse is chanted, or even sung. It is necessary to accept a compromise, a less than perfect representation of the act. And in defining an acceptable compromise, it is necessary to determine the essential element of a piece of music and represent that in writing, at the very least. Only in this way will successive performances, based on the written representation, be recognizable as performances of the same piece.[326]

It is clear that in Western music, in contrast to other traditions, pitch at some point became an essential element in that sense.[327] And it seems evident that in the Greek tradition it

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[326] Nattiez (1987, 98) summarizes Roman Ingarden on the nature of the written representation of a piece of music: "La partition constitue le 'schéma' de l'oeuvre qui garantit son identité au cours de l'histoire, même si de nombreux éléments qui ne sont pas fixés dans la partition 'jouent un rôle essentiel pour la forme esthétique de l'oeuvre,' et si le schéma définit un grand nombre de possibilités de realisation." See also Ingarden (1962).

[327] G. Becking (1973) writes, for example: "Un indigène africain joue un air sur sa flûte de bambou. Le musicien européen aura

had always been an essential element of melody. It appears, however, that liturgical chant in the Carolingian ninth century was a type of music based on an interaction of text and melodic movement whose performance was determined by a number of additional characteristics, such as timbre, gesture, fluctuating pitch, and even physical demeanor.

Thus, the task of representing liturgical chant in written form was difficult if not impossible; why, then, was it undertaken? In the introduction to this monograph, the interest of the Carolingians in the process of literacy was discussed. We now look at a few examples of textual evidence for specific reasons that Carolingian theorists, such as Hucbald and Aurelian, would

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beaucoup de mal à imiter fidèlement la mélodie exotique, mais quand il parvient enfin à déterminer les hauteurs des sons, il est persuadé de reproduire fidèlement le morceau de musique africain. Mais l'indigène n'est pas d'accord, car l'Européen n'a pas fait assez attention au timbre des sons. Alors, l'indigène rejoue la même air sur une autre flûte. L'Européen pense qu'il s'agit d'une autre mélodie, car les hauteurs des sons ont été complètement changées en raison de la construction du nouvel instrument, mais l'indigène jure que c'est le même air. La différence provient de ce que le plus important, pour l'indigène, c'est le timbre, alors que pour l'Européen, c'est la hauteur du son."

have had for involving liturgical chant in the general process of literacy.

In book 3 of *De nuptiis* Martianus Capella writes that Grammar comes forward to speak her piece carrying an elegant box, filled with the tools of her trade:

"Nam ex eodem scalprum primo vibranti demonstrabat acumine, quo dicebat circumcidi infantibus vitia posse linguarum, dehincque nigello quodam pulvere, qui ex favilla confectus vel sepia putaretur, illato per cannulas eadem resanari."[328] ([224], Willis 60)

Martianus is clearly referring to the normative function of the grammatical arts in general, and of writing in particular. Indeed, Johannes Scottus writes: "ACUMEN artis grammatice significat vel pennas."[329] (Lutz 76) Remigius is somewhat more generous in his commentary:

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[328] From the box she showed first a pruning knife that had a quivering point; she said that the errors of speech made by children could be trimmed away with this knife. Then these errors could be corrected by means of a certain black powder carried in reeds, which is thought to be made of ash or the ink of a cuttlefish.

[329] This signifies either acumen in the grammatical arts or penpoints.

"PER SCALPRUM significantur regulae subtiles et asperae quas Grammatica tradit, quibus ineruditus sermo corrigitur. . . . SEPIA genus est herbae ex cuius pulvere efficitur incaustum, quo ea quae pueri discunt solent scribere ut memoria retineant, nam et ipsarum litterarum formae ad grammaticam pertinent. ILLATO IPSO PULVERE PER CANNULAS Cannulae designant pennas sive harundinem quibus litterae formantur."[330] (Lutz 2.4)

Remigius, who, it will be remembered, was for a period of time Hucbald's associate at Reims, confirms the corrective functions of grammar and of writing and, in addition, associates writing with memory.

Describing his reasons for undertaking to improve a tonary, Regino refers to the corrective function of writing near the opening of his *De harmonic institutione*: "Cum frequenter in ecclesiae vestrae diocesibus chorus psallentium psalmorum melodiam confusis resonaret vocibus, propter dissonantiam toni, et pro huiuscemodi re vestram venerationem saepe commotam

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[330] PER SCALPRUM: The subtle and severe rules that Grammar hands down are signified, with which uneducated speech is corrected. SEPIA is a type of herb from whose dust the ink is made, by means of which boys usually write down the things they learn so that they remember them, for the shapes of these letters pertain to grammar. ILLATO IPSO PULVERE PER CANNULAS: CANNULAE means the pens or reeds with which letters are formed.

vidissem; arripui Antiphonarium, et eum a principio usque in finem per ordinem diligenter revolvens, antiphonas, quas in illo adnotatas reperi, propriis, ut reor, distribui tonis . . ."[331] (*Scriptores Ecclesiastici* 1.230ab)

Aurelian expresses a related thought in the specific context of the performance of chant at the opening of his nineteenth chapter: "Libet interea mentis oculum una cum acie stili ad modulationes inflectere versuum, et quae propria unicuique sit sonoritas toni in eius litteratura verbis pauculis indagare. . . . Et nisi aut in medio aut in fine provida inspectione aut perspicatione antea circumvallentur oculo, unius toni tenor in alterius permutabitur."[332] (Gushee 118)

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[331] Because frequently in the dioceses of your church the chorus of those singing the melody of the psalms sings out in disorganized voices, caused by the dissonance of the tone, and in the presence of this sort of thing I had often seen your reverence disturbed, I seized the Antiphonary and going over it diligently from beginning to end, I assigned to the [various] tones as I deemed proper the antiphons that I found written down in it.

[332] It is appropriate now to turn the mind's eye and the penpoint to the melodies of the verses and to investigate in a few words the proper sonority of each tone according to its lettering. . . And unless they are invested beforehand with a cautious visual

In other words, if melodic phrases are written down, they can be inspected before they are sung and error can be avoided. *Litteratura* is, of course, a reference to the notation by means of syllabic formularies described at length in the third chapter of this study.

In his chapter on rhetoric, Martianus expounds another aspect of writing, namely, its association with memory:

"Nam sicut id, quod conscribitur, cera continetur et litteris, sic quod memoriae mandatur, in locis tamquam in cera paginaque signatur; imaginibus vero quasi litteris rerum recordatio continetur. Sed, ut diximus, magnam exercitationem res laboremque conquirit, in qua illud observari compertum est solere, ut scribamus ipsi quae facile volumus retinere."[333] ([538-39], Willis 190)

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inspection or discrimination either at the middle or at the end, the tenor of one tone will be changed into that of another.

[333] For just as that which is written is held in wax and letters, so that which is assigned to the memory is imprinted in locations just like in wax or on the page. Indeed, the memory of things is contained in reminders just like letters. But, as we have said, memorization requires extensive practice and effort in which it is known that this is customarily observed, so that we write those things that we want to remember easily.

Isidore's text, describing letters as a source of memory and the silent voices of the absent was quoted in chapter 2, but is worth repeating: "Litterae autem sunt indices rerum, signa verborum, quibus tanta vis est, ut nobis dicta absentium sine voce loquantur. [Verba enim per oculos non per aures introducunt.] Usus litterarum repertus propter memoriam rerum. Nam ne oblivione fugiant, litteris alligantur. In tanta enim rerum varietate nec disci audiendo poterant omnia, nec memoria contineri."[334] (Lindsay 1.3)

Hucbald finds a similar link between memory and writing in his exposition of customary and scientific notations. Neumatic notations, despite their bewildering variety, can be of some assistance to the memory: "quamvis ad aliquid prosint,

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Remigius was of some help in the translation: "RES scilicet memoriae, CONQUIRIT id est quaerit, IN QUA scilicet exercitatione. DEINDE scilicet compertum est, HOC OBSERVARI SOLERE." (Lutz 2.104) [RES, namely, (of) memory, CONQUIRIT, that is, requires, IN QUA, namely, in practice. DEINDE, namely, is known, HOC OBSERVARI SOLERE.]

[334] An English translation of this passage was given in chapter 2 in the section on *littera*.

rememorationis subsidium minime potest contingere."[335] (*Scriptores Ecclesiastici* 1.117b)[336]

A third aspect of a written text that might have appealed to the notators of Carolingian chant was its potential utility in the dissemination of necessary information.[337] Hucbald hints at this idea, writing: "Sic per has omne melum annotatum, etiam sine docente, postquam semel cognitae fuerint, valeat decantari."[338] (*Scriptores Ecclesiastici* 1.117b) It is at least possible that eliminating the need for a teacher can result in a wider access to

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[335] Although they are useful for something; a minimal assistance to memory can result.

[336] This particular function of musical notation continues to be debated. Siohan (1962, 22) writes: "Le signe musical, élément graphique, n'est pas la musique, pas même son reflet, mais uniquement un aide-mémoire." Nattiez (1987, 98) takes a somewhat broader view of musical notation: "Il faut en effet reconnaître que l'écriture permet une manipulation des unités musicales élémentaires que la seule mémoire ne permet pas."

[337] Baüml (1990) mentions the dissemination of information as an aspect of literacy in general that could well be applied to music literacy.

[338] So that every melody notated with these, after they have been learned for once and for all, is capable of being sung, even without a teacher.

information, if written documents can be produced in sufficient numbers. On the same theme, Regino of Prüm writes in his *Chronicon* that things worth recording were to be learned *in chronicorum libris* or *ex relatione patrum.* (Nelson 265) By implication, these were equally effective sources of information.

Finally, Andreas Ekenberg's study of the functions of liturgical song and singing sheds some light on the subject of music literacy. After a thorough investigation of the writings of three Carolingian authors (Hrabanus Maurus, d. 856; Aurelian of Réomé; and Amalarius of Metz, d. ca. 850), Ekenberg summarzies in his abstract (iv) three propositions derived from his readings of these texts:

"In the first place, the Carolingian authors state (in an often vivid metaphorical language), that the role of chant is to make men more receptive to the texts in the liturgy and to the mystery which is at the heart of the celebration, as well as to help them interiorize these texts and this mystery. Secondly, song is an eschatological sign--the Church sings in communion with the angelic hosts. Finally, chant--to be authentic--is to express the unanimity of Christians; and it is to be in accordance with devotion of the heart to God, and confirmed in a life pleasing to Him. The last-mentioned point is strongly emphasized by the sources."

We have previously touched on Ekenberg's first two points, mentioning the Christian interpretation of the Greek doctrine of the ethos of music and Aurelian's reference to the singing of angelic hosts.[339] Ekenberg's third point supports several of the conclusions that McKitterick sets out in her book on Carolingian reforms and the Frankish church (1977). Stipulating that the Frankish kings were more important to the replacement of pagan rites by Christian than to the consolidation of the Gallican and Roman rites, accomplished by individual members of the clergy, McKitterick argues that the liturgy was not merely a vehicle for worship and instruction, but a symbol of the unity of Frankish society.

Combining Ekenberg's third proposition with McKitterick's fourfold description of the Carolingian reform program--eradication of paganism, promotion of unity, proclamation of Christianity, and instruction of the people--and accepting Nelson's unequivocal statement that "a crucial feature of the cultural context of Carolingian literacy was the church's commitment to the practice of the written word," the policy of supporting the appearance and fact of Christian unity can be seen to bear directly on the process of representing chant in written form. Thus, it is reasonable to conclude that the practice of notating chant was at

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[339] It is worth mentioning that Wallach (1959, 153) claims that Alcuin instituted at Aachen the practice of singing the Credo.

least in part an application of the general processes of reform and literacy to an extremely important component of the liturgy. The importance of the written word to the Carolingian church is eloquently expressed by Hrabanus Maurus:

"Lex pia cumque dei latum dominans regit orbem,
Quam sanctum est legem scribere namque dei!
Est pius ille labor, merito cui non valet alter
Aequiparare, manus quem faciet hominis.
Nam digiti scripto laetantur, lumina visu,
Mens volvet sensu mystica verba dei.
Nullum opus exsurgit, quod non annosa vetustas
Expugnet, quod non vertat iniqua dies:
Grammata sola carent fato, mortemque repellunt,
Praeterita renovant grammata sola biblis.
Grammata nempe dei digitus sulcabat in apta
Rupe, suo legem cum dederat populo,
Sunt, fuerant, mundo venient quae forte futura,
Grammata haec monstrant famine cuncta suo."[340] (Godman 1985, 248)

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340 As God's kindly law rules in absolute majesty over the wide world,
it is an exceedingly holy task to copy the law of God.
This activity is a pious one, unequalled in merit
by any other which men's hands can perform.

* * *

Sed iam prolixus sermo finem praestolatur.

Regino of Prüm

* * *

For the fingers rejoice in writing, the eyes in seeing,

and the mind at examining the meaning of God's mystical words.

No work sees the light which hoary old age

does not destroy or wicked time overturn:

only letters are immortal and ward off death,

only letters in books bring the past to life.

Indeed God's hand carved letters on the rock

that pleased Him when He gave His law to the people,

and these letters reveal everything in the world that is,

has been, or may chance to come in the future. (Translation by Godman, 249)

LIST OF WORKS CITED

Collections of Primary Sources

Grammatici Graeci. 8 vols. Leipzig: Teubner, 1878-1910.

Grammatici Latini. Ed. H. Keil. 7 vols. Leipzig: B.G. Teubner, 1855-80.

Vol. 1. Charisius. Diomedes. *Excerpta ex libris Charisii et Diomedis partim ab aliis edita partim nunc primum e libris manu scriptis expressa.*

Vol. 2-3. Priscian. *Prisciani institutiones ex recensione Martini Hertzii. Eiusdem scripta minora.*

Vol. 4. Probus. Donatus. Servius. *Probi Donati Servii qui feruntur De Arte Grammatica Libri.*

Vol. 5. Cledonius. Pompeius. Consentius. *Artium scriptores minores.*

Patrologiae cursus completus sive bibliotheca universalis . . . omnium ss. patrum. Series secunda in qua produent patres . . . ecclesiae latinae. Ed. J. P. Migne. 221 vols. Paris: 1844-55, 1862-64.

Scriptores Ecclesiastici de Musica . Ed. M. Gerbert. 3 vols. St. Blaise, 1784.

Stoicorum Veterum Fragmenta. Ed. J. von Arnim. 6 vols. Leipzig: Teubner, 1924.

Individual Primary Sources

Alia Musica. Ed. Jacques Chailley. Paris: CNRS, 1965.

Alcuin. *Epistolae. Monumenta Germaniae historica.* Vol. 5, sec. 4. Berlin, 1898.

Amalarius of Metz. *Amalarii episcopi opera liturgica omnia.* Ed. J. Hansens. Studi e Testi, vol. 138-140. Rome: Biblioteca Apostolica Vaticana,1948-50.

Apollonius Dyscolis. *Scripta minora.* Ed. R. Schneider. Leipzig: Teubner, 1878.

Aristides Quintilianus. *De musica.* Ed. R. P. Winnington-Ingram. Leipzig: Teubner, 1963.

---. *On Music.* Trans. T. Mathiesen. New Haven: Yale University Press, 1983.

Aristotle. *De interpretatione. Translatio Boethii.* Ed. L. Minio-Paluello. Bruges-Paris: Desclée de Brouwer, 1965.

---. *The Organon.* Trans. H. P. Cooke and H. Tredennick. Cambridge: Harvard University Press, 1938.

---. *Poétique.* Ed. R. Dupont-Roc and J. Lallot. Editions du Seuil: Paris, 1980.

---. *Traité de l'ame.* Ed. and trans. G. Rodier. Paris: Ernest Leroux, 1900.

Aristoxenus. *Elementa harmonica.* Ed. R. da Rios. Rome: Poligrafica publica, 1954.

