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# Slashes, Dashes, Points, and Squares: The Development of Musical Notation

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## Slashes, Dashes, Points, and Squares: The Development of Musical Notation

Music has been around for a long time; in almost every culture around the world we find evidence of music. Music throughout history started as mostly vocal music, it was transmitted orally with no written notation. During the early ninth and tenth century the written tradition started to be seen and developed. This marked the beginnings of music notation. Music notation has gone through many stages of development from neumes, square notes, and four-line staff, to modern notation. Although modern notation works very well, it is not necessarily superior to methods used in the Renaissance and Medieval periods.

In Western music neumes are the name given to the first type of notation used. While other cultures such as the Greeks had an older method of notation that outdates neumes, neumes were considered the beginnings of the western tradition of notation. “The word ‘neumes’ is derived from the Greek word *neuma* which means ‘a sign.’”<sup>1</sup> The neumes were simply a sign or series of signs that represented how a piece of music was to be performed. Leo Treitler states, “As early as the mid-nineteenth century the question of the ‘origins’ of the neumes was one of the most prominent of medieval topics of discussion.”<sup>2</sup> While the origin of neumes has been a popular topic for centuries, a clear answer as to the exact origins cannot be found. There are several theories that attempt to point to a certain spot where neumes originated, but there is simply not enough evidence to be completely sure. Richard Rastall says, “The earliest surviving manuscripts of neumatic notation, dating from the ninth and tenth centuries originated in the monastery of St. Gall in Switzerland.”<sup>3</sup> There were many different places that began to use

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<sup>1</sup> Hope R Strayer, "From Neumes to Notes: The Evolution of Music Notation." *Musical Offerings* 4, no 1. (2013): 2. <http://dx.doi.org/10.15385/jmo.2013.4.1.1>

<sup>2</sup> Leo Treitler, "The 'Unwritten' and 'Written Transmission' of Medieval Chant and the Start-Up of Musical Notation." *The Journal of Musicology* 10, no. 2 (1992): 133.

<sup>3</sup> Richard Rastall, *The Notation of Western Music*. (New York: St. Martin's Press, 1982), 31.

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neumes. Each of these places had a slightly different way of notating the neumes. Figure 1 below shows the difference between the French, Norman, Square notation and modern transcription.

	FRENCH	NORMAN	SQUARE	TRANSCRIPTION
Virga		∩	∩	•
Punctum	.	.	.	•
Pes	↓	∩	∩	—•
Crista	∩	∩	∩	—•
Scandicus	∩	∩	∩	—•
Climacus	∩	∩	∩	—•
Torculus	∩	∩	∩	—•
Porroctus	∩	∩	∩	—•
Pes Subbipunctis	∩	∩	∩	—•
Torculus Resapitus	∩	∩	∩	—•
Porroctus Flexus	∩	∩	∩	—•
Epiphonus	∩	∩	∩	—•
Cephalicus	∩	∩	∩	—•
Distropha and Bivirga	∩	∩	∩	—•
Triostropha and Trivirga	∩	∩	∩	—•
Oriscus	∩	∩	∩	(no separate symbols)
Pressus	∩	∩	∩	
Salicus	∩	∩	∩	
Quilisma - Pes	∩	∩	∩	
F - CLEF	F	F	∩	and eventually ∩:
C - CLEF	C	C	∩	and eventually ∩:

Figure 1: Differences in regional notation<sup>4</sup>

<sup>4</sup> Rastall, The Notation of Western Music, 34.

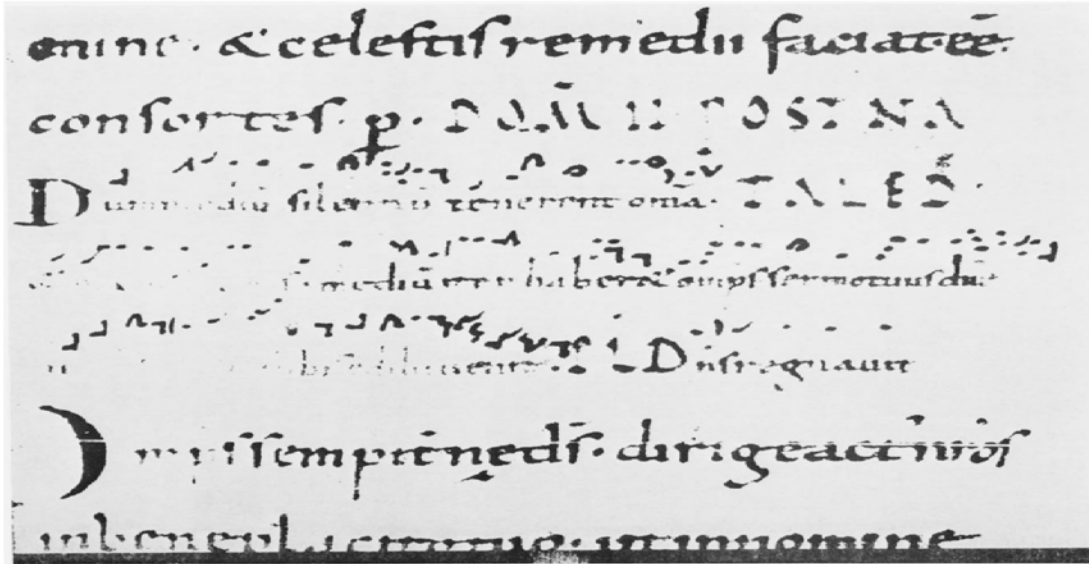


Figure 2: Opening of the introit *Dum medium silentium* from the missal Paris, Bibliotheque Nationale, MS fonds lat .17305<sup>5</sup>

Figure 2 is an example of some of the earliest forms of neumatic notation. The neumes are above the words and look as if they are either a mistake in the writing or someone wrote in a different language over the words. In the ninth century the neumes represented how many notes were to be sung; it did not represent actual pitches or durations. “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.”<sup>6</sup> Thus the oral tradition was still needed to learn the music; the neumes were just to help to make the learning process go faster and aid the memory. “Written sources originating during that period show many signs of the continuing activities of oral processes along with written ones in the transmission of music, confirmation that writing was for a long time in support of, rather than in competition with, the

<sup>5</sup> Kenneth J. Levy, “On the Origin of Neumes.” *Early Music History: Studies in Medieval and Early Modern Music* 7, (1987): 71. <http://www.jstor.org/stable/853888>.

<sup>6</sup> Strayer, 3.

oral performance tradition.”<sup>7</sup> The music still needed to be sung in order to pass it along. The neumes did not possess enough information to allow someone to learn the music strictly from the neumes if they had never before heard the piece.

Until the tenth century music still had to be learned by rote with the neumes as an aid to faster learning. Heightened neumes appeared during this time. The heightened neumes gave a better idea of where the melody was to go by giving a general contour of the notes. The early neumes just gave the number of notes that were to be sung. Heightened neumes allowed for an even better idea of what the music was to sound like without hearing it, by placing the neumes at different distances above the words. Sometimes a line was scratched or drawn to represent the pitch “A”, giving a sense of what the pitches were. Exact pitches were still relative at this point as the heights of the neumes were not exact representations of the pitches. “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.”<sup>8</sup> Although there was still no complete way of notating everything that was sung, there didn’t need to be; the heightened neumes worked very well for what was needed. This made the notation of this time sufficient and not inferior to what we have today. They did not have notation like we have today because they did not need it. “The primary task of melody in chant is the presentation of language in such a way as to project its sound structure and meaning with maximum distinctness, while at the same time being faithful to principles of melodic syntax and grammar that assure coherence of idiom and genre and to the

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<sup>7</sup> Leo Treitler, “The Early History of Music Writing in the West.” *Journal of the American Musicological Society* 35, no. 2 (1982): 237. <http://www.jstor.org/stable/831146>.

<sup>8</sup> Strayer, 4.

constraints of performance practice in the liturgical situation.”<sup>9</sup> In the church the most important part of the chant was the text; therefore, the melody needed to be something that made the text more memorable. The neumes simply made it easier to remember the contour of the melody while the words governed the rhythms. Figure 3 illustrates this and shows the heightened neumatic notation with the line to represent a single pitch.

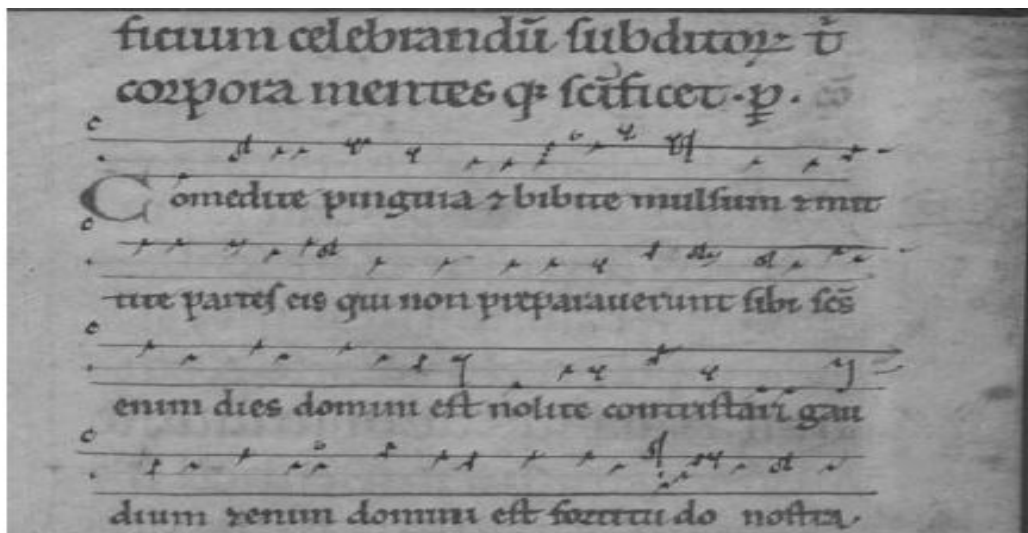


Figure 3: chant *Comedite pinguia* heightened neumes<sup>10</sup>

Heightened neumes were used by those in the church; those who did the actual chanting had to have all the tunes memorized. Memorization for some may have been easy, but for others it may have taken a long time with many repetitions. There were countless chants during this time, making learning all the words and tunes a daunting task. This was an incredible feat; the hours of music that would have been memorized is incomprehensible to us today. Neumes and heightened neumes were developed as a way to aid in the memorization of the chants. They

<sup>9</sup> Leo Treitler, *The "Unwritten" and "Written Transmission"*, 138-139.

<sup>10</sup>Kathleen E. Nelson, "Fragments of Medieval Chant Manuscripts at the University of Sydney." *Fontes Artis Musicae* 55, no. 1 (2008): 227.

could also have been a way for monks to carry chants from one area to another and teach others the chants; learning them would have taken place faster with the new notation, and the visiting monk would not have had to stay as long in one place to make sure it was learned if they didn't want to, or were needed elsewhere.

The next shift in notation went from neumes or points, to square notation. John Hanes does a good job of explaining the shift from point to square in the following quote:

The most significant graphic change in music script of the Middle Ages is the advent of square notation. The simplest way to describe this change is in terms of the basic building block of music notation, a single pitch called a point (*punctus*) in the earliest period, the other fundamental neume being the *virga*. The point prevailed from the ninth to the twelfth centuries, after which time it yielded to the square note (*nota quadrata*). The new square note and the compound shapes based on it did indeed exhibit a more angular and quadratic aspect than the general cursive and rounded look of much earlier notation.<sup>11</sup>

The “*virga*” is one of the main symbols that was used in square notation the other being the “*punctum*”, which looked very similar; these became interchangeable in the square notation. When notation began to shift to the mensural notation, the “*virga*” became called a “*breve*”, which had a rhythmic connotation. One reason that the symbols took on a square shape was that the quill pens that were being used lent themselves to square notes better than any other shape.

The next major event in music notation was the development of the four-line staff in the early eleventh century by Guido d'Arezzo. The staff solidified the pitches, giving whoever had the music an almost complete knowledge of the piece without ever having to hear it. The lines of the staff were most often drawn with red and black ink, making the staff very visible. The line for *f* was in red, and *c*, though sometimes in red, was often put in yellow, or sometimes green. The lines on the staff fluctuated on what each line stood for which note, this continued until the

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<sup>11</sup> John Haines, "From Point to Square" *Textual Cultures: Text, Contexts, Interpretation* 3, no. 2 (2008): 30. <http://0-www.jstor.org.library.cedarville.edu/stable/30227869>.

four line staff became standard, and the lines did not change notes dependent on range. “In all cases the notes are placed both on and between the lines. The lines thus represent d, f, a and c’, or f, a, c’ and e’, according to the tessitura of the chant: low-lying chants occasionally dispense with the c’ line, so that the lines represent B, d, f and a. Chant has never used more than four stave-lines.”<sup>12</sup> At this point the notes became more important on the page than the words. “Music written on staves takes up much more room than the neumatic script occupying a thin band only.”<sup>13</sup> This was simply because more room was required for a person to be able to read and decipher the notes on the staff than the contour of neumatic notation. The neumes were not overly prominent; the words were of more importance. But in the early staff notation the musical notation began to become more important than the words. The staff notation required more room because it was much more intricate, and contained a lot of information that needed to be passed to the reader. The four line staff needed more space than did the heightened neumes because the size of the staff stayed constant throughout the piece.

The four line staff had two different clefs to represent what notes the staves represented. The first clef was the C-clef, which would have been placed on one of the top three lines of the staff. It looked like a C in shape and represented where middle C on the keyboard would be in the staff. The next clef was the F clef; the F clef would have been placed on one of the top two lines of the staff. The middle of the F shaped sign showed where the F below middle C. Figure 4 below shows the relationship between the early clefs and our modern equivalent.

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<sup>12</sup> Rastall, 31.

<sup>13</sup> Janka Szendrei, “The Introduction of Staff Notation into Middle Europe” *Studia Musicologica Academiae Scientiarum Hungaricae* 28, Fasc. 1/4 (1986): 307. <http://www.jstor.org/stable/902429>



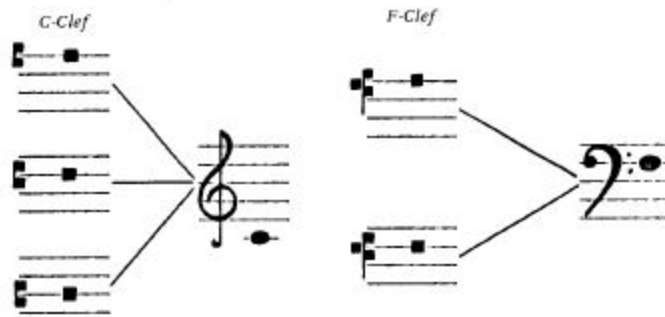


Figure 4: Interpretation of the C and F clefs<sup>14</sup>

The four-line staff is still standard for use in notating plainchant today. Guido d'Arezzo is credited with the creation of the staff in c. 1000-50. Guido was a prominent musical theorist in the Middle Ages. Not all scholars agree that Guido invented the staff though all agree that he had some input on the development.<sup>15</sup> The greatest accomplishment of the four-line staff was that now singers could learn to read and to perform a song which they had never before heard. Although the four-line staff developed in the eleventh century was becoming more and more common, the older methods of heightened neumes were still used for several centuries. The shapes of the neumes in northern France even began to adapt to fit into the staff better, and that is what formed the basis on what we now have as modern four-line notation of plainchant.<sup>16</sup> In the eleventh and twelfth centuries, the oral tradition was still used because the plainchant neumes still did not contain any rhythmic values. "Plainsong notation was not concerned with rhythm."<sup>17</sup> The oral tradition was still important and was used along with the written.

<sup>14</sup> Lloyd Ultan, *Music Theory Problems and Practices in the Middle Ages and Renaissance*. (New York: W. W. Norton and Company, Inc., 1957), 4.

<sup>15</sup> John Haines, "The Origins of the Musical Staff," *The Musical Quarterly* 91, no. 3-4 (2008): 327. <http://0-www.jstor.org.library.cedarville.edu/stable/20534535>.

<sup>16</sup> Hoppin, 60.

<sup>17</sup> Curt Sachs, "Some Remarks about Old Notation" *The Musical Quarterly* 34, no. 3 (1948): 365. <http://www.jstor.org/stable/739549>.

Mensural notation developed out of the plainchant neumatic notation. In plainchant notation the squares and diamonds were placed on the four-line staff to represent pitches but not to represent the durations of notes. This is because in plainchant the rhythm was not the primary focus or concern, the notes were. In the thirteenth century there was an increasing focus on polyphony. This led to the need for music to have measured time to keep all the parts straight. It would have been very hard to keep two parts together, and keeping together the four or more parts that polyphony required would have been difficult. “Hence, the time-values of the individual notes were indicated in the various shapes of their symbols-as rectangles, squares, and diamonds, either by leaving them bare, or else by adding distinctive stems and later even flags.”<sup>18</sup> With this beginning of notating rhythms as well as the notes the oral tradition was slowly fading into the past. It was becoming less and less important for a person to hear the music to be able to perform it. If a person was able to read the notation, then hearing the song sung first was almost unnecessary. This gave music a new advantage; it did not have to be transmitted by a person who knew the chant. The chant could be carried from one place to another by any messenger.

In mensural notation the standard note, the breve, could be divided both into three notes and into two notes depending on the mensuration symbol. This development came out of the Ars Nova period which simply means “new art”. A couple of the developments of the Ars Nova are the binary and ternary division of notes. “The mensural point-in-time, and the mensural note value, have the capacity of multivalence: they can and do attach themselves to diverse and

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<sup>18</sup> Sachs, 365.

simultaneously coexisting patterns.”<sup>19</sup> This allowed music to have several of what would in our modern terminology be different key signatures. The perfect time signature was considered the 9/8 time signature because it had three sets of three. Three symbolized the perfection of the trinity. The imperfect time signature would have been the 2/4 time signature which is two sets of two. The sign for these time markings looked like circles or half circles with dots inside them or slashes through them. Figure 5 below illustrates this, and shows how notes in each time signature would be divided. “The dot placed within the complete or broken circle as indication of perfection became known as *punctum perfectionis* (point of perfection) and was sometimes referred to as ‘the prick of perfection.’ The broken circle has been retained in modern notation where it represents 4/4 meter often referred to as ‘common time.’”<sup>20</sup> Our symbol for cut time also comes from mensural notation it is 4/4 time where diminution came into play. The symbol is the half circle shape with a slash through it. When mensural notation was used it was considered imperfect and not used as often, but it is now our most common time signature. Figure 5 shows how breves and semibreves would be divided when the mensuration signs were used.

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<sup>19</sup> Graeme M. Boone. “Marking Mensural Time” *Music Theory Spectrum* 22, no. 1 (2000): 43.  
<http://www.jstor.org/stable/745851>.

<sup>20</sup> K Marie Stolba. *The Development of Western Music a History*. (Iowa: Wm. C. Brown Publishers, 1990), 126.

<i>Sign</i>	<i>Mensuration</i>
⊙	■ ◆ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
○	■ ◆ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
⊙	◆ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
⊙	◆ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
○	■ ◆ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
○	◆ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

Figure 5: Mensural notation symbols interpreted<sup>21</sup>

Andrew Hughes describes the diminutions and rhythmic variability's of the mensural notation in the following quote very well.

In the first half of the fifteenth century, rhythmic instability, so much a feature of fourteenth and fifteenth century music, shifts from the meaning of the note symbols themselves to the actual speed of the music. This is reflected by the replacing of the compound rhythmic schemes equivalent to our 6/8 or 9/8 by the 3/4, a change which is not the simplification it is usually said to be. The fact is that two bars of the later 3/4 are musically equivalent to one bar of the earlier 6/8, plus an additional imperfect subdivision of the minim. If, as seems certain, there was doubling of speed we once again have the original 6/8, now able to include the semi-minim. In other words the note values of the later 3/4 are a conventional doubling of the earlier values in order to facilitate the writing of very short notes. The same remarks apply, mutatis mutandis, to the earlier 9/8, although this in fact falls into disuse.

The doubling of speed, which amounts to placing the tactus on the breve rather than the semibreve, is confirmed in several ways: the musical idioms of the 3/4 are equivalent to those of the 6/8 in notes twice as long. Moreover, the later



<sup>21</sup> Jason Stoessel, "Revisiting 'Aÿ, mare, amice mi care': insights into late medieval music notation" *Early Music*, 40, no. 3 (2012): 456. <http://0-www.jstor.org.library.cedarville.edu/stable/23327766>

mensuration sign is often  $\text{C}$  instead of  $\text{O}$ , and even when the latter is used, concordances sometimes indicate that the former should be understood.<sup>22</sup>

Thus a modern example would be a half note in 4/4 time would be the same as a quarter note in 2/2 time, resulting in a doubling of the tempo. This process called diminution came into play in the fourteenth century when mensural notation was being used. Diminution worked by making the breve the length that the semibreve would have been, thus doubling the tempo. There was a period however where it was hard to tell if the values of the notes were doubled, though there were usually some more complicated rhythms that helped remedy that problem. Actual counts for the breves remained ambiguous because of the way that they could be divided. This is still a problem for those interpreting mensural notation today.<sup>23</sup> Figure 6 below further illustrates why this would have been difficult and shows the modern translations.

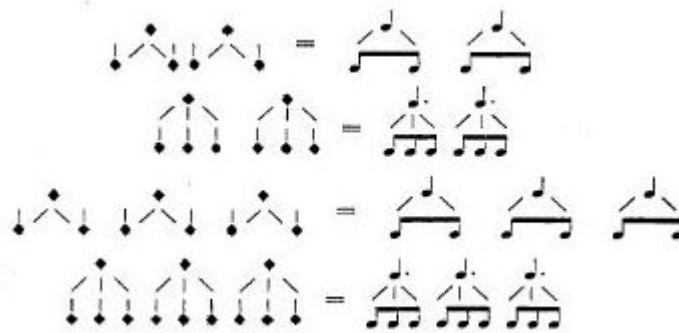


Figure 6: Visual of Mensural divisions in modern notation<sup>24</sup>

In mensural notation the signs were used to denote a general way which the notes should be divided. Anna Maria Busse Berger puts it as follows, “In many cases the mensuration signs

<sup>22</sup> Andrew Hughes, “Mensuration and Proportion in Early Fifteenth Century English Music” *Acta Musicologica* 37, fasc. 1/2 (1965): 48-49. <http://www.jstor.org/stable/932338>.

<sup>23</sup> Hughes, 49.

<sup>24</sup> *New Oxford History of Music: Ars Nova and the Renaissance 1300-1540*, ed. Dam Anselm Hughes and Gerald Abraham, (London: Oxford University Press, 1960), 4.

are used without any additional explanations, in others a canon or coloration is added.”<sup>25</sup> Thus sometimes coloration was added to the music. Red notes were often used to help denote rhythmic values or durational changes.<sup>26</sup>

Heading into the Baroque period in the seventeenth century we see a rise in instrumental music. Per Dahl says, “With the rise of instrumental music in the Baroque era, musical notation became more accurate and the specifications from the composer on how to perform his musical work became more detailed.”<sup>27</sup> In the early Baroque era we see a shift from the square notation to an early version of our modern notation. The five line staff and the rounded notes were first seen in this period.

Some people may argue that our modern written notation is better or rather superior to the older neumatic notation. This is very much like the argument that sometimes occurs between musicians that Suzuki, or learning by ear or rote memorization, is not as good as learning by note. This all boils down to the same age old argument; is the oral and/ or aural tradition better than the written tradition, and is the modern notation better than the neumatic or square notation? Shinichi Suzuki was a musician in the early nineteen hundreds; he developed a teaching method for violin that starts very young children on the violin without using any written notation. The method develops the child’s ear and their aural skills as they learn to play. He believed that children should learn to play by listening and mimicking music, especially folk music. “Shinichi Suzuki has based his revolutionary expectation that all children can learn to play the violin on his observations of how children acquire spoken language, one of the most complex of all learning

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<sup>25</sup> Anna Maria Busse Berger, “The Origin and Early History of Proportion Signs” *Journal of the American Musicological Society* 41, no. 3 (1988): 407.

<sup>26</sup> Rastall, 61.

<sup>27</sup> Per Dahl, “*The Rise and Fall of Literacy in Classical Music: An Essay On Musical Notation.*” *Fontes Artis Musicae* 56, no. 1 (2009): 69.

tasks. His ‘mother tongue’ approach assumes that every healthy youngster masters the difficulties of learning language as a result of listening, endless repetition, and the ability to proceed at an optimal, individual rate.”<sup>28</sup> This is very similar to the way early chants were learned through rote memorization and repetitive hearings. While Suzuki emphasizes strong listening skills and playing from memory it has been criticized for not developing good reading skills and only developing listening and memory skills. Other methods tend to go in the opposite direction and focus solely on reading and not on developing listening and memory skills. Thus, neither method seems to be perfect although each has its strengths and weaknesses. Suzuki allows younger students who cannot read yet to begin learning the violin. This can be a good thing but if not transferred properly, they may rely completely on their ear and not on the music when they do learn to read music or they may never learn to read music. This would force them to memorize vast amounts of music, and they could run into problems when playing in a group. Other methods teach music reading at the same time as learning to play by ear, this can develop strong readers that can play any music placed in front of them without having to hear it first, although they may have more difficulty memorizing music when it is necessary.

In the early tenth and eleventh centuries when early neumatic notations were first being used the tradition was predominantly oral and thus focused on the ear and memory. Now the focus is on reading the notes and doing exactly what they say. Does this make one method better than the other? No, they are different methods coming from different traditions and needs. Both the oral tradition and the written tradition are useful and serve their purpose. Maybe a combination of both of them is what we need in our music classes today, learning to use the ear

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<sup>28</sup> Augustus Brathwaite, “Suzuki Training: Musical Growth or Hindrance?” *Music Educators Journal*, 75, no. 2 (1988): 42-45. <http://www.jstor.org/stable/3398060>

while learning to read notes. There are benefits to both methods. Learning by ear has the benefit of being able to memorize large amounts of music; learning by note ensures that one can play in a group and doesn't have to hear a piece to be able to perform it.

Neumatic notation was developed and used as a guide to show how many notes were to be sung; heightened neumes were to give both the number of notes and a general contour. The oral tradition was still there and was used in the learning process; chants would be sung and the words and neumes would be used as a guide. Square four-line staff notation and mensural notation were to give exact pitches and timings; this made the oral tradition almost not needed. The only reason it would be used was to get the dynamics and any inflection that would not have been notated. The last is modern notation which gives every possible musical expression, from notes and rhythms to dynamics and tempos. Thus throughout the development of western notation the oral tradition and the written tradition have been used. The oral, through no longer necessary for music to continue, should not be forgotten. It is still important to the development of a competent musician.



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