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Guido of Arezzo and His Influence on Music Learning

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Imagine, for a moment, that you are a young choirboy in an Italian monastery. It is the year AD 900, and your choirmaster has just announced the performance of a new chant for an upcoming feast day. You watch with anticipation as he takes out the monochord, a single-stringed wooden instrument, and listen eagerly as he performs the new chant he is about to teach you. As you begin the process of learning the chant, you carefully imitate each interval of the melody as you hear it played on the monochord, relying only on your ear to guide you. The days pass slowly as you painstakingly learn the new music, continually reviewing the intervals learned on the previous day and attempting to match exactly the pitches of new notes as they are played on the monochord. After weeks of this time-consuming and arduous process, you and your fellow singers are finally ready to perform the chant on the feast day. As you sing at the mass, you wonder if you will remember the chant when called upon to perform it in another year or two. You question if the scant notation in the tonary will sufficiently remind you of the tune, or if you will need to relearn the chant in a few years' time. You ask yourself if all the hard work and time of the past few weeks will have been wasted, and, vaguely, you wonder if there is a better way to teach and learn music.

This better method of teaching and learning music became established through the work of medieval music scholar and teacher Guido of Arezzo. As one of the most influential music theorists and pedagogues of the Middle Ages, Guido revolutionized the music education methods of his time. Through his developments in the hexachord system, solmization syllables, and music notation, his work set the course for our modern system of music. By building upon the theories of those before him, Guido expanded and reshaped the existing musical system, transforming the way music was taught and, ultimately, establishing his ideas as an essential part of our modern musical heritage.

Born in the late 990s in Italy, Guido began his education and musical career as a Benedictine monk in the abbey of Pomposa near Ferrara, Italy. Although many details of his life are lost to history, it is known that, by the first part of the eleventh century, he had “attained a high reputation for his musical learning.”¹ Guido moved to the city of Arezzo around the year 1025, where he was given the

¹ W. S. Rockstro, “The Great Musical Reformers. II. Guido d’Arezzo,” *The Musical Times and Singing Class Circular* 30 no. 552 (Feb. 1, 1889): 76, <http://www.jstor.org/stable/3359955> (accessed September 2, 2011).

task of training the singers in the city's cathedral, during which time he developed his innovative teaching methods. As his reputation as an educator and theorist grew, he was invited by Pope John XIX to visit Rome and present his new teaching method shortly after the completion of his *Micrologus* treatise. Although his visit seems to have been met with great approval, his poor health forced him to leave Rome and return to a monastery near Arezzo. The later events of his life are relatively unknown; however, it is presumed that he died around the year 1050.

Although the details of Guido's personal life have been lost to history, his innovations and musical ideas have been preserved in his various writings. The major works positively attributed to him are *Prologus in antiphonarium*, *Regule rithmice* (also known as *Regulae rhythmicae*), *Epistola ad michahelem*, and the treatise *Micrologus*. The latter, written around 1024, was Guido's most famous work, becoming one of the most widely circulated music treatises of the medieval period after Boethius's *De institutione musica*. With the widespread dissemination of his various ideas and teaching methods, Guido garnered a high reputation as a pedagogue, eventually leading to an invitation to visit Rome. His methods had a favorable effect upon the Pope, whom Guido describes in the *Epistola* as being much impressed, stating that Pope John XIX "recognized quickly in himself what he scarcely believed in others."² Guido's reputation lasted well after his death as theorists throughout the Middle Ages and Renaissance built upon his innovations in their own developments of the musical system. Writers such as Middle Ages theorist Johannes Cotto described Guido as "the Master, whom we consider the greatest in our field since Boethius,"³ and modern writers also state that his "writings continue to be considered novel and far-reaching in their implications."⁴

Although many musical writers, both past and modern, hold Guido's work in high regard, his theories have also been the subject of criticism and dispute. In his *Epistola* to Brother Michael, Guido describes himself as "dejected and burdened by many obstacles," stating that both he and Brother Michael have been the subject of criticism and disdain due to the innovative teaching methods he had proposed.⁵ Throughout history the originality and extent of Guido's developments have been a matter of much dispute, with critics downplaying his role in music history as "more of a codifier and improver of a system already in a high stage of development"⁶ and stating that Guido neglected to explain "how far the

² Guido of Arezzo, *Epistola ad michahelem*, in *Guido D'Arezzo's Regule rithmice, Prologus in antiphonarium, and Epistola ad michahelem: A Critical Text and Translation* by Dolores Pesce (Ottawa: The Institute of Mediaeval Music, 1999), 451.

³ Johannes Cotto, *De Musica*, in *Hucbald, Guido, and John on Music: Three Medieval Treatises*, trans. Warren Babb and ed. Claude V. Palisca (New Haven: Yale University Press), 108.

⁴ Dolores Pesce, *Guido D'Arezzo's Regule rithmice, Prologus in antiphonarium, and Epistola ad michahelem: A Critical Text and Translation* (Ottawa: The Institute of Mediaeval Music, 1999), 37.

⁵ Guido of Arezzo, *Epistola ad michahelem*, 439.

⁶ Albert Seay, *Music in the Medieval World* (Englewood Cliffs: Prentice-Hall, 1965), 41.

improvements he described were the result of his own inventive genius or telling us how many of them were in general use at the time.”⁷

Despite the controversies that may surround Guido’s work, it is certain that his primary desire and goal in developing his methods was to aid students in the learning of chant. This objective was unique in his time, as previous theorists, such as Boethius, chose to focus their writings on the philosophical and mathematical implications of music rather than on the education of their readers. Guido states his aim in the opening of the *Micrologus*: “Desiring therefore to set forth my own so useful method of study for the general benefit, I summarized as briefly as I could. . . certain things that I believed would help singers.”⁸ The *Prologus in antiphonarium* opens in a similar manner, with Guido again describing this goal: “I have determined to notate this antiphoner, so that hereafter through it, any intelligent and diligent person can learn a chant.”⁹ As a closer examination of his work will reveal, Guido’s innovations in the hexachord system, solmization syllables, and music notation are all directed towards the goal of improving the music learning process of his day. As a result of his passion and devotion to this goal, his developments had a profound impact not only upon the way music was taught but also upon the entire course of music history.

The first of Guido’s major developments in the realm of music theory and education was his codification of the hexachord system. In his system, the notes of the musical gamut were described in interlocking six-note segments, known as hexachords, all of which shared the same interval pattern. This system, built on the existing modal system and similar in a sense to our modern concepts of scales and tonality, allowed singers to group the chants according to the particular hexachord to which each chant belonged. Guido’s system also gave singers the ability to learn the intervals of a chant within the context of a specific hexachord rather than by merely listening and repeating patterns as heard on the monochord, an ability which would be furthered by his development of solmization. Finally, the hexachord system allowed singers to change between hexachords if the chant were to exceed the proper range of its original hexachord in a process known as mutation or transposition. As the hexachord system became codified in a manner that was more easily understandable, it “would quickly become an important tool for teaching the system itself and for teaching the important technique of transposition.”¹⁰

⁷ W. S. Rockstro, “The Great Musical Reformers. III. Magister Franco,” *The Musical Times and Singing Class Circular* 30, No. 556 (June 1, 1889): 333, <http://www.jstor.org/stable/3359740> (accessed September 2, 2011).

⁸ Guido of Arezzo, *Micrologus*, in *Hucbald, Guido, and John on Music: Three Medieval Treatises*, trans. Warren Babb and ed. Claude V. Palisca (New Haven: Yale University Press, 1978), 58.

⁹ Guido of Arezzo, *Prologus in antiphonarium*, in *Guido D’Arezzo’s Regule rithmice, Prologus in antiphonarium, and Epistola ad michahelem: A Critical Text and Translation* by Dolores Pesce (Ottawa: The Institute of Mediaeval Music, 1999), 416-17.

¹⁰ Charles M. Atkinson, *The Critical Nexus: Tone-System, Mode, and Notation in Early Medieval Music* (New York: Oxford University Press, 2009), 230.

Although Guido was the first theorist to describe the hexachord system, the overall concept of modes, or the grouping of notes into specific interval patterns, dates back to ancient Greece. Working from a sixteen-note gamut that encompassed all the natural notes from B² to D⁴ and included B-flat as well as B-natural, the Greeks organized the notes into groups of four to create a system of five distinct tetrachords. This system, known as the Immutable System, allowed theorists to explore the mathematic relationships in the intervals between notes. Boethius, a scholar and theorist of the late fifth century, further developed the Immutable System in his work *De institutione musica*, which “offered the most comprehensive and detailed treatment of [the modes] available to the Middle Ages” and became one of the most widely circulated music treatises of the medieval period.¹¹

In *De institutione musica*, Boethius outlined his modal system, basing it on the Greek system by organizing the notes of the gamut into three types of tetrachords, each with a different interval pattern. The diatonic tetrachord, with an interval pattern of Semitone-Tone-Tone, “was the one taken over from Boethius into the medieval theoretical tradition” and was used by pre-Guidonian theorists such as Hucbald, St. Odo of Cluny, and the writers of the *Enchiriadis* treatises.¹² Building on this concept of tetrachords, Boethius also described a system of seven modes or scales, which he described as “an entire collection of pitches, brought together within the framework of a consonance.”¹³ The modes, spanning the range of an octave, each began on a different note of the gamut and possessed a unique interval pattern. These intervals and patterns were the outcome of specific mathematical ratios which further served to indicate consonance or dissonance between pitches. For Boethius, the tetrachords and modes were a means of describing the philosophical and mathematical nature of music, relating the music of instruments to that of humanity and the cosmos:

But to what purpose is all this? So that there can be no doubt that the order of our soul and body seems to be related somehow through those same ratios by which subsequent argument will demonstrate sets of pitches, suitable for melody, are joined together and united.¹⁴

As the Middle Ages progressed, Boethius’s ideas were utilized by other writers and theorists. Hucbald, St. Odo of Cluny, and the anonymous author of *Musica enchiriadis*, all writing around the late ninth and early tenth centuries, built upon Boethius’s ideas as they further developed the concepts of the tetrachord and modes that would lay the foundation for Guido’s theories. In the *Musica*

¹¹ Ibid., 25.

¹² Ibid., 11.

¹³ Anicius Manlius Severinus Boethius, *Fundamentals of Music*, trans. Calvin M. Bower and ed. Claude V. Palisca (New Haven: Yale University Press, 1989), 153.

¹⁴ Ibid., 7.

enchiriadis treatise, the author describes a tetrachord system in which tones are “joined together, ascending and descending in a natural way, so that they follow one another, always in similarly constituted groups of four,” organizing the gamut into a system of four consecutive, non-overlapping tetrachords.¹⁵ While still retaining the mathematical and philosophical focus of Boethius’s writings, *Musica enchiriadis* also provides additional information for students of music regarding the structure of the modes and melodies. According to the author, melodies may only end on particular notes, known as finals, which in modern nomenclature are D, E, F, and G. Each final serves as the focus of a particular mode, and the four types of modes can be further divided into two subtypes, “maior” or “authentic” and “minor” or “plagal,” based on their range around the final. In the authentic modes, the final was the beginning note of the scale, while in the plagal modes the final was placed towards the center of the scale.

Hucbald, a Frankish theorist and Benedictine monk, further elaborated upon the developments of the *Musica enchiriadis* treatise. His work “represents the first attempt to fuse Boethian theory with chant theory” and provided a basis for Guido’s innovations in the hexachord system.¹⁶ In his writings, Hucbald used the same Greek gamut as Boethius, expanding it slightly to cover a span of two octaves from A² to A⁴. He, like the author of the *Enchiriadis* treatise, organized this gamut into tetrachords to create the system which he presents as a basis for chant theory. Closely paralleling the work of Hucbald, St. Odo of Cluny, whose writings also had a significant influence on Guido, further described the system presented in *Musica enchiriadis*. Defining a mode as “a rule which classifies every chant by its final,” Odo confirmed the use of D, E, F, or G as suitable finals to be used in a chant.¹⁷ In addition, Odo established new names for the four main types of modes, referring to them as Protus, Deuterus, Tritus, and Tetrardus, titles which Guido later used in his writings on the modes and hexachords. By classifying chants according to their mode, Odo paved the way for Guido’s hexachord system, which uses this classification as a way to teach new chants rather than presenting it merely as a theoretical or compositional tool.

As Guido developed his hexachord system, he used the ideas of Boethius, Odo, and others to provide the foundation for his innovations. Basing his system on the gamut of Γ (gamma or G²) to D⁴ as described by Hucbald and Odo, Guido used the first seven letters of the alphabet to indicate pitches, repeating them at the octave as in our modern scale system rather than at the fifth as in the Greek system. This was a significant move from the four Greek letters used to indicate pitch in the scales of Boethius and the *Enchiriadis* treatise, which Guido criticizes in his *Regule rithmice*: “I am astonished that some have made four symbols for the pitches, as if they are the same at the fifth, of which some differ. Some,

¹⁵ Anonymous, *Musica enchiriadis*, in *Musica enchiriadis and scolica enchiriadis*, trans. Raymond Erickson and ed. Claude V. Palisca (New Haven: Yale University Press, 1995), 2.

¹⁶ Atkinson, 149.

¹⁷ Pseudo-Odo of Cluny, *Dialogue on Music*, in *Source Readings in Music History*, ed. Oliver Strunk and Leo Treitler (New York: W.W. Norton, 1998), 207.

however much they are related, do not agree perfectly.”¹⁸ In addition to emphasizing the consonance of the octave, using seven letters allowed the notes to “be plain to little boys,” giving even young students the ability to learn and understand the gamut.¹⁹

As he developed his hexachord system, Guido also reaffirmed the modal system outlined by Odo and the author of *Musica enchiriadis*. In *Micrologus*, Guido describes four modes entitled Protus, Deuterus, Tritus, and Tetrardus, similar to those outlined by Odo, which “are so differentiated from one another by their inherent dissimilarity, that none of them will grant another a place in its domain.”²⁰ Each of these modes is associated with a particular final, D, E, F, or G, which in turn allows singers to determine the mode of a chant “according to which kind of property it sounds, whether at the beginning or at the end.”²¹ Further, Guido, like the author of *Musica enchiriadis*, divides each of the four modes into “high” and “low” subtypes known as authentic and plagal, respectively, based on their range and deviation from the final.

Although Guido did use the previously existing gamut and modal system as the basis for his innovations, his hexachord system was a unique development. Based on the six intervals he believed were foundational to music, Guido divided the gamut into six-note groups known as hexachords to create “a system of seven overlapping hexachords on G, C, and F,” as shown in Figure 1 below.²²

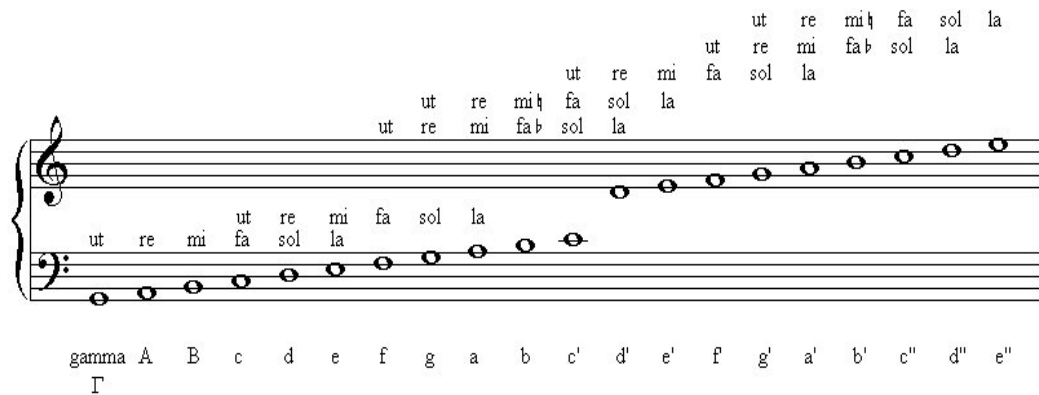


Figure 1: Diagram of Hexachord System

With an interval structure of Tone-Tone-Semitone-Tone-Tone, the center of each hexachord was the semitone. By determining the location of the semitone in a chant, the singer could determine in which hexachord he was singing and could therefore know the exact location of all the intervals in the chant. Essentially, the

¹⁸ Guido of Arezzo, *Regule rithmice*, in *Guido D'Arezzo's Regule rithmice, Prologus in antiphonarium, and Epistola ad michahelem: A Critical Text and Translation* by Dolores Pesce (Ottawa: The Institute of Mediaeval Music, 1999), 345.

¹⁹ *Ibid.*, 335.

²⁰ Guido of Arezzo, *Micrologus*, 66.

²¹ Guido of Arezzo, *Epistola ad michahelem*, 499.

²² Richard Hoppin, *Medieval Music* (New York: W. W. Norton, 1978), 63.

hexachord gave the singer a reference point for the chant, allowing him to place each note and interval exactly where it should belong and enabling “any piece in any mode [to] be understood and sung in terms of only one six-note pattern.”²³ These three hexachords, beginning on C, G, and F, were known as “natural,” “hard,” and “soft,” respectively, with the F hexachord including a B-flat instead of a B-natural. Although in *Micrologus* Guido does describe the use of B-flat “mostly in that chant in which F. . .recurs rather extensively, either low or high,” he discourages its use in his later writings.²⁴ In the *Epistola ad michahelem*, he states that if B-flat were to be used to avoid the tritone interval when ascending a fourth from F, F-sharp would similarly have to be accepted to allow an ascent from B-natural, a practice which had not been popularly accepted: “but because no one has done the latter, no one ought to do the former.”²⁵

In addition to providing a method of learning and organizing the intervals of a chant, Guido’s hexachord system also allowed singers to change between hexachords in a process known as mutation. If a melody went beyond the range of one hexachord, the singer would change into another hexachord by finding a common tone between the two. This process, similar to our modern concept of modulation, was further facilitated by Guido’s later development of solmization syllables.

Although the hexachord system shares similarities with the modal system of Guido’s day, it is important to recognize that the two concepts are not identical. While the hexachord system is built upon the preexisting modal system and gamut, it was designed “to facilitate the teaching and learning of plainchant melodies”²⁶ and does not “reflect the scalar patterns, or modes, in which these melodies were written.”²⁷ In short, the hexachord system provided a means of learning chant by giving a frame of reference for the intervals between notes, while the modal system allowed chants to be classified according to their finals, much in the way the modern scale system organizes music by the tonic scale degree.

As music theory progressed through the late Middle Ages, Guido’s hexachord system became foundational to the development of tonality. The modal system and the hexachord continued to exist side-by-side, with the modal system becoming firmly entrenched in the church music of the day and leading to our modern church modes. However, with the development of polyphony during and after Guido’s time, particularly in secular music, the limits of the hexachord and modal systems began to be tested. The necessity for consonance in polyphony, particularly at intervals of a fourth and fifth, led to the addition of chromatic notes in a practice known as *musica ficta*. The *musica ficta* notes were those outside the

²³ Léonie Rosenstiel, ed., *Schirmer History of Music* (New York: Schirmer Books, 1982), 31.

²⁴ Guido of Arezzo, *Micrologus*, 64.

²⁵ Guido of Arezzo, *Epistola ad michahelem*, 517.

²⁶ Hoppin, 63.

²⁷ *Ibid.*, 64.

traditional gamut and hexachord system, or, in other words, the placement of a semitone where none had previously existed. This led to the development of additional hexachords, known as *ficta* hexachords, beyond those on C, G, and F in order to accommodate these new notes: “we know, however, that at some point musicians began to go beyond these limits and that eventually it became possible to flatten and sharpen all the seven uninflected notes within an octave.”²⁸

As the hexachord system began to disintegrate during the fifteenth century, “the entire rationale of medieval solmisation, namely to identify the semitone. . .and give surrounding context to it, was eroded.”²⁹ Theorists throughout the Renaissance continued to propose solutions to this problem while at the same time shifting from the monochord to the keyboard as the basis of music theory. Writers such as Prosdocius de Beldemandus, Johannes Hothby, and Pietro Aaron devised new gamuts in which “every step could receive both a flat and a sharp,” leading to the modern chromatic scale.³⁰ In the sixteenth century, Gioseffe Zarlino gave the “first recognition of the fact that there were only two types of modes, those which had a tonic major third and were cheerful, and those which had a minor third and were sad.”³¹ His organization of the chromatic gamut into these two types “forced a dichotomization of modal theory which closely paralleled actual practice and pointed the way toward the major and minor tonalities.”³² Although it is uncertain when exactly the transition from the modal and hexachord systems to our modern system of tonality occurred, it would seem that, as chromatic notes were added to the scale with the development of polyphony and counterpoint during the Renaissance and Baroque periods, the tonal limitations of Guido’s hexachord system led to its eventual obsolescence.

The second of Guido’s major innovations in music theory and education was his creation of a system of solmization syllables. Closely related to his previous development of hexachords, the solmization syllables allowed the hexachord system to be used as a practical tool in the learning of chants. Prior to Guido’s time, students would learn new chants by imitating pitches as played on the monochord in a time-consuming, painstaking process which Guido himself describes as “childish—good for beginners, but very bad for those who continue further.”³³ As the disadvantages of this method became apparent, “Guido’s new system, in many ways the beginning of modern sight-singing technique, was

²⁸ Karol Berger, “The Expanding Universe of Musica Ficta in Theory from 1300-1550,” *The Journal of Musicology* 4, No. 4 (Autumn, 1985-Autumn, 1986): 414, <http://www.jstor.org/stable/763749> (accessed February 2, 2012).

²⁹ Margaret Bent, “Diatonic ‘Ficta,’” *Early Music* 4 (1984): 12, <http://www.jstor.org/stable/853845> (accessed February 2, 2012).

³⁰ Karol Berger, 421.

³¹ Robert W. Weinpahl, “Zarlino, the Senario, and Tonality,” *Journal of the American Musicological Society* 12, No. 1 (Spring 1959): 30, <http://www.jstor.org/stable/829515> (accessed February 2, 2012).

³² *Ibid.*, 41.

³³ Guido of Arezzo, *Epistola ad michahelem*, 461.

badly needed as a method of learning the chant.”³⁴ With the solmization syllables, singers could become familiar “with the intervallic context surrounding each syllable” within the hexachord, enabling them to determine the exact placement of pitches and, ultimately, to learn chants without the aid of the monochord.³⁵

Although Guido’s developments in the hexachord system built upon the theories of scholars before him, his solmization system is uniquely his own invention. While some writers have suggested that ancient Greek and Arabic music included the use of solmization syllables, there is little to no evidence to support this claim, and scholars generally recognize Guido’s innovation as exclusively his. The solmization system is detailed in his work *Epistola ad michahelem*, in which he describes the discovery of “a most excellent method for finding an unknown melody, recently given to us by God, and proven most useful.”³⁶ Because the syllables are discussed only in the *Epistola*, it is reasonable to assume that they were developed towards the end of Guido’s life as a culmination of his earlier innovations in the hexachord system and in music notation.

To create the solmization system, Guido took the first syllables of each phrase in the hymn *Ut queant laxis* to establish the syllable set “ut-re-mi-fa-sol-la,” as indicated in Figure 2.

The figure displays four lines of musical notation in a single system, each with a treble clef and a key signature of one flat (B-flat). The notes are placed on the staff lines, and the lyrics are written below them. The first line is: Ut que - ant la - - - xis, Re - so - na - re fi - bris, with 'Ut' on the first line, 'Re' on the second, 'Mi' on the third, 'Fa' on the fourth, 'Sol' on the fifth, and 'La' on the sixth. The second line is: Mi - - - ra ges - to - rum, Fa - mu - li tu - o - rum, with 'Mi' on the first line, 'Re' on the second, 'Mi' on the third, 'Fa' on the fourth, 'Sol' on the fifth, and 'La' on the sixth. The third line is: Sol - - - ve pol - lu - ti, La - bi - i re - a - tum, with 'Sol' on the first line, 'Re' on the second, 'Mi' on the third, 'Fa' on the fourth, 'Sol' on the fifth, and 'La' on the sixth. The fourth line is: Sanc - - - te Jo - han - nes, with 'Sol' on the first line, 'Re' on the second, 'Mi' on the third, 'Fa' on the fourth, 'Sol' on the fifth, and 'La' on the sixth.

Figure 2: *Ut queant laxis*

Because each phrase of the hymn began one note higher than the previous line, each step of the hexachord was given a unique syllable, allowing the singer to find the pitch of a note and to determine its position within the hexachord:

³⁴ Mark A. Leach, “‘His ita perspectis’: A Practical Supplement to Guido of Arezzo’s Pedagogical Method,” *The Journal of Musicology* 8, No. 1 (Winter 1990): 83, <http://www.jstor.org/stable/763524> (accessed September 2, 2011).

³⁵ Stefano Mengozzi, *The Renaissance Reform of Medieval Music Theory: Guido of Arezzo Between Myth and History* (New York: Cambridge University Press, 2010), 1.

³⁶ Guido of Arezzo, *Epistola ad michahelem*, 457.

And thus do you see that this melody begins in each of its six phrases with six different pitches? If someone, thus trained, knows the beginning of every phrase so that he can without hesitation immediately begin any phrase he chooses, he will easily be able to sing the same six pitches according to their properties wherever they appear.³⁷

In addition to indicating the exact location of each pitch within the hexachord, solmization also drew attention to the center of the hexachord, the semitone interval, which was given the syllables “mi-fa.” By highlighting this interval, the singer could determine the hexachord in which a chant fit and, thereby, the surrounding intervallic context of any given pitch in a melody. As singers learned the chant, each note and its appropriate syllable played “an active role in the complex chain of signification that linked the notes on the page with the sounds of the gamut and with the mnemonic traces of the basic intervals in the singer’s mind.”³⁸ Because the solmization syllables linked the notes of the new chant to a known interval pattern, Guido states that, by using this method, “you may competently sing unheard chants as soon as you see them written down, or, hearing unwritten chants, you can immediately set them down in writing well.”³⁹

Under the solmization method, a singer would, upon receiving a new chant to learn, assign a syllable to each note based upon the particular hexachord to which that chant belonged. He would then know exactly which step in the hexachord each note matched and would be able to sight-sing the chant, taking time to correct intervals that were challenging or required mutation into a new hexachord. With this new method, the learning of chants became much easier and faster, and singers “could easily sing unknown chants before the third day, which by other methods could not happen for many weeks.”⁴⁰

As the hexachord syllables were applied to the notes of the gamut, “some tones could be found in all three proprieties or hexachords and thus took syllables from all three.”⁴¹ For example, the note C⁴ could belong to any of the three hexachords under the syllables “sol” (F hexachord), “fa” (G hexachord), or “ut” (C hexachord) and was therefore given the name “C-sol-fa-ut,” while the note Γ (gamma) could belong only in the G hexachord as “Gamma-ut.” As this system of nomenclature became more common, the name “Gamma-ut” was contracted to “gamut” and was used to refer to the entire set of musical notes. By naming notes with both letters and syllables, the notes of the gamut were given specific names to distinguish them from each other. Further, the process of mutating between

³⁷ Ibid., 469.

³⁸ Stefano Mengozzi, *The Renaissance Reform*, 105.

³⁹ Guido of Arezzo, *Epistola ad michahelem*, 471.

⁴⁰ Ibid., 465.

⁴¹ Robert Vladimir Henderson, “Solmization Syllables in Musical Theory, 1100 to 1600” (PhD diss., Columbia University, 1969), 2, <http://search.proquest.com/docview/288021635?accountid=26732> (accessed September 2, 2011).

hexachords was simplified as singers could immediately place the pivot note in the interval context of either hexachord.

With each note designated by a letter and its appropriate syllables, the gamut could be clearly understood as a system of overlapping hexachords. To aid in this understanding, the human hand was used as a learning device, known as the Guidonian Hand (Figure 3), to allow the student to visualize the gamut and recall the intervals between notes.

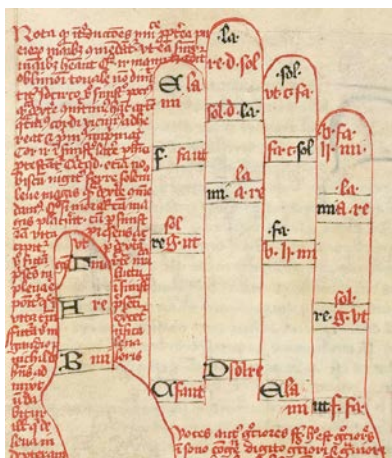


Figure 3: Guidonian Hand

Each note, with its appropriate letter and syllables, was placed on a joint of the human hand, mapping the gamut in a spiral pattern. Students could then use the hand to learn the gamut and its notes, while teachers could use the hand to indicate specific pitches in a chant to their students:

The hand was both a mnemonic and a pedagogical device. The association of a clef and its syllables with a specific place on the hand helped memory and provided the teacher with a convenient method of demonstrating and practicing the steps and intervals of the gamut.⁴²

Although named after Guido, the exact origin of the Guidonian Hand is unknown and is not mentioned in any of Guido's writings. It is thought to have arisen after Guido's time, likely as the invention of teachers and musicians who sought to memorize and teach the gamut, yet "it is clear that the developed hand was the final product of the search initiated by Guido."⁴³

⁴² Carol Berger, "The Hand and the Art of Memory," *Musica Disciplina* 35 (1981): 12, <http://www.jstor.org/stable/20532236> (accessed September 2, 2011).

⁴³ *Ibid.*, 32.

For Guido, the solmization syllables and the hexachord system were intimately connected as a single pedagogical system. As Guido's method spread, the hexachord became the "primary organizing agent of the ecclesiastical modal system from the 11th century onwards."⁴⁴ Despite the changes made to the hexachord system as chromatic notes were added to the gamut, the solmization syllables themselves remained largely undiscussed and unchanged through the centuries. As music progressed from the medieval modal system into modern tonality, the syllable "ti" was added to indicate the leading tone and the syllable "ut" was changed to "do" in an effort in ease pronunciation.

For the most part, the history of Guido's syllables remained largely undocumented until the development of the modern solfege system in the late nineteenth century. Known as the tonic sol-fa system, this method, like Guido's solmization, assigned a specific syllable to each degree of the scale, allowing students to understand the intervals of the scale and the pitch tendencies of specific notes. The system was first developed in the late nineteenth century by English music educator Sarah Glover, who "discovered a need for reform in the teaching of music reading skills."⁴⁵ Seeking a means of teaching music without relying on traditional notation, Glover adopted Guido's system, altering it slightly to produce the syllable set "do-ra-me-fa-sole-lah-te." Glover's method caught the attention of John Curwen, an English minister who, like Glover, sought to improve the music education of students. In his system, Curwen used Glover's syllables but also added specific hand signals "to individualize the syllables" and to aid in their memorization.⁴⁶

Although Glover and Curwen initiated the resurrection of Guido's solmization syllables, the solfege system gained popular acclaim and usage in the mid-twentieth century through the methods of Zoltán Kodály, a Hungarian music scholar and educator. His system, "almost entirely built round the use of solfa," used the Italian syllables "do-re-mi-fa-so-la-ti" and hand signs adopted from John Curwen.⁴⁷ Kodály's system, still a central part of music education, used solmization as Guido did to indicate a note's function within the scale, to teach students to notate heard melodies, and to allow singers to learn new melodies quickly and easily.

The third area of Guido's innovations in music education and theory were his developments in music notation. His improvements in this area laid the

⁴⁴ Mengozzi, *The Renaissance Reform*, 20.

⁴⁵ Peggy D. Bennett, "Sarah Glover: A Forgotten Pioneer in Music Education," *Journal of Research in Music Education* 32, No. 1 (Spring 1984): 52, <http://www.jstor.org/stable/3345280>, (accessed February 2, 2012).

⁴⁶ Ruth Zinar, "John Curwen: Teaching the Tonic Sol-Fa Method 1816-1880: An English Minister Proposed Teaching Music through the Sound of Tones and Only Later Using Notation," *Music Educators Journal* 70, No. 2 (October 1983): 47, <http://www.jstor.org/stable/3401212> (accessed February 2, 2012).

⁴⁷ Geoffrey Winters, "The Kodály Concept of Music Education," *Tempo*, New Series, No. 92 (Spring 1970): 16, <http://www.jstor.org/stable/943178> (accessed February 2, 2012).

foundation for our modern musical staff and notation and provided a means of visually expressing his hexachord and solmization systems. By linking these areas, music notation proved to be a vital step in Guido's reform of music education, allowing singers to visualize the music they were organizing into hexachords and singing to solmization syllables. As a result of his work, "there was now available to the West a practical method of notating music that was fully diastematic, whose intervals represented precise numerical ratios that could be converted directly into sound."⁴⁸

Prior to Guido's invention, music notation was sparse and unclear. Serving only as a reminder of a previously learned melody, the musical notation of the early medieval period provided little help to a singer who was studying a chant for the first time. Although the music of ancient Greece used some form of notation, "the earliest [medieval] manuscripts for use by the choir contained nothing but the texts" and singers had to rely upon their memories when performing chants.⁴⁹ Boethius, writing in the early sixth century, describes a system of notation in which four Greek letters, one for each note name, were used to designate the pitches. Each letter was rotated at a certain angle to indicate the tetrachord to which it belonged, allowing the musician to know the pitch of each note. In his treatise *De institutione musica*, Boethius describes the purpose of notation as a means of recording and preserving melodies:

Through this remarkable means, then, they discovered that not only the words of songs—conveyed through letters—but also the very melodies themselves—expressed in these written symbols—could be preserved in the memory and for posterity.⁵⁰

Although the system described by Boethius was used to some extent by later theorists, such as Hucbald and the authors of the *Enchiriadis* treatises, the earliest notation signs in the Western musical tradition "are not found in any manuscript before the ninth century."⁵¹ During the eighth and ninth century, however, notation signs known as neumes began to be developed as a means of aiding singers. Believed to have originated in "grammatical accents indicating the rise and fall of the voice" in recitation, the earliest neumes, shown in Figure 4, were simply signs placed above the text of a chant to indicate the ascent or descent of a melodic line.⁵²

⁴⁸ Atkinson, 229.

⁴⁹ Hoppin, 57.

⁵⁰ Boethius, 123.

⁵¹ Carl Parrish, *The Notation of Medieval Music* (New York: W. W. Norton, 1957), 8.

⁵² Hoppin, 57.

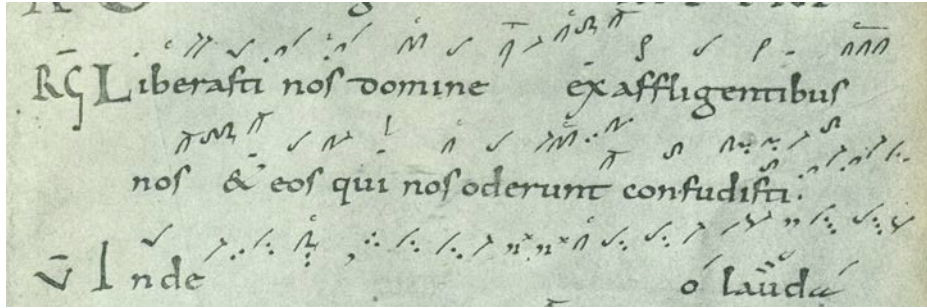


Figure 4: Early Neumatic Notation

Although this early notation “was anything but simple and indicated many subtleties of performance,” it expressed only the number of notes and the overall direction of a melody without giving any idea of the specific pitches or intervals between notes.⁵³

In an effort to solve this lack of clarity and specificity, diastematic or heightened neumes, shown in Figure 5, were developed towards the end of the tenth century.

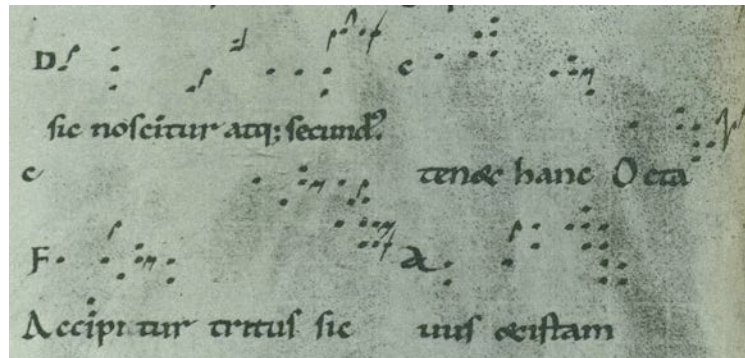


Figure 5: Diastematic Neumatic Notation

These neumes, “placed at various distances from an imaginary line representing a given pitch, according to their relationship to that line,” indicated not only the direction but also the approximate size of an interval.⁵⁴ Shortly after the development of the heightened neumes, a single line indicating a specific pitch, usually C or F, was added to the music to serve as a reference point for the neumes. Despite the improvements of the heightened neumes, however, this notation, like the original neumes, failed to provide specific pitches for the notes and intervals.

As notation continued to develop, several theorists during the pre-Guidonian era sought to remedy the problems of neumatic notation. Writers such as St. Odo of Cluny recognized the need for a specific notation system, writing that, with notation, “I may recognize the chant better and, if anything completely escapes

⁵³ Ibid., 59.

⁵⁴ Parrish, 9.

my memory, have recourse to such notes with entire confidence.”⁵⁵ In an effort to resolve the disadvantages of neumatic notation, the author of *Musica enchiriadis* outlined a notation system, known as dasian notation, in which the syllables of a chant were placed on a set of lines which likely represented the strings of an instrument, as shown in Figure 6.

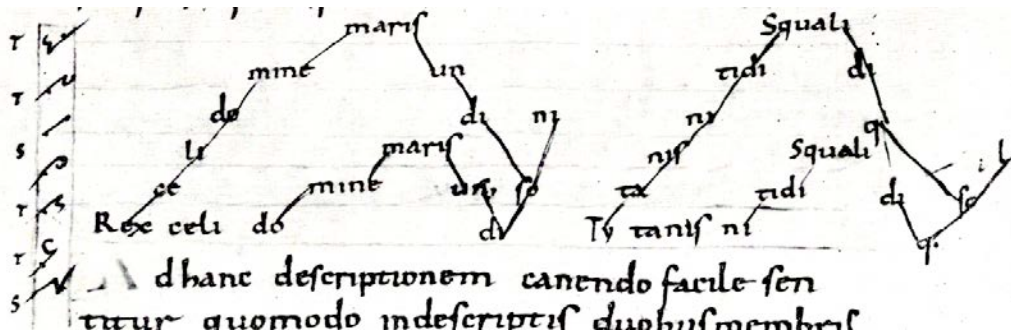


Figure 6: Dasian notation from *Musica enchiriadis*

In dasian notation, each line represented a specific pitch, which was indicated by a Greek letter placed at the beginning of the line. Hucbald, in *De harmonica institutione*, describes a similar notation method. In his system, Hucbald used a staff of six lines, representing the strings of the cithara, “in which the textual syllables are written in the spaces, and the distances between the spaces are indicated in the margin by T and S for Tone and Semitone.”⁵⁶ This system, like that of *Musica enchiriadis*, indicated both the exact pitches of a chant as well as the precise intervals of a melody. In his treatise, Hucbald also advocates the addition of letters to neumatic notation, writing:

Therefore if these little letters which we accept as a musical notation are placed above or near the customary notes, sound by sound, there will clearly be on view a full and flawless record of the truth, the one set of signs indicating how much higher or lower each tone is placed, the other informing one about the afore-mentioned varieties of performance.⁵⁷

⁵⁵ Pseudo-Odo of Cluny, 203.

⁵⁶ Warren Babb, *Hucbald, Guido, and John on Music: Three Medieval Treatises*, ed. Claude V. Palisca (New Haven: Yale University Press, 1978), 10.

⁵⁷ Hucbald of St. Amand, *De harmonica institutione*, in *Hucbald, Guido, and John on Music: Three Medieval Treatises*, trans. Warren Babb and ed. Claude V. Palisca (New Haven: Yale University Press, 1978), 37.

Despite its innovations, however, Hucbald's notation system seems to have been limited to theoretical usage, and "there is strong reason for believing that it was employed by Hucbald and his friend, St. Odo, alone."⁵⁸

Building upon the developments of *Musica enchiridis* and of Hucbald, Guido adopted the idea of using multiple lines to indicate specific pitches. However, unlike previous authors, Guido limited his staff to four lines positioned a third apart, as in modern notation. He describes the advantages of this notation in the *Prologus in antiphonarium*, writing that "itches are so arranged that each sound, howsoever much it is repeated in a chant, is always found in one and the same row. . .thus, however many sounds there are on one line or on one space, they all sound similarly."⁵⁹ Unlike the notation of Hucbald and *Musica enchiridis*, Guido also chose to place neumes, rather than the text of a chant, on the staff lines "because [the neumes] take less space than letters" and allow the singer to read the notation more easily, as in Figure 7.⁶⁰

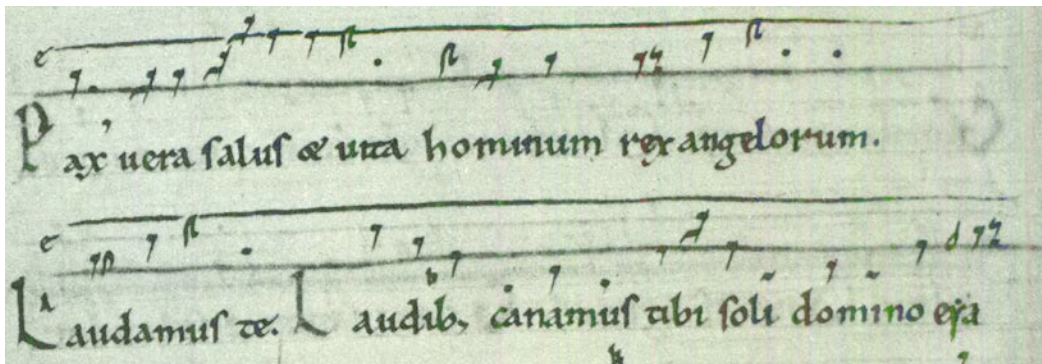


Figure 7: Guidonian-era Notation

In addition to placing the lines of the staff a third apart, Guido added colors and clef signs to indicate the specific pitch of the lines and "to show where the following neume is to be placed."⁶¹ With this system, either a letter, known as a clef sign, is placed at the beginning of a line or a colored line is used to indicate the pitch of that line, typically F or C. By using the color yellow for the C line and red for the F line, Guido drew attention to the half-steps preceding those notes that served as the center of the hexachords, providing an important frame of reference for the singer. The colors and clef signs were vital to indicate the specific pitches of a chant, with Guido writing that "if a clef or color is missing from the neumes, it will be like a well when it does not have a rope, whose waters, although many, are of no benefit to those seeing them."⁶²

⁵⁸ W. S. Rockstro, "The Great Musical Reformers. I. Hucbald de St. Amand," *The Musical Times and Singing Class Circular* 30, No. 551 (Jan. 1, 1889): 14, <http://www.jstor.org/stable/3360944> (accessed September 2, 2011).

⁵⁹ Guido of Arezzo, *Prologus in antiphonarium*, 419.

⁶⁰ *Ibid.*, 375.

⁶¹ *Ibid.*, 383.

⁶² *Ibid.*, 379.

With Guido's notation system, singers could visualize the chant they were learning as the lines, clef signs, and colors indicated the exact pitch and size of the intervals they were to sing. Further, the notation, with its colors emphasizing the half-steps E-F and B-C, allowed the singer to determine the hexachord of the chant and how each pitch fit into that hexachord. Once the singer had determined the placement of each pitch, he could then affix the proper solmization syllables to each note, enabling him to sight-sing a previously unknown chant.

While Guido's developments in notation have had a profound influence on the Western musical tradition, there is significant debate regarding the originality of his work in this area. Although some scholars believe that "the so-called 'Guidonian notation' is an original invention, a stroke of genius by Guido of Arezzo,"⁶³ others believe that "if anyone should be credited with the invention of the staff in music, it is less Guido than a large group of anonymous scribes who came shortly after him in the twelfth and thirteenth centuries."⁶⁴ With the introduction of a form of musical staff in the *Musica enchiridis* treatise as well as in the writings of Hucbald, it may be said that Guido's contribution to the development of notation was to popularize the musical staff rather than invent it.⁶⁵ In this view, the concept of staff notation may be seen as an amalgamation of the work of previous scholars rather than as an invention by a single individual. Despite his use of previous ideas, however, it is commonly believed that the placement of staff lines a third apart is unique to Guido, with virtually no evidence to suggest otherwise. Regardless of how the works of previous writers influenced Guido and his innovations, it is generally accepted that "his written prescription [of staff notation] led to its adoption first in Italy and then throughout Western Europe."⁶⁶

Although the writings of theorists in the time immediately following Guido tend to focus more on the philosophy of music and less on its pedagogy, there is some indication that his improvements in music notation were well-received. Johannes Cotto, writing in his treatise *De musica* around the twelfth century, enthusiastically praises Guido's system:

These Guidonian neumes, on the other hand, indicate all the intervals unambiguously. Not only do they completely obviate error, but, once learned perfectly, they will not allow one to forget how to

⁶³ Jos. Smits van Waesberghe, "The Musical Notation of Guido of Arezzo," *Musica Disciplina* 5 (1951): 53, <http://www.jstor.org/stable/20531824> (accessed September 2, 2011).

⁶⁴ John Haines, "The Origins of the Musical Staff," *The Musical Quarterly* 19, No. 3/4 (Fall-Winter 2008): 337, <http://www.jstor.org/stable/20534535> (accessed September 2, 2011).

⁶⁵ *Ibid.*, 344.

⁶⁶ Pesce, 18.

chant from them. Who, then, would not see their great usefulness?⁶⁷

Cotto continues by emphasizing the importance of the lined staff, writing that “he who clings to these unlined neumes is a lover of error and falsehood, but he who sticks to musical neumes wishes to hold to the path of certainty and truth.”⁶⁸ Yet despite the ardent praise of writers such as Cotto, the dissemination of Guido’s notation system into the contemporary musical culture was faced with difficulties. During the medieval period, each geographic region had its own unique system of notation. While Guido’s notation did eventually become the standard, its adoption was slow and gradual as singers and teachers were forced to relearn the way they read and taught music. Further, the transcription of this new notation was more elaborate, requiring greater accuracy on the part of scribes, and its use necessitated an expensive replacement of existing chant books.

In spite of these difficulties, Guido’s innovations had a permanent influence on music notation. His four-line staff, spaced in thirds, became the standard for chant and is still used in modern plainchant notation. Although the use of colors to indicate the lines F and C gradually faded from usage by the fourteenth century, his use of clef signs or letters to indicate the pitch of a specific line remained an essential part of music notation. Our modern staff, like Guido’s, spaces the lines a third apart, and our modern treble, bass, and other clef signs also have their origins in those of Guido. Despite the vast changes to notation since the medieval period, Guido’s innovations remain foundational to modern music.

While our contemporary musical system might seem far removed from that of Guido, his ideas continue to play an important role in Western music. Although the hexachord system has become obsolete as a means of organizing music, the solmization syllables connected with it remain an essential part of modern music education. Today’s students continue to use solfege syllables to learn the placement of a song’s pitches and intervals, just as Guido’s students did. Modern music notation is also indebted to Guido, and variations of his musical staff and clef signs continue to be used. Even though Guido’s innovations have all undergone changes over the centuries, they continue to be present in some form at the center of Western music and its education.

As a whole, Guido’s developments in the hexachord system, solmization syllables, and music notation revolutionized the music learning methods of his day. With the hexachord system, singers could group the chants according to the hexachord to which each one belonged. They could use the hexachordal context to learn the intervals of a chant, and they could also mutate from one hexachord to the next. With the solmization syllables, students could use the hexachord as a tool for learning new chants, and they could further understand the gamut as a system of overlapping hexachords. Singers could easily determine the “mi-fa”

⁶⁷ Johannes Cotto, *De Musica*, 147.

⁶⁸ *Ibid.*, 150.

interval in a chant, using this central half-step to discover the hexachord of a chant. Finally, with Guido's music notation, students could visualize the music they were learning, using the placement of the neumes on the staff lines to determine the exact intervals between notes as well as the location of the crucial "mi-fa" interval. As a result, the combination of these elements resulted in an easier, simpler, and more efficient way to learn music, one which "perhaps briefly and adequately open[s] the door of the art of music."⁶⁹

Imagine, once again, that you are a choirboy in the same Italian monastery. As before, the choirmaster announces the performance of a new chant for an upcoming feast day. This time, however, you are handed not the monochord, but rather a sheet of music. As you examine the music, you notice the colored lines and clef signs indicating the notes F and C. Using these markers, you can quickly determine the location of the half-steps and, with this knowledge, the hexachord to which the chant belongs. After discovering the hexachord, you re-examine the notation to determine the note names, mapping them onto your hand as you match the letter names to the proper solmization syllables. Once you have determined the syllables for each note in the chant, you play the starting pitch on the monochord. However, rather than relying upon the instrument to learn the melody, you instead sight-sing the chant confidently and accurately, using the notation and your knowledge of the solmization syllables and hexachord to sing each note and interval. After a few short days of practice, you are ready to perform the chant. As you sing the chant at mass, you know that you are singing every interval correctly. You are confident that, should you forget the tune, the notation will clearly remind you of each note, regardless of when you are next called upon to perform the chant. You are certain that the time and effort of the past several days have not been wasted, and you know that, due to the work of Guido of Arezzo, this is a better way to learn music.

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⁶⁹ Guido of Arezzo, *Epistola ad michahelem*, 529.

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