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From Neumes to Notes: The Evolution of Music Notation

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New things are often viewed as being better and more advanced than older counterparts. However, new does not denote superior. Music notation serves as one example of old methods that were as adequate as the new. Early forms of music notation may appear vague and ambiguous, but when combined with oral tradition the notation contained all the information required for a successful performance. Though these early notational forms seem insufficient when compared with contemporary forms, notation cannot be removed from the context in which it served. From the origin of neumes in the ninth century to the rhythmic developments of the *Ars Nova* period in the fourteenth century, each musical period collaborated with the foundation of oral tradition to create and adapt notational forms. The evolution of music notation progressed as series of innovations that worked alongside oral tradition to meet the musical demands of each period.

Before delving into a discussion of notation, two classes of music notation must be defined. Notation can be either phonetic “in which sounds are represented by letters, numbers or other signs” or diastematic, also called intervallic “in which sounds are represented graphically.”¹ Ancient Greek and Chinese music is based on phonetic music notation while Western music is a diastematic music notation.² Even within the parameters of diastematic notation the scope of notational forms is vast since various countries and cultures developed individual forms of notation. Differences consist of variations in penmanship, slight modifications, or fundamentally different styles.³ Some of these cultures include, but are not limited to Coptic, Ethiopian,

¹ Richard Rastall, *The Notation of Western Music* (New York: St. Martin’s Press, 1982), 1.

² *Ibid.*

³ Willi Apel, *Gregorian Chant* (Bloomington: Indiana University Press, 1966), 99.

Armenian, and Russian.⁴ This paper will not attempt to encompass all these forms; instead, it will trace a progression of Western music notation.

Western notation begins with neumes. Although ancient notational forms such as Greek notation predate neumes, the foundation of Western music notation originates here. The word “neumes” is derived from the Greek word *neuma* which means “a sign.”⁵ Leo Treitler describes neumes as “those melodic inflections of the syllables.”⁶ Numerous theories exist on how the neumes developed, but pinpointing an exact source proves to be elusive. Even among well-respected scholars, varying opinions exist on how to interpret the evidence. Kenneth Levy supplies six theories on how neumes originated: accents in classical literature, Byzantine-Greek models, cheironomy [the gestures made by choir directors to trace melodic lines], punctuation-signs and language-usage, ekphonic notations, and eclectic theories.⁷ Numerous debates still center on this issue, but many scholars agree that neumes most likely originated from accents in classical literature. Carl Parrish states, “it is generally held today that the direct origin of neumes lay in the accentuation signs of Greek and Roman literature, ascribed to the Aristophanes of Byzantium (ca. 180 B.C.).”⁸ Despite the ambiguity in the specific ancestral predecessors of neumes, there is no debate that ancient forms prompted the origin of Western music notation.

The use of neumes to notate melodies first began as symbols placed above the text to indicate the melodic gesture for that syllable. Neumes encoded musical information concerning the “coordination of melodic syllables of text...and the directions of melodic movement *within* the

⁴ Dom Anselm Hughes, ed., *Early Medieval Music up to 1300* (London: Oxford University Press, 1954). 45-57.

⁵ Rastall, *The Notation of Western Music*, 15.

⁶ Leo Treitler, “The Early History of Music Writing in the West,” *Journal of the American Musicological Society* 35, no. 2 (1982): 244, doi: 10.2307/831146.

⁷ Kenneth Levy, “On the Origin of Neumes,” *Early Music History* 7. (1987):62-64, <http://www.jstor.org/stable/853888>.

⁸ Carl Parrish, *The Notation of Medieval Music* (New York: W.W. Norton, 1957), 4.

inflections represented by the neumes.”⁹ These early neumes appeared in the ninth century and contained general information concerning the melodic contour, yet the intervallic distance between each note was indistinguishable.¹⁰ Since exact pitches could not be discerned from neumatic notation, a melody still had to be taught to the performers through oral tradition. Therefore, the formation of music notation did not replace the traditions of music. Instead, it complemented and enhanced musical methods that were already in practice. “[T]hese signs served only as a guide for singers who knew the melodies more or less by heart, or for the choir leader who may have interpreted them to the singers by appropriate movements of the hand. Such neumes are called staffless, oratorical, cheironomic.”¹¹ The forms of oral and written music were not mutually exclusive; they worked together to create an optimum form of musical practice.

Up to this point in the evolution of notation neumatic notation suited the demands of the period. Music was still learned through rote memorization, but now notation provided a guide through the melodic line of a piece and aided memorization. However, neumes did not offer any more information than a general idea of the musical outline. An alternation to the neumatic notational form remedied this problem.

Shortly before the year 1000 we find the earliest traces of a more careful manner of writing, designed to give a clearer visual indication of pitches and intervals. Without actually writing a staff, the scribes imagined horizontal lines representing lower or higher pitches, and wrote the neumes not only in lower or higher positions, but also to a certain extent in various degrees of elongation, so that a *podatus* standing for an ascending fourth would reach up higher than one indicating an ascending second...Notation of a tentatively diastematic character appears for the first time in Italian and Aquitanian (southern France) manuscripts of the late tenth century.¹²

⁹ Treitler, “The Early History of Music Writing in the West,” 245.

¹⁰ Apel, *Gregorian Chant*, 118.

¹¹ *Ibid.*

¹² Apel, *Gregorian Chant*, 118-119.

The resulting innovation was diastematic or heightened neumes. They gave a greater specificity to the notation of the time since an approximate size and direction of each interval could be determined according to the relative height of the neumes. Exact intervals could not yet be determined since the heights were relative. However, diastematic neumes conveyed a clearer sense of the melodic shape than the earlier neumatic form.

Following the invention of the diastematic neumes heightened over an imaginary line, an actual line began to be used in notation. The line which appeared near the end of the tenth century started as a dry line scratched into parchment and was later drawn in ink.¹³ This line is the ancestor of what we know today as a staff. Dom Anselm Hughes comments on the progression: “Before long the actual lines of the staff began to appear—first the line for *F*, usually in red; then that for *c*, often in yellow; then lines intermediately for *a* and over the top of the *c*-line for *e*... Once the staff was established as a convention, men began to abandon the use of varied colours and to rule all four lines in red or in black.”¹⁴ Either “C” or “F” was drawn on one of the lines to indicate the pitch of the line. Both letters most frequently appeared on the fourth or third line.¹⁵ After the selection of which letter was to be used, neumes were arranged on the lines and spaces much in the same way notes are placed on a modern staff. Unlike the contemporary staff, the early staff had only four lines.

Guido of Arezzo, a Benedictine monk, is credited with the innovation of the staff; however, debates abound concerning Guido’s specific involvement in staff notation. Oliver Strunk states that Guido most likely did not solely devise the staff, but made significant contributions to its development. Others such as Jos. Smits van Waesberghe assert that Guido singlehandedly invented and introduced staff notation.¹⁶ Despite disagreement on Guido’s participation in the creation of the staff, most scholars acknowledge that Guido’s numerous writings on the staff helped promulgate its use. In Guido’s Prologue to his

¹³ Parrish, *The Notation of Medieval Music*, 9.

¹⁴ Hughes, *Early Medieval Music up to 1300*, 290.

¹⁵ Andrew Klarmann, *Gregorian Chant*, (Toledo: Gregorian Institute of America, 1945), 2.

¹⁶ Jos. Waesberghe, “The Musical Notation of Guido of Arezzo,” *Musica Disciplina*. 5 (1951):16, <http://www.jstor.org/stable/20531824>.

Antiphoner he describes the characteristics of the new notational system. “We use two colors, namely yellow and red, and by means of them I teach you a very useful rule that will enable you to know readily to what tone and to what letter of the monochord every neume and any sound belongs...”¹⁷

For the first time in the West, the pitches of a melody could be transmitted without the aid of oral tradition. Musicians could learn new songs without hearing them first. Guido deemed the practice of teaching a melody through listening as “childish” and praised staff notation as “an excellent method in finding an unknown melody...and most useful in practice.”¹⁸ Musicians now possessed a clear map of the music they sang. The creation of the staff indicated specific directions for the size, direction, and distance of the interval. Guido also identified the staff’s assistance with memorization. “After I began teaching this procedure to boys, some of them were able before the third day to sing an unknown melody with ease, which by other methods would not have been possible in many weeks.”¹⁹ These aspects of the new notation produced ramifications for both the literacy and transportation of music; music could be learned without hearing it, music could be memorized more easily, and music could be transported to and learned in distant cities.

The invention of staff notation expanded the possibilities of music, but it did not eliminate the use of oral tradition. Anna Maria Busse Berger states, “The invention of writing does not automatically put an end to memorization. Quite the opposite, writing is normally used at first as a mnemonic tool. Thus, we should no longer assume that the invention of the staff...which made possible unambiguous pitch notation eliminated or reduced performance from memory.”²⁰ She asserts that even after the creation of the staff, orality was the chosen method of learning music. Notation served as an aide by reminding singers of chants that they already memorized. As the specificity of music notation increased, it

¹⁷ Oliver Strunk, ed., *Source Readings in Music History*, Rev. ed. (New York: W. W. Norton., 1978), 213.

¹⁸ *Ibid.*, 216.

¹⁹ Strunk, *Source Readings in Music History*, 217.

²⁰ Anna Maria Busse Berger, *Medieval Music and the Art of Memory* (Berkeley: University of California Press, 2005), 47-48.

did not radically replace the use of oral tradition. Instead, orality and music notation continued in complementary roles.

Up to this point in the evolution of music notation, each innovation developed methods to represent pitch, but pitch is only one dimension of music as a whole. Music involves the movement of sound through time and space; therefore, rhythm is an essential component to the formation of music. "Music, like poetry, is an art which exists only in the succession of time and consequently an organization of temporal motion is a fundamental requirement of both arts."²¹ The notation of rhythm had been largely neglected, but according to Reverend Andrew Klarmann rhythm provides the essence of music. "Rhythm is the soul of a melody. Its presence endows the composition with life and unity."²² Since the foundation of pitch notation was already well developed, focus in music notation shifted towards creating a functional rhythmic system.

The first standard form of rhythmic notation occurred with Notre Dame polyphony. Polyphony existed before Notre Dame, but in the late twelfth century scholars at the cathedral of Notre Dame in Paris sparked a musical revolution with "greater intensity and of more important consequences than that of any previous period."²³ The emerging practice of polyphony demanded a more specific type of rhythmic notation to clearly delineate between contrapuntal parts. Two exceptional composers at Notre Dame, Leoninus and Perotinus, are notable for their contributions to the evolution of music notation.²⁴ Their compilation and revision of a repertoire of polyphonic music systematized a method of rhythmic notation that would overtake western European music notation. According to William Waite, the notational forms developed and implemented by Leoninus and

²¹ William Waite, *The Rhythm of Twelfth-Century Polyphony: Its Theory and Practice* (New Haven: Yale University Press, 1954), 13.

²² Klarmann, *Gregorian Chant*. 34.

²³ Willi Apel, *The Notation of Polyphonic Music: 900-1600*, 5th ed. (Cambridge: Mediaeval Academy of America, 1953), 215.

²⁴ The identity and contributions of these men would remain unknown if it were not for the anonymous writings of an English theorist aptly entitled Anonymous IV who attributes the *Magnus liber organi* to Leoninus and Perotinus in his musical treatise written circa 1280. Haines, "Anonymous IV," 376-378.

Perotinus consisted of the most decisive developments in the history of music.²⁵ That declaration may overextend the eminence of Notre Dame, but the introduction of a rhythmic notational form perfectly complemented the rise in elaborate polyphonic music.

Leoninus greatly contributed to the evolution of music notation through the writing and compiling of the *Magnus liber organi*. Perotinus added to this accomplishment by revising and rewriting sections of the *Magnus liber*. For the first time in Western history, the *Magnus liber organi*, or *Great Book of Organum* incorporated not only pitch, but also rhythm. The rhythmic system used for the *Magnus liber organi* is a modal notational system based on modes of rhythmically organized music.²⁶ Modal notation, based on poetic meters, functions with only two values: short and long.²⁷ The short value is called *brevis* and the long value is called *longa*.²⁸ Patterns of the *brevis* and *longa* were arranged to form six rhythmic modes which came to be known as ligatures. The introduction of modal notation allowed for pitches to be placed into the division of time, but unlike contemporary forms of rhythmic notation, rhythmic modes are a quantitative form. “The unit of measurement in modern music is then a measure which consists of a fixed number of beats of equal duration ... The basis of modal rhythm on the other hand is... a succession of notes of *varying* value.”²⁹ There are no “fixed” beats in modal notation because individual rhythmic values are determined by their context, not by their innate character. Despite this fact, modal notation founded at Notre Dame by Leoninus and Perotinus provided the first innovation of a rhythmic system to organize and arrange polyphonic music.

Even at this point in the evolution of musical notation, orality still played an important role. There are three central manuscripts of the *Magnus liber organi* and vast differences exist between all three. This is evidence for oral transmission.³⁰ Berger asserts that “[m]emorization played a central role in all organum, discant, and counterpoint

²⁵ Waite, *The Rhythm of Twelfth-Century Polyphony: Its Theory and Practice*, 2-3.

²⁶ Rastall, *The Notation of Western Music*, 37.

²⁷ *Ibid.*, 38.

²⁸ Apel, *The Notation of Polyphonic Music: 900-1600*, 220.

²⁹ Waite, *The Rhythm of Twelfth-Century Polyphony: Its Theory and Practice*, 13.

³⁰ Berger, *Medieval Music and the Art of Memory*. 1.

treaties...all formulas were memorized and made their way to Notre Dame repertory.”³¹ As seen in earlier forms of notation, written music does not end oral tradition; instead it is used to aid memory. During the Notre Dame period notation and orality continued to coexist in a symbiotic relationship.

Franco of Cologne developed the next rhythmic innovation by building on the established modal system. Franco contributed to the evolution of music notation by assigning specific durational values to individual notes by different note shapes and creating the formal definition of a rest.³² In Franco’s musical treatise *Ars cantus mensurabilis*, written between 1260 and 1280, Franco defined the new system of longs, breves, and semibreves as three distinct units of sound duration and elevated the rest as an equal measurement of the omission of sound.³³ Since a note’s value could be determined by its shape, Franconian notation eliminated the necessity of placing notes in ligature patterns. Carl Parrish states, “[t]his independence of the note symbols from the modes is the most important single feature of the Franconian system; it means that each note or ligature can unmistakably transmit a definite rhythmic significance by itself, rather than by its position in a note group.”³⁴

While the Franconian form of notation gave notes individual values instead of values based on context, notes were still dependent on the rules of perfection and imperfection. The long could be classified in three different ways: perfect, imperfect, and duplex. Rastall explains this concept. “A perfect l[ong] was that of three tempora [units of time]...a perfect l[ong] could be imperfected by a b[reve].”³⁵ Therefore, depending on whether a breve preceded or followed a long, a long could either be perfect and worth three units of time or imperfect and worth two. To modern eyes the concept of perfect and imperfection appears strange and confusing, but the readers of this new form of notation understood how to interpret it. This could be compared to how modern musicians understand that a dot next to a note adds to the note

³¹Berger, *Medieval Music and the Art of Memory*. 156.

³²Lloyd Ultan, *Music Theory: Problems and Practices in the Middle Ages and Renaissance*. (Minneapolis: University of Minnesota Press, 1977) 20-21.

³³Strunk, *Source Readings in Music History*, 228-229.

³⁴Parrish, *The Notation of Medieval Music*, 109.

³⁵Rastall, *The Notation of Western Music*, 48.

half of its original value. Music must be read and understood within the context of its creation.

The Ars Nova period of the fourteenth century contributed significant innovations in music notation. Lloyd Ultan declares that the notational forms evolved here “provided the foundation for the developments that were to produce the notation still in use in the twentieth century.”³⁶ The term for this period “Ars Nova” or “new art” derives from a treatise of the same name written by Philippe de Vitry, a leading figure in the evolution of a new rhythmic system.³⁷ Three main features characterize the Ars Nova period. The first involves the creation of the minim, a note value smaller than the semi-breve.³⁸ The second feature includes a greater specificity to the note divisions. The terms *modus*, *tempus*, and *prolation* describe the division between the long, breve, and semibreve.³⁹ Each term could denote either a perfect or imperfect, which essentially meant a division or three or two. Figure 1 illustrates the relationship between the terms and the note values they described.

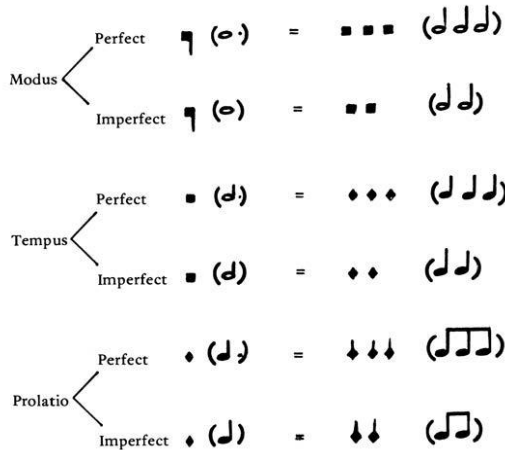


Figure 1. Ars Nova Note Values and Relationships ⁴⁰

³⁶ Ultan, *Music Theory: Problems and Practices in the Middle Ages and Renaissance*, 73.

³⁷ *Ibid.*, 61.

³⁸ Apel, *The Notation of Polyphonic Music: 900-1600*, 338-339.

³⁹ Ultan, *Music Theory: Problems and Practices in the Middle Ages and Renaissance*, 62.

⁴⁰ *Ibid.*, 62, example 5.1.

The third feature consists of the relationships for note groupings. The four principal relationships were called prolations. Important key phrases with this system are tempus, major, and minor. Tempus refers to the division of the breve into semibreves while major and minor prolations describe the division of the semibreve into the minim.⁴¹ The following chart demonstrates and summarizes the groupings.

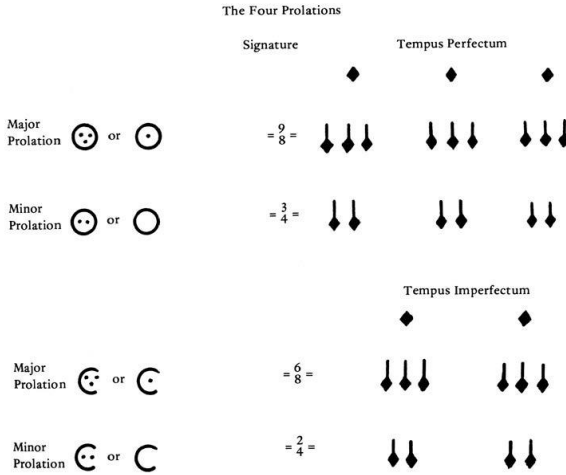


Figure 2. The Four Prolations⁴²

The innovations during Ars Nova provided an excellent stepping stone towards modern notation. Ultan contends, “[t]he significance of notation developments during this period cannot be underestimated, for they provided the premises for the notation for the following six hundred years.”⁴³

The increasing specificity of both Franconian and Ars Nova notation led to an interesting development in the relationship between notation and oral tradition. Since an exact notation for both pitch and rhythm resulted from these two periods, oral tradition was no longer necessary to teach a song. Now the representation of music on paper allowed for the exact oral replication and recreation of music. Berger states, “[a

⁴¹ Ultan, *Music Theory: Problems and Practices in the Middle Ages and Renaissance*, 63.

⁴²Ibid., example 5.2.

⁴³ Ultan, *Music Theory: Problems and Practices in the Middle Ages and Renaissance*, 74.

point] that is relevant to us is that only writing made verbatim memory possible. Oral societies are less interested in exact repetition and more in re-creation of texts.”⁴⁴ Oral tradition complemented early forms of notation by supplementing information that notation did not contain. Now music notation complemented the oral tradition by enabling exact recall. The increased amount of encoded information in notation did not eliminate the oral tradition, but changed the way that memorization and orality were implemented.

Early forms of music notation appear vague and indefinite according to modern standards, but the notations of each period led to successful performances. While earlier musicians did not possess the precise forms of notation used today, contemporary musicians do not possess the bank of memorized music attained by early musicians. The amount of music memorized by these musicians is nearly unfathomable. The total amount of music from the Mass and Office Proper could be seventy-five to eighty hours of music; this equals a selection of Beethoven’s instrumental works and the complete Wagnerian canon. The context of early music notation defined its function within each musical period. Music notation cannot be separated from oral tradition with which it collaborated nor can it be compared to modern forms of notation. Kivy affirms this statement. “[Trying to realize Medieval notation with modern rules and conventions] is like putting a dinosaur in Times Square and concluding that it is ill-adapted for survival.”⁴⁵ Just as the dinosaur was never meant to exist in Times Square, older notation is not meant to be evaluated through the scope of modern requirements. Kivy continues this idea.

Under the rules and conventions of modern musical practice, *of course* [early notation] does not fully determine a performance, note-for-note. In that conceptual scheme it appears hopelessly vague in comparison with the score of a Brahms symphony. In its own practice, however, it is neither vague or imprecise. Within the conceptual apparatus of musical institutions which is served, it provides just what the

⁴⁴ Jack Goody, *The Interface between the Written and the Oral*, 85, quoted in Berger, *Medieval Music and the Art of Memory*, 82.

⁴⁵ Peter Kivy, *New Essays on Musical Understanding*, (Oxford: Clarendon Press, 2001), 13.

modern symphonie score does for ours: it gives all of the information a musician sees himself as requiring for a correct sonic realization. In his eyes it fully determines performance.⁴⁶

Early music notation fulfilled the needs for which it was created. Also, notation served different purposes in each period making it impossible to deem one form less sufficient than another. Forms progressed and alterations were made when a current form was found lacking. Therefore the story of music notation is not a progression from inferior to superior, but the enfolding of a series of innovations, an evolutionary process of creation and modification.

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⁴⁶ Peter Kivy, *New Essays on Musical Understanding*, (Oxford: Clarendon Press, 2001), 13.

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