Augustine. *De Dialectica.* Ed. D. Jackson. Dordrecht/Boston: D. Reidel Publishing Co., 1975.

---. *De Doctrina Christiana.* Ed. W.M. Green. Vindobonae: Hoelder-Pichler-Tempsky, 1963.

---. *De Musica.* Ed. G. Marzi. Florence: Sansoni, 1969.

Aurelian of Réomé. *Musica Disciplina.* Ed. L. Gushee. Corpus Scriptorum de Musica, vol. 21. Rome: American Institute of Musicology, 1975.

Boethius. *Commentarii in L. Aristoteli Peri Hermeneias.* Ed. C. Meiser. 2 vols. Leipzig: B.G. Teubner, 1877 and 1880.

---. *De institutione arithmetica, De institutione musica, Geometria.* Ed. G. Friedlein. Leipzig: B.G. Teubner, 1867.

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.

Cassiodorus. *Cassiodori Senatoris Institutiones.* Ed. R.A.B. Mynors. Oxford: Clarendon Press, 1937.

Censorinus. *De natali liber.* Ed. O. Jahn. Hildesheim: G. Olms, 1965.

Commemoratio brevis. De tonis et salmis modulandis. Ed. and trans. T. Bailey. Ottawa: University of Ottawa Press, 1979.

---. Ed. H. Schmid. In *Musica and Scolica Enchiriadis.* Munich: Verlag der Bayerischen Akademie der Wissenschaften, 1981.

Donatus ortigraphus. *Ars grammatica.* Ed. E.J. Chittenden. Turnhout: Brepols, 1982.

Dionysius Thrax. *Ars grammatica.* Ed. G. Uhlig. Leipzig: Teubner, 1884.

---. *Le grammaire de Denys le Thrace.* Ed. and trans. J. Lallot. Paris: CNRS, 1989.

Einhard. *Vita Karoli Magni.* Ed. O. Holder-Egger. Hanover and Leipzig: Hahn, 1911.

Guido of Arezzo. *Micrologus.* Ed. J. S. van Waesberghe. Corpus Scriptorum de Musica, vol. 4. Nijmegen, Netherlands: American Institute of Musicology, 1955.

Hrabanus Maurus. *De institutione clericorum libri tres.* Ed. A. Knöpfler. Munich 1900.

Isidore. *Etymologiae: Isidori Hispalensis episcopi Etymologiarum sive originum libri XX.* Ed. W.M. Lindsay. 2 vols. Oxford: Oxford University Press, 1911.

Johannes Scottus. *Johannis Scotti Annotationes in Marcianum.* Ed. C. Lutz. Cambridge, Mass.: Medieval Academy of America, 1939.

Macrobius, A.T. *Commentarius in Somnium Scipionis.* Ed. J. Willis. Leipzig: B.G. Teubner, 1963.

---. *Saturnalia.* Ed. J. Willis. Leipzig: B.G. Teubner: 1963.

Martianus Capella. *De Nuptiis Philologiae et Mercurii.* Ed. A. Dick. Stuttgart: B.G. Teubner Verlagsgesellschaft, 1969.

---. *De Nuptiis Philologiae et Mercurii.* Ed. J. Willis. Leipzig: B.G. Teubner Verlagsgesellschaft, 1983.

Musica et Scolica Enchiriadis. Ed. H. Schmid. Munich: Bayerische Akademie der Wissenschaften, 1981.

Notker. *Martianus Capella,* De nuptiis Philologiae et Mercurii. Ed. J.C. King. Tuebingen: Max Niemeyer, 1979.

Paulus Diaconus. *Incipit ars Donati quam Paulus Diaconus exposuit.* Ed. A. Amelli. Monte Cassino, 1899.

---. *Expositio artis Donati.* Ed. F. B. Giolito. Genoa, 1990.

Plato. *The Dialogues of Plato.* Trans. B. Jowett. (1871) London: Oxford University Press, 1924.

---. *Theaetetus and Sophist.* Trans. H. N. Fowler. New York: G. P. Putnam's Sons, 1921.

---. *Timaeus.* Ed. and trans. R.D. Archer-Hind. London: Macmillan and Co., 1888.

---. *Timaeus and Critias.* Trans. D. Lee. New York: Penguin Books, 1965.

Quintilian, F. *Institutio Oratoria.* Ed. G.P. Gcold. Cambridge: Harvard University Press, 1920.

Remigius. *Remigii Autissiodorensis in artem Donati minorem Commentum.* Ed. W. Fox. Lipzig, 1902.

---. *Commentum in Martianum Capellam.* Ed. C.E. Lutz. 2 vols. Leiden: E.J. Brill, 1962.

---. *In Artem Donati minorem commentum.* Ed. W. Fox. Leipzig: B.G. Teubner, 1902.

Marius Victorinus. *Marii Victorini Ars grammatica.* Ed. I. Mariotti. Felice le Monnier: Florence, 1967.

Secondary Sources

Alberi, M. "Alcuin, the Aachen Palace School of Charlemagne, and the Carolingian Renaissance." *History Today* 39 (1989): 34-41.

Apel, W. *Gregorian Chant.* Bloomington: University of Indiana Press, 1958.

Arbusow, L. *Colores rhetorici.* Göttingen: Vandenhoeck and Ruprecht, 1963.

Atkinson, C. "*De accentibus toni oritur nota quae dicitur neuma*: Prosodic Accents, the Accent Theory, and the Paleofrankish Script." In *From Rome to the Passing of the Gothic: Essays in Honor of David Hughes.* Ed. G. Boone. Isham Library Papers 4. Cambridge: Harvard University Press, forthcoming.

Bailey, T. *The Intonation Formulas of Western Chant.* Toronto: Pontifical Institute of Medieval Studies, 1974.

Banniard, M. *Genèse culturelle de l'Europe, Ve - VIIIe siècle.* Paris: Editions du Seuil, 1989.

---. *Viva voce, communication écrite et communication orale du IVe au IXe siècle en Occident latin.* Paris: CNRS, 1992.

Bäuml, F. H. "The Beginnings of Literacy in the East Frankish Kingdoms." Talk presented at California State University, Northridge, 8 December 1990, under the auspices of the CSUN Center for Medieval Studies.

---. "Varieties and Consequences of Medieval Literacy and Illiteracy." *Speculum* 55 (1980): 237-65.

Becking, G. "Musicologie et linguistique." In *Questions de poétique.* Ed. R. Jakobson. Paris: Editions du Seuil, 1973.

Bergson, H. *Essai sur les données immédiates de la conscience.* Paris, 1928.

Bernhard, M. *Studien zur Epistola de armonica institutione des Regino von Prüm.* Munich: Bayerischen Akademie der Wissenschaften, 1978.

---. *Wortkonkordanz zu Anicius Manlius Severinus Boethius* De Institutione Musica. Munich: Verlage der Bayerischen Akademie der Wissenschaften, 1979.

Bielitz, Mathias. *Musik und Grammatik: Studien zur mittelalterlichen Musiktheorie.* Munich-Salzburg: Musikverlag Emil Katzbichler, 1977.

Bischoff, B. "Die europäische Verbreitung der Werke Isidors von Sevilla." In*Mittelalterliche Studien.* Stuttgart, 1981.

Blaise, A. *Dictionnaire latin-français des auteurs chrétiens.* Strasbourg, 1954.

Bolinger, D. *Intonation and Its Uses.* London: Edward Arnold, 1989.

Bullough, D. A. *Carolingian Renewal: Sources and Heritage.* Manchester: University of Manchester Press, 1991.

Chadwick, H. *Boethius: The Consolations of Music, Logic, Theology and Philosophy.* Oxford: Oxford University Press, 1981.

Chailley, J. *La musique grecque antique.* Paris, 1979.

Chartier, Y. "Hucbald de Saint-Amand et la notation musicale." In *Musicologie Mediévale: Notations et Sequences.* Ed. M. Huglo. Paris: Champion, 1987.

---. *La musica d'Hucbald de Saint-Amand.* Ph.D. dissertation, Paris-Sorbonne, 1973.

Chase, W. J. *The Ars Minor of Donatus, for 1000 Years the Leading Textbook of Grammar.* Madison: University of Wisconsin Press, 1926.

Chélini, J. *L'Aube du Moyen Age.* Paris: Picard Editeur, 1991.

Corbin, S. *Die Neumen.* Cologne, 1977.

Cristante. L. *Martiani Capellae de Nuptiis Philologiae et Mercurii, Liber IX.* Padua: Antenore, 1987.

De Rijk, L. M. "On the Chronology of Boethius' Works on Logic." *Vivarium* 2 (1964): 1-49; 125-62.

Derrida, J. *De la Grammatologie.* Paris: Editions de Minuit, 1967.

Dictionary of the Middle Ages. Ed. J. R. Strauss. 13 volumes. New York: Charles Scribner's Sons, 1982.

Droz, G. *Les mythes platoniciens.* Paris: Editions du Seuil, 1992.

Duchez, M-E. "Des neumes à la portée." *Revue de musique des universités canadiennes* 4 (1983): 22-65.

---. "Description grammaticale et description arithmétique des phénomènes musicaux: le tournant du IXe siècle." In *Sprache und Erkenntnis im Mittelalter.* Berlin and New York: Walter de Gruyter, 1981.

---. "La représentation spatio-verticale du caractère musical grave-aigu et l'élaboration de la notion de hauteur de son dans la conscience musicale occidentale." *Acta Musicologica* 51 (1979): 54-73.

Egger, E. *Apollonius Dyscole: Essai sur l'histoire des théories grammaticales dans l'antiquité.* Paris, 1854. Rptd. Hildesheim: Georg Olms Verlag, 1987.

Ekenberg, A. *Cur Cantatur? Die Funktionen des liturgischen Gesanges nach den Autoren der Karolingerzeit.* Stockholm: Almqvist and Wiksell International, 1987.

Encyclopedia of Philosophy. Ed. P. Edwards. 8 vols. New York: Macmillan, 1972.

Fontaine, J. *Isidore de Séville et la culture classique dans l'Espagne wisigothique.* 3 vols. 1959. 2nd edition. Paris: Etudes Augustiniennes, 1983.

Ganshof, F.L. *The Carolingians and the Frankish Monarchy.* Trans. J. Sondheimer. London: Longman, 1971.

Ganz, D. *Corbie in the Carolingian Renaissance.* Sigmaringen: Thorbecke, 1990.

---. "The Preconditions for Caroline Minuscule." *Viator* 18 (1987): 23-44.

Gibson, M., ed. *Boethius: His Life, Thoughts, and Influence.* Oxford: Basil Blackwell, 1981.

---. "Priscian: *Institutiones grammaticae*: a handlist of manuscripts." *Scriptorium* 26 (1972): 105-24.

Gilson, E. *La philosophie au moyen âge.* Paris: Payot, 1962.

Godman, P. *Poetry of the Carolingian Renaissance.* Norman: University of Oklahoma Press, 1985.

---. *Poets and Emperors: Frankish Politics and Carolingian Poetry.* Oxford: Clarendon Press, 1987.

Gushee, L. "Aurelian of Réôme." In *New Grove Dictionary of Music and Musicians.* Ed. S. Sadie. 20 vols. London: Macmillan, 1980. 1:702-704.

Hafner, W. *Das Basiliuskommentar zur Regula S. Benedicti.* In*Beiträge zure Geschichte des alten Mönchtums und des Benediktinerordens* 23 (1959).

Halm, K., ed. *Rhetores latini minores.* Leipzig: Teubner, 1863.

Halphen, L. *Charlemagne et l'empire carolingien.* Paris: Editions Albin Michel, 1968.

Handschin, J. "Eine alte Neumenschrift." *Acta Musicologica* 22 (1950): 69-97.

Harris, Roy. *The Origins of Writing.* London: Gerald Duckworth and Co., 1986.

Haug, A. *Gesungene und schriftlich dargestellte Sequenz.* Neuhausen-Stuttgart: Hänssler-Verlag, 1987.

Hildebrandt, M. M. *The External School in Carolingian Society.* Leiden, New York, Cologne: E. J. Brill, 1992.

Hiley, D. "Notation, III. History of Western Notation to c1260." In *New Grove Dictionary of Music and Musicians.* Ed. S. Sadie. 20 vols. London: Macmillan, 1980. 13: 128-144.

Holtz, L. *Donat et la tradition de l'enseignement grammatical,* Paris, 1981.

---. "Le retour aux sources de la latinité du milieu du VIIIe siècle à l'an mil." *Bulletin de l'association Guillaume Budé* 21 (1981): 369-88.

---. "Tradition et diffusion de l'oeuvre grammaticale de Pompée, commentateur de Donat." *Revue de philologie* 45 (1971): 48-83.

Hoppin, R. *Medieval Music.* New York and London: W. W. Norton and Co., 1978.

Hucbald, Guido, and John on Music. Three Medieval Treatises. Trans. W. Babb. Ed. C. Palisca. New Haven and London: Yale University Press, 1978.

Hucke, H. "Toward a New Historical View of Gregorian Chant." *Journal of the American Musicological Society* 33 (1980): 437-67.

Huglo, M. "Bilan de 50 années de recherches (1939-1989) sur les notations musicales de 850 à 1300." *Acta musicologica* 62 (1990):224-259.

---. "Introduction of Byzantine Intonation Formulae into Western Practice." In *Studies in Eastern Chant* 3. Oxford: Oxford University Press, 1971.

---. *Les livres de chant liturgique.* Turnhout, Belgium: Brepols, 1988.

---., ed. *Musicologie médiévale: Notations et Séquences.* Paris: Centre National de la Recherche Scientifique, 1987.

---. "La notation wisigothique est-elle plus ancienne que les autres notations européenes?" *España en la Música de Occidente.* 1 (1987): 19-26.

---. "The Reception of Calcidius and of the 'Commentaries' of Macrobius from the Carolingian Epoch." *Scriptorium* 44 (1990): 3-20.

---. *Les Tonaires: Inventaire, Analyse, Comparaison.* Paris: Societé Française de Musicologie, 1971.

---. "Tradition orale et tradition écrite dans la transmission des mélodies grégoriennes." *Studien zur Tradition in der Musik.* Ed. H.H. Eggebrecht and M. Lütolf. Munich: Musikverlag Emil Katzbichler, 1973. pp. 31-42.

Ingarden, R. "Das Musikwerk." *Untersuchungen zur Ontologie der Kunst, Musik, Architektur, Film.* Tübingen: Niemeyer, 1962. Fr. trans. *Qu'est-ce que l'oeuvre musicale?* Paris: Christian Bourgois, 1987.

Jakobson, R. "Linguistics and Poetics." In *The Structuralists from Marx to Lévi-Strauss.* Ed. R. and F. DeGeorge. Garden City, New York: Anchor Books, 1972.

Jeffery, P. *Re-envisioning Past Musical Cultures: Ethnomusicology in the Study of Gregorian Chant.* Chicago: University of Chicago Press, 1992.

Jespersen, O. *The Philosophy of Grammar.* London, 1924.

Jourdan-Hemmerdinger, D. "Fonction du chant dans les discours et lectures publics." In*Aspects de la Musique Liturgique au Moyen Age.* Ed. Christian Meyer. Paris: Editions Creaphis, 1991.

Kaczynski, B.M. *Greek in the Carolingian Age: The St. Gall Manuscripts.* Cambridge: The Medieval Academy of America, 1988.

Klibansky, R. *The Continuity of the Platonic Tradition during the Middle Ages.* Millwood, New York: Kraus International Publications, 1982.

Laistner, M.L.W. *Thought and Letters in Western Europe A.D. 500 to 900.* 2nd ed. Ithaca, 1957.

Latin Script and Letters A. D. 400-900. Ed. J. J. O'Meara and B. Naumann. Leiden: E. J. Brill, 1976.

Law, V. *The Insular Latin Grammarians.* Suffolk, Eng.: Boydell Press, 1982. Rpt. 1987.

Lebecq, S. *Les Origines franques, Ve-IXe siècle.* Paris: Editions du Seuil, 1990.

Lelong, C. *La Vie quotidienne en Gaule à l'epoque mérovingienne.* Paris: Hachette, 1963.

Leonardi, C. *I codici de Marziano Capella.* Marsilio: Padua, 1962.

Le Roux, M. P. *The 'De harmonica institutione' and 'Tonarius' of Regino of Prüm.* Ann Arbor: University of Michigan Press, 1970.

Lesne, E. "Les livres, scriptoria et bibliothèques du commencement du VIIIe à la fin du XIe siècles." In *Histoire de la propriété en France* IV. Lille, 1938.

Levy, K. "Charlemagne's Archetype of Gregorian Chant." *Journal of the American Musicological Society* 40 (1987): 1-30.

--- and L. Treitler. Communications, *Journal of the American Musicological Society* 41 (1988): 566-78.

---. "On the Origin of Neumes." *Early Music History* 7 (1987): 59-90.

---. "Toledo, Rome and the Legacy of Gaul." *Early Music History* 4 (1984): 49-99.

Lewis, C. and C. Short, eds. *A Latin Dictionary.* Oxford: Clarendon Press, 1989.

Liddle, H. G. and R. S. Scott, eds. *A Greek-English Lexicon.* 1843. Rev. H. S. Jones. 9th ed. Oxford: Clarendon Press, 1940.

Lippman, E. A. *Music and Space, A study in the philosophy of music.* New York: Columbia University Press, 1952.

Lowe, E. A. *Codices Latini Antiquiores: A Palaeographical Guide to Latin Manuscripts Prior to the Ninth Century.* 11 vols. and supplement. Oxford: Oxford University Press, 1934-72.

Maddox, R. P. *Terminology in Early Medieval Music Treatises ca. 400-1100 A.D.: A Study of Changes in Musical Thought as Evidenced by the Use of Selected Basic Terms.* Ph.D. dissertation, UCLA, 1987.

Magee, J. *Boethius on Signification and Mind.* Leiden: E.J. Brill, 1989.

Marrou, H-I. *Décadence romaine ou Antiquité tardive?* Paris: Editions du Seuil, 1977.

---. *Saint Augustin et la Fin de la culture antique.* Paris: De Boccard, 1958.

Mathiesen, T. "Problems of Terminology in Ancient Greek Theory: 'APMONIA.'" In *Festival Essays for Pauline Alderman.* Ed. B. L. Karson. Provo, Utah: Brigham Young University Press, 1976.

McKitterick, R. *The Carolingians and the Written Word.* Cambridge: Cambridge University Press, 1989.

---. *The Frankish Church and the Carolingian Reforms, 789-895.* London: Royal Historical Society, 1977.

---. *The Frankish Kingdoms under the Carolingians, 751-987.* London and New York: Longman, 1983.

Morrison, K.F. *The Two Kingdoms: Ecclesiology in Carolingian Political Thought.* Princeton: Princeton University Press, 1964.

Nahm, M. C., ed. *Selections from Early Greek Philosophy.* New York: Appleton-Century-Crofts, Inc., 1947.

Nattiez, J-J. *Musicologie générale et sémiologie.* Paris: Christian Bourgois, 1987.

Nees, L. *A Tainted Mantle: Hercules and the Classical Tradition at the Carolingian Court.* Philadelphia: University of Pennsylvania Press, 1991.

Nelson, J. "Literacy in Carolingian government." In *The Uses of Literacy in Early Medieval Europe.* Ed. R. McKitterick. Cambridge: Cambridge University Press, 1990.

Nichols, S. G. "The New Medievalism: Tradition and Discontinuity in Medieval Culture." In*The New Medievalism*, ed. M. S. Brownlee,

K. Brownlee, and S. G. Nichols. Baltimore: Johns Hopkins University Press, 1991.

Nortier, G. *Les Bibliothèques Médiévales des Abbayes Bénédictines de Normandie.* Paris: Bibliothèque d'Histoire et d'archéologie chrétiennes, 1971.

O'Donnell, J.R. "Alcuin's *Priscian.*" In *Latin Script and Letters A.D. 400-900.* Ed. J.J. O'Meara and B. Naumann. Leiden: E. J. Brill, 1976.

Packard Humanities Institute CD-ROM 5.3: Index of 200 Classical Authors. 1993.

Parkes, M. B. *Pause and Effect: An Introduction to the History of Punctuation in the West.* Berkeley: University of California Press, 1993.

Phillips, N. Musica *and* Scolica Enchiriadis: *The Literary, Theoretical, and Musical Sources.* Diss. New York University, 1984. Ann Arbor: UMI, 1984. 85505525.

Quain, A. "The medieval accessus ad auctores." *Traditio* (1945): 215-264.

Reynold, N., ed. *Texts and Transmission.* Oxford: Oxford University Press, 1985.

Riché, P. *Ecoles et enseignement dans le haut Moyen Age.* Paris: Picard, 1989.

---. *Education et culture dans l'Occident barbare, VIe-VIIIe siècle.* Paris: Editions du Seuil, 1973.

---. *Instruction et vie religieuse dans le haut Moyen Age.* London: Variorum Reprints, 1981.

---. *Vie quotidienne dans l'empire carolingien.* Paris: Hachette, 1973.

Richter, M. "À quelle époque a-t-on cessé de parler latin? A propos d'une question mal posée." *Annales Economies, Sociétiés, Civilisations* 38 (1983): 439-448.

---. "Die Sprachpolitik Karls des Grossen." *Sprachwissenschaft* 7 (1982):412-37.

---. "Towards a Methodology of Historical Sociolinguistics." *Folia Linguistica Historica* 6/1 (1985): 41-61.

Riou, Y. "Codicology and Neumatic Notation." *Cahiers de Civilisation Médiévale* 33 (1990): 255-80, 381-96.

Robins, R.H. *Ancient and Medieval Grammatical Theory in Europe.* London: G. Bell and Sons, Ltd., 1951.

Roger, M. *L'enseignement des lettres classiques d'Ausone à Alcuin.* Paris, 1905.

Rosier, I., ed. *L'Héritage des grammairiens latins de l'antiquité aux lumières.* Paris: Société pour l'Information Grammaticale, 1988.

Russell, B. *A History of Western Philosophy.* New York: Simon and Schuster, 1945.

Schaeffer, P. *Traité des objets musicaux.* Paris, 1966.

Schuler, M. "Die Musik an den Hoefen der Karolinger." *Archiv fuer Musikwissenschaft* 27 (1970): 23-40.

Seeger, C. "Prescriptive and Descriptive Music Writing." In *Studies in Musicology 1935-1975.* Berkeley: University of California Press, 1977.

Seznec, J. *The Survival of the Pagan Gods.* Trans. B.F. Sessions. New York: Pantheon Books, 1953.

Shanzer, D. *A Philosophical and Literary Commentary on Martianus Capella's* "De Nuptiis Philologiae et Mercurii Book 1'". Berkeley: University of California Press, 1986.

Siohan, R. "La musique comme signe." *Colloque sur le signe et les systèmes de signes*, Royaumont, 12-15 avril 1962, E.P.H.E., sec. 6, IX.

Stahl, W.H. and R. Johnson with E.L. Burge. *Martianus Capella and the Seven Liberal Arts.* 2 vols. New York: Columbia University Press, 1977.

Stevick, R. D. "Scribal Notation of Prosodic Features in The Parker Chronicle, Anno 894 [893]." *Journal of English Linguistics* 1 (1967): 57-66.

Stock, B. *The Implications of Literacy.* Princeton: Princeton University Press, 1983.

Sullivan, B. "Interpretive Models of Guido of Arezzo's *Micrologus.*" *Comitatus* 20 (1989): 20-42.

Sullivan, R. E. "The Carolingian Age: Reflections on Its Place in the History of the Middle Ages." *Speculum* 64 (1989): 267-306.

Theis, L. *L'héritage des Charles (de la mort de Charlemagne aux environs de l'an mil).* Paris: Editions du Seuil, 1990.

Thesaurus Linguae Latinae. Leipzig: B. G. Teubner, 1900-.

Treitler, L. "The Beginnings of Music-Writing in the West: Historical and Semiotic Aspects." *Language and Communication* 9 (1989): 193-211.

---. "The Early History of Music Writing in the West." *Journal of the American Musicological Society* 35 (1982): 237-79.

---. "Homer and Gregory: The Transmission of Epic Poetry and Plainchant." *The Musical Quarterly* 60 (1974): 333-72.

---. "Oral, Written, and Literate Process in the Transmission of Medieval Music." *Speculum* 56 (1981): 471-91.

---. "Paleography and Semiotics." In *Musicologie Médievale: Notations et Sequences.* Ed. M. Huglo. Paris: Champion, 1987.

---. "Reading and singing: on the genesis of occidental music-writing." *Early Music History* 4 (1984): 135-208.

---. "The 'Unwritten' and 'Written' Transmission of Medieval Chant and the Start-up of Musical Notation." *Journal of Musicology* 10 (1992):131-191.

Veyne, P. *Les Grecs ont-ils cru à leur mythes?* Paris: Editions Gallimard, 1990.

Wagner, P. "Un piccolo trattato sul canto ecclesiastico in un manuscritto del secolo X-XI." *Rassegna gregoriana* 3 (1940): 481-84.

Wallach, L. *Alcuin and Charlemagne: Studies in Carolingian History and Literature.* Ithaca: Cornell University Press, 1959.

Weakland, R. "Hucbald as Musician and Theorist." *Musical Quarterly* 42 (Jan. 1956): 66-84.

Wieland, G. "Alcuin's Ambiguous Attitude toward the Classics." *Journal of Medieval Latin* 2 (1992):84-95.

Winden, J. C. M. van. *Calcidius on Matter.* Leiden: E. J. Brill, 1959.

Wingell, R. "Hucbald of St. Amand and Carolingian Music Theory." In *Festival Essays for Pauline Alderman.* Ed. B. L. Karson. Provo, Utah: Brigham Young University Press, 1976.

Wolff, P. *l'Eveil intellectuel de l'Europe.* Paris: Editions du Seuil, 1971.

Wright, R. *Late Latin and Early Romance in Spain and Carolingian France.* Liverpool: F. Cairns, 1982.

---. "Speaking, Reading and Writing Late Latin and Early Romance." *Neophilogus* 60 (1976): 178-89.

Zuckerkandl, V. *Sound and Symbol.* Trans. W. R. Trask. New York: Pantheon Books, 1956.