THE WARP AND WEFT OF FABRIC:
A COMPOSITION FOR STRINGS

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF MUSICAL ARTS

By

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Denton, Texas

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Doctor of Musical Arts (Composition), May, 1999. 64 pp. essay, 45 pp. score, 4 tables, 21 illustrations, references, 6 titles.

The six-movement work is scored for two violins, a viola, and a violoncello.

A new approach toward the decision making of the compositional process is revealed which structures the parameters of the composition along an arbitrary frame of reference. This reference is selected prior to composition and influences every aspect of the work. The reference chosen is an existing musical work used in quotation and for stylistic modeling, paraphrase, and variation. Consonance, dissonance, and thematic development are defined in terms of this source.

*Le Messe de Notre Dame* by Guillaume de Machaut serves as the musical source of the reference information. Material from the mass forms quotations, pitch sources, rhythmic figures, formal modeling, and style paraphrasing. The fourteenth-century work lends content and character to *The Warp and Weft of Fabric.*

The string ensemble work explores a variety of compositional techniques ranging from textures of color washes created from quoted passages to linear melodic and counterline development from styles and techniques drawn from Machaut’s mass. Modern adaptations of fourteenth century techniques and theories are exploited for interesting developmental procedures. *The Warp and Weft of Fabric* contemporary work conceived and matured within a medieval context.
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Introduction

The Warp and Weft of Fabric, a string composition scored for the two violins, viola, and violoncello was designed as a multimovement work in sections that explore the acoustic complexities of the chamber ensemble in pitch, rhythm, and timbral production. The tapestry of sound woven from line and melody and harmonic relationships would scarcely surprise the listener in the contemporary musical climate. The exploration of a new approach to genesis creates the uniqueness of this musical work. The construction of the “warp” of the form and structure is completed by the “weft,” which finishes the patterns and binds the individual fibers into a single weave. Aspects of the music were chosen as pertinent or insignificant to a section on the basis of an efficient achievement of the final goal. The Warp and Weft of Fabric is a study of the selection of style and structure, based on precompositional decisions and the construction of an outside frame of reference.

An Overview of the Influence of Precompositional Decision

Since music was first divided into functional forms, the purpose of the music has influenced the design and style. An architectonic plan chosen as a formal structure defines the goal of the resulting work. A frame of reference built from that plan provides guidelines, boundaries, and structure. It influences the basic elements of the piece, including pitch, rhythm, and stylistic considerations. But the design denotes more than a structure or style; it also implies a character and motivation inherited from the history of
the design. The very elements that guide the larger compositional decisions influence the
minutia of the compositional process. In short, each part of a composition influences all
other parts of the piece, as the material and texture of fabric contribute to its coloration
and use.

Historically, precompositional decisions to employ certain stylistic and formal
elements predetermined major attributes in the eventual design of a composition. Text
and lyrics established many elements of mass settings, song forms, song cycles, and
oratorios. Standard titles establishing formal design, character, and/or and motive are
found in each historical period. The dance suite, trio sonata, and concerto all create an
expectation of dramatic interplay among different movements, groupings within the
orchestration, or sectional contrasts in key selection and voicings. The consequent
evaluation of the work hinges on its fulfillment of these expectations.

Precompositional Decision in the Sonata-Allegro Concept

The sonata-allegro concept exemplifies a significant branch of formal design with
precompositional determination of style and structure. An opening subject states the
theme of the movement. The theme contains the embryonic material that transforms into
the other aspects of the movement within an established framework of expectations.
When the composer approaches these expectations creatively, the audience receives the
work well, but the decisions made in the context of the sonata-allegro form evolved
through countless thematic treatments throughout the centuries. This context, invoked by
the initial statement and anticipated restatements of the theme, causes the listener to
respond along guidelines shaped by previous experience; the listener receives the work
within a referential framework. Having been created within that model, a composition fully exploits previous advances made by others using that structure.

The Primary Objective of *The Warp and Weft of Fabric*

The objective of this string composition, *The Warp and Weft of Fabric*, was to exploit the predisposition of the ear established by a musical frame of reference. This would provide a traditional expectation of fulfillment based on the established context. But this context is based entirely on a frame of reference from an outside source. Material within the composition itself forms the listener's reception of the environment rather than do external cues. The perception that a musical performance evokes in an audience is a combination of intonation, phrasing, pitch arena, rhythmic groupings, and an architectonic design that considers each of these elements.

Further, the objective of the work was to inspire a reliance on the aural perception of the entire piece rather than on a visual one. The musical statements create this environment, not a programmatic title, program notes, or extramusical references. The connection was derived from a series of quotations and compositional material based on an independent musical selection taken from the historical moment when the oral tradition of critical thinking gave way to written knowledge.¹ The pivotally placed work from this influential time tipped the scales toward modern thought. *The Warp and Weft*

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¹ Shai Burstyn, "In Quest of the Period Ear," *Early Music*, 25, no. 4 (1997): 693. Burstyn points out the inclusion of the rhythmic design, dynamics, and the advances in notation place a literary emphasis on what must have surely been works of aural intricacy and detail. This bridge lies between two mind-sets: one embracing millennia of intellectual development, the other heralding the literacy of thought that characterizes modern culture.
of Fabric seeks to tip them back a bit. This mode of material selection was arbitrary and precompositional. It also extended beyond the superficial to a higher level of context for the work beyond the musical elements of form, pitch, and rhythm. The quoted source is Machaut's *Messe de Notre Dame*. Elements of this mass from the fourteenth century forms the binding material for *The Warp and Weft of Fabric*.

**Compositional Organization Defined**

At the most basic level, a musical composition has an edifice of sound with organized and structured noise. Designed around elements that either create unity or contrast with the rest of the structure, the organization creates or releases tension. The creation of tension through disharmony, rhythmic differences, or timbral disparity provides momentum through imbalance; the balance between tension and release is the primary driving force in a successful piece. The organization of sound uses various resolution elements to delineate sections. As a direct result of the strategic placement of these elements, this resolution creates direction and purpose within the scope of a single composition.

Through use of the quotations and pertinent aspects of the existing material as boundaries and guidelines, an environment was designed for *The Warp and Weft of Fabric* to form new ideas that are received in a different light from the new ideas presented independently. The quoted sources were deconstructed and analyzed for components to use as building blocks. These components take the form of pitch series, numeric relationships, and timbral elements. This raw material provides a basis for the palette of choices creating compositional considerations within that new environment.
reflecting the work quoted.

Organization Based on a Predetermined Frame of Reference

In The Warp and Weft of Fabric, precompositional decisions influencing the character and design provided the organization. Compositional techniques were employed to fulfill the expectation created by the original design. The Warp used a sectional design fitting the predetermined form, with certain elements of unity and contrast built into the structure. These were exploited to achieve the goals of the individual composition. Nonmusical decisions control musical material, as evidenced by programmatic forms such as the symphonic poems of Liszt, the dramatically controlled motives in Berg’s Lulu, the precise arbitrary measurement of Bartok’s 4th String Quartet, or the isorhythmic tenors of fourteenth-century masses and motets; however, the nonmusical influences must be subjected to conformity with the overall design of the composition.

Composers have made precomposition design decisions completely apart from the musical considerations of the piece, as in the aleatoric work of John Cage. Nonmusical devices create empirical data independent of the musical design. Chance methods, mapping techniques, and stochastic number processing render information that arbitrarily translates into musical information irrespective of formal considerations. These data are applied to various musical parameters at the composer’s discretion, and these elements are manipulated to create a more effective presentation of the work. However, the design of the organization and structure is predetermined by the method selection and is not related to its aural consideration.
The purpose of the design framework is strategic positioning to exploit the contrast of similar and dissimilar sections. On a large scale, contextual placement of movements provide continuity and forward progression. Pitch centers figure prominently in expansion of tonal exploration, and scale and individual pitch selection reflect the direction of the tonal center, consonant, dissonant, or modal. The tempo and textural changes between movements and transitions contribute to the progression through the work. These elements rest in the context of the architectonic framework. The selection creates movement or repose within the expectations of the overall structure for that moment.

The Historical Perspective of Organization Through Key Centers and Motivic Design

Historically, the music of the common practice period was based on scalar pitch structures, tonal key orientations, and progressive relationships between sections. As the formalization of multimovement works occurred, the expectation of key centers used in each movement became more rigid. Deviation from the standard internal-movement key selection was perceived as tension requiring release within the context of the period. This technique created a sense of forward movement within the body of the work.

Complementing textures and styles organized multiple movements integrated into a work as a whole. Frequently unifying themes and motifs endowed a common character that pervaded the piece. These elements formed a connection identifying the central character and linking the disparate parts of the whole into a common goal. Motivic elements provided primary components of the organizing structure and enhanced the
integration of contrasting themes and textures in separate movements.

The intention of *The Warp and Weft of Fabric*—to derive an independent frame of reference from an existing work—functioned as a guide for structure and material selections. Composers of works with sonata-allegro design used guidelines created by the stylistic expectations of audience and performer alike. These were anticipated elements selectively fulfilled or defeated by the composer. *The Warp and the Weft of Fabric* achieves the creation of the same compositional guidelines with references to Machaut's Mass. This pivotal work from the fourteenth century brings a sense of character and style to *The Warp*. The environment in which Machaut lived and wrote profoundly affected the orientation and direction of *The Warp* and imparted an attitude of reverence taken from Machaut.

**Background Information on Composition Using References to Existing Works**

The application of quotation within a work has had many incarnations historically. These inserted sections provide contrast for surrounding material. The dramatic statement highlights the familiar refrain. The successful imagery evokes a mood change characteristic of the insert. However, from an existing work, data can also be gleaned to apply to the control and design of form, structure, timbre, texture, melody, counterpoint, and harmonic design. Elements can be referable from a motivic level to conceptual design and intent.

Charles Ives composed extensively with material gleaned from external sources. He modeled the structures of his works, quoted passages, and executed a variety of
repackaging techniques on tunes and melodies from his past. His early exposure to the music of nineteenth-century New England, with its folk and hymn tunes, became envelope with Ives' classical training. The many styles and song forms from his life synthesize into his unique approach to composition. His works showcase numerous applications of information from quotations. He steps beyond the simple quote and composed with stylistic allusions, variations on a tune, paraphrasing, and resetting with new accompaniments, lyrics or melodies. He most eloquently demonstrates his skill with exaggerated quotation in quodlibet, juxtaposing multiple sources in close proximity with virtuoso technique.²

For many musical venues, derivative techniques were the standard compositional practice in the past. This was a practical result of the musical environments. The liturgical mass and the accompanying chant were strictly interpreted, with few innovations or avenues for exploration; however, the creative urge was not to be suppressed. In the form of tropes and sequences, the existing material developed into new forms and musical styles. The evolution from such rigid foundations made external compositional influence from an existing work of music an accepted standard. Any single section carefully avoided excessive deviation from the chant reference.

Quotation in Early Music

Music based on chant achieved a high level of intricacy with the cantus firmus mass. This was a polyphonic rendition of a section of the Ordinary, with the chant

melody for the text sung in the tenor voice. The tenor eventually developed into a slow augmentation of the original chant with "harmonic implications," rather than a melodic figure. The final composition would be far removed from the original context of the tenor line while still retaining the invariable pitch progression of the chant line.\(^3\)

The parody/imitation mass was a logical but innovative development of the cantus firmus technique. This was a logical extension in which a composition was based on a more extensive statement from another work. In parody/imitation mass, entire voicings and sections were quoted and developed into a new movement for the mass. A modern parallel to this technique utilizes the chord changes of a jazz standard, forming the basis for new tunes and lyrics. An entirely new work is created upon the framework that existed for another song.\(^4\)

An Example from Literature

Written literature includes an outstanding example of this derivative technique. One of the premier works in twentieth-century English language literature is *Ulysses* by James Joyce. In his epic work on the condition of Ireland at the beginning of the twentieth century, Joyce told a tale of frustrated vision and lost hope within the

\(^3\)For this study, the main fact to glean from the cantus firmus development was the outside source of form and modal relationships. The external source was aligned referenced, and manipulated to create the frame of the movement within which the composer worked. Frequently, a single line of chant was extrapolated to be the foundation for the entire cycle of polyphonic movements of the mass.

\(^4\)This has an historical antecedent based in the traditional blues standards. A codified set of chord changes was established through interaction between players, who developed individual styles that utilized the standard framework to fit together. This allowed for maximum freedom of expression within the existing format of pick-up bands and open improvisation.
framework of another monumental work, *The Odyssey*, by Homer. The Irish novelist invoked the Greek epic by titling the work after the protagonist. Events and participants in Homer’s work serve as types that are reflected in Joyce’s story. These bind the chronologies of the story lines together.5

Joyce wrote *Ulysses*, the story of Leopold Bloom, his unfaithful wife, Molly, Stephen Dedalus, and the Dublin of June 16, 1904, in the manner and style of Homer’s epic. His choice of the classic adventure saga set the mood and direction. In a classical tragic drama, the frustration of a contemporary Irishman is set forth within the skeleton of Ulysses’ epic voyage. The personal struggle for his own freedom and that of the Irish takes grand form in the warm glow of Homeric monsters and the capriciousness of Greek gods and goddesses. Joyce applied the story motivation, the basic form, and the character development to evolve and expose Bloom and his wife Molly. Further, he revealed interior motivation through the window of the existing Homeric work.

An Underlying Reference

Joyce based many levels of *Ulysses*’ lengthy form on Homer’s work. Many new styles, different writing techniques, and a variety of literary experiments were among the ambitious goals Joyce set out to achieve. However, Bloom’s story is set with his everyday interactions, paralleling the monstrous confrontations of Ulysses’ journey. Shown in the placement of events to create an overall form to the work, the tale of

5For years, Joyce had considered the idea of parallel stories using Homer’s writings. He wrote several earlier works, including *The Dubliner*’s that served as staging areas for the structural design of *Ulysses*. Character, motivation and internal conflicts were placed in new settings with new intents. This, in a way, was Joyce’s lifelong obsession realized in *Ulysses*. 

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Bloom’s life moved in a parallel sequence and a progression of place that make a flowing formal design stemming from Homer.

The setting is independent of any relationship or derivative elements, but the primary plot structure—longing for freedom, seeking a return to a formerly experienced happiness—are common binding elements. These not only link the works in common objective and motivation, but give additional insight into the subtext and mood of the setting. The supporting characters and side issues provide an historical depth that adds credibility to their contemporary relevance.

This series of notes served as a reminder of possible parallels between Bloom’s return to Eccles Street and Ulysses’ return to Ithaca. . . .

The many Homeric parallels not included in the final text of *Ulysses* are significant, since they illustrate how much more important the Homeric background was for Joyce than it is to the reader. Invaluable to Joyce as a ready-made guide for the ordering of his material, the correspondences with the *Odyssey* do not provide a major level of meaning in the completed work. Ezra Pound was right in his early judgment of the Homeric framework: “These correspondences are part of Joyce’s mediaevalism and are chiefly his own affair, a scaffold, a means of construction, justified by the result, and justifiable by it only.”

More Than Form

The parallels in *Ulysses* also imparted a deeper understanding of motivation and character development. The fears and desires propel the story through an otherwise ordinary day and give richness to the shared experience. The events captured and encapsulated are part of a moment in time, soon to end, for both the nation and the author. The subtext of the pursuit of lost greatness and return to a peace remembered is the

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foundation of Joyce’s protagonist Bloom, his country, and his personal life, as seen clearly in Homer’s *Ulysses*.

References to events create reference markers that unify the work as a whole. Bloom succumbs to the intoxication of “lotus blossom” in a hot bath. The characters proceed down a pathway of precise calculation through the streets of Dublin as cautiously as Ulysses’ travel through the Wandering Rocks. After carnivorously devouring lunch, Bloom consumes a Gorgonzola cheese sandwich. He accompanies it with a blood-red burgundy to cap off a “battle-scene” lunch break.

After all there’s a lot in that vegetarian fine flavour of things from the earth garlic, of course, it stinks Italian organgrinders crisp of onions, mushrooms truffles. Pain to animal too. Pluck and draw fowl. Wretched brutes there at the cattlemarket waiting for the poleaxe to split their skulls open. Moo. Poor trembling calves. Meh. Staggering bob. Bubble and squeak. Butchers’ buckets wobble lights. Give us that brisket off the hook. Plup. Rawhead and bloody bones. Flayed glasseyed sheep hung from their haunches, sheepsnouts bloodypapered snivelling nosejam on sawdust. Top and lashers going out. Don’t maul them pieces, young one. Hot fresh blood they prescribe for decline. Blood always needed. Insidious. Lick it up, smoking hot, thick sugary. Famished ghosts.

Ah, I’m hungry.7

The external structure of *Ulysses* fits into the framework of the existing work with internal nodes of reference for alignment. A completely independent literary work carefully nests within a supporting structure that reflects internal designs. The genius of Joyce’s work lies in part in this structure, arbitrarily constructed from an analysis of a

literary work created centuries before.\textsuperscript{8}

\textit{Machaut's Le Messe de la Notre Dame}

\textit{Le Messe de la Notre Dame} by Guillaume Machaut, a masterwork of liturgical music, created over an extended period, forms the base for this present composition.\textsuperscript{9} The various movements, compiled and performed within a single service, foreshadowed a significant compositional form, the first setting of the sections of the Ordinary of the Mass by a single composer.

A Brief Description of the Mass

Composed over a number of years, this stands as one of Machaut's finest creations in its use of texture, timbral variations, traditional cantus firmus design, and innovative strophic techniques. The work was composed evidently without specific intention of unity; however, the work is integrated by consistent compositional methods, technical devices, and similar motivic treatments.\textsuperscript{10}

\begin{itemize}
  \item \textsuperscript{8}Joyce, always attracted by Ulysses, envisioned himself in the classic story. It was a brilliant development to reverse this identification with the hero. Rather than seeing his own life in the early Greco-Universe, he places the character and development of the classic figure in his twentieth-century world.
  \item \textsuperscript{9}Elizabeth Keitel, "A Chronology of the Compositions of Guillaume de Machaut" (Ph.D. diss., Cornell, 1976). Keitel established through manuscript study the case of noncontiguous composition.
  \item \textsuperscript{10}The unifying elements are more procedural than motivic. The interjected two-voice separation sections of two measures each in the \textit{Gloria} and \textit{Credo} are simple and use in many permutations. These delineate sections in the non-isorhythmic movements. Similar voicings in the openings and cadences create a common atmosphere that reflects the composer and his style. This unintentional "cyclic" element call to mind a resemblance to the tightly constructed mass cycles that were prevalent in the fifteenth century and beyond. However, they speak more to the common author than a departure from the normal compositional method. This first pivotal work in the genre lays the
\end{itemize}
The Machaut Experience

*The Warp and the Weft* extracts from the ephemeral spirit of the Machaut work and recasts it in a contemporary mode. It is impossible, however, to experience any musical encounter by attempting to adopt the same mind set as a previous century. The twentieth century has lost its naivete. The simplicity of fourteenth-century lifestyle and the influence of regional colloquial music would not have prepared those attending polyphonic mass for the event they experienced. The quiet meditation during the anticipated chant was broken as the lush brilliance of the four-voice music burst forth with the opening Kyrie. Machaut’s presentation of the Ordinary was unique. The attempt to capture and re-create the “Contextual Ear” of a society in which an aural experience could be new and unique is the focus of *The Warp*. Much attention has been devoted of late to the issue of “period listening.” The study is applied to authentic collegium musicum and interpretive nuances of performance practice. One cannot hear with a figurative “period ear,” however accurate the performance may be in regard to the notation; the actual initial exposure to any innovation cannot be reproduced by faithful replication alone. Such a recapturing of the historical experience is achieved only through an oblique approach that recreates a similar subjective experience, rather than an exact duplication of the musical event. The emphasis is more on the music in an environment than on the music as notated and analyzed.

In the blast of constant sound in modern society, how does a composition evoke a

groundwork for the highly integrated structure exploited later.

11 See the periodical *Early Music* 25, no. 4 (1997) for the current state of research.
fresh response? Barring shock value for its own sake, the uniqueness of the exposure is beyond us, yet expectation can be created through the compositional design.

Choreographing environmental elements enhances a perceived musical reality, portraying each microevent in a carefully positioned light. This subjective performance experience is the closest approach we have to eliciting the reactions of a listener in pre-aural preservation. Modern attempts at period listening seek to replicate the conditions and explore the audience expectation to extract a sense of the original performance. This quartet attempts to capture the spirit of wonder and mystery felt by a medieval listener rather than by a twentieth-century audience.

Along with an unpolluted sound environment, this first complete mass cycle of Machaut's is unique among his works; however, Machaut's characteristic style, one of the primary binding elements of the cycle, permeates all the movements. The alternating textures, the complex rhythms placed within an overall rhythmic flow, the voicing patterns, the close, intimate sections of movement, and the open, expanded, more deliberate places all impart viable elements of style. These applied specifics were used to create a new composition that has a resemblance to Machaut's constructions. The recreation experiences and captures the delicate beauty of his legato intermezzi and the zest of the syncopated two-voice interjection as prelude to a phrase opening.

12 It is a recurring fantasy to have been present at a pivotal moment in history and to understand its significance to the flow of cultural development. Frequently the myopic state of daily experience keeps the viewer from recognizing significant events. The desire here is to recreate the audience's response at its first exposure to an historical event. Although it is impossible to recreate the inexperienced reaction, the generated expectation within the controlled atmosphere should enable a similar emotional impact as that on the first hearing of Machaut in the fourteenth century.
The Machaut Attitude

A significant aspect of Machaut's sacred music is his reverence for the ministration of the service and the dignity of the portrayal of the text. The music conveys an underlying attitude of devout hope and dignity. Machaut focused on the function of the mass, regardless of the technique employed. The gentleness and strength imply a power of conviction integral to the experience of Machaut's composition.

Selected material from the Machaut's maifss served as a reference to integrate large formal decisions, thematic elements, and small motivic devices of *The Warp and Weft of Fabric*. Analysis provided abstract data to generate control devices, or quotations, stated directly as part of structurally significant statements (fig. 1).

Machaut Analysis

*Form*

Machaut composed polyphony for six sections of the Ordinary: Kyrie, Gloria,
Credo, Sanctus, Agnus Dei, and the Ite Misse Est. The common mass cycles of the fifteenth century frequently omitted the Ite Misse Est. However, *The Warp and Weft of Fabric* retains Machaut’s significant six-movement design. His work pairs the two syllabic sections, the Gloria and the Credo, with similar sectional strophic forms. The other movements are set as cantus-firmus tenor constructions in fourteenth-century isorhythmic design. *The Warp* uses six movements in pairs. Three settings of large multisectional movements have shorter, satellite companions with a single-concept design.

*Consonance*

From the earliest writing of polyphony through Machaut’s lifetime, vertical relationships were viewed differently from those in the “common practice period” harmonic concept. Logically stemming from plainchant, polyphonic composition evolved in a linear fashion of multiple independent voices. Vertical relationships developed a standard of consonance and dissonance that expanded throughout the centuries into various rules for part writing and counterpoint.

Regarding consonance dissonance and resolution, Johannes Tinctoris articulated the accepted treatment of intervallic relationships in *Liber de Arte Contrapuncti*. His observations from the compositional practices of the late fifteenth century provided specific interval definitions and described accepted uses of the intervals in the context of a composition. These insights were gleaned from exposure to the premier composers of the day and from his own artistic creations. Fifteenth-century polyphonic music perfected these practices in the improvised, multivoiced works in which interval consonance had its
aurally based birth.

But even as Tinctoris used his ear to articulate specific intervallic treatment in linear counterpoint, he codified the new styles and techniques of the fifteenth and sixteenth centuries. His works emphasized the increased importance of vertical relationships in recognition of the new importance of harmonic movement. By definition, this change in musical thought began in the first half of the century as a departure from Boethius, whose philosophy still dominated in the fourteenth century. Boethius's linear-based music construction, the primary concept in Machaut's day, is most applicable to this analysis.

Line

The primacy of the singable melodic line in each part did not pass until the advent of the early Baroque figured-bass accompaniments. Here, accompaniment voices were derived vertically from intervals expanded over a melodic bass line that served as complement to the solo melody. By the early seventeenth century, however, the linear polyphonic composition had passed through the glory of Renaissance multivoiced masterpieces. These works in turn presaged the intricate imitative forms that flourished in the eighteenth century. In Machaut's time, this alternating cycle between the vertical and horizontal lay with the linear relationship considered first.  

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14The evolution of polyphony emphasized linear control of vertical relationships. The hierarchy of consonance developed intuitively from the intervals created by the juxtaposition of voices following independent, but parallel directions. Resulting
In keeping with his approach, selecting and exploiting linear material in the organization of both vertical and horizontal relationships, *The Warp and the Weft of Fabric* extractes material that applies to diverse elements, from thematic and melodic figures to motivic structural devices and form. These controls developed from the simplest of lines (fig 2).

![Figure 2](image)

**Figure 2.** *Le Messe de Notre Dame*, by Guillaume de Machaut. *Ite Missa Est*, Plainchant Introit. Leech-Wilkinson Transcription.

![Figure 3](image)

**Figure 3.** *Le Messe de Notre Dame*, by Guillaume de Machaut. *Kyrie I*, Tenor line. Leech-Wilkinson Transcription.

Combinations were declared either pleasant and proper or disconcerting and demonic. From these initial aural responses sprung the history of harmonic analysis. The emphasis of various musical styles may switch from vertical to horizontal; however, the key to a well-crafted composition lies in the balance of the two.
Cells derived from the pitch and rhythm of Machaut's lines form structure cells. This technique takes the duration of each note from the source (fig 3) and designated a

Figure 4. The Warp and Weft of Fabric, by Michael McBride. Movement 5, ms. 145-47, viola.

pattern 3-1-2-3-0. These elements are integrated into units applicable to pitch or rhythm interchangeably in the compositional process of The Warp. The cells modify into various permutations of new figures related in character to the original (fig. 4).

Quotation

Machaut wrote extensively in quotation-based composition. The primary treatment of liturgical music was the Cantus Firmus or tenor mass, in which the plainchant melody sung at that particular section in the mass was placed in the tenor voice in various rhythms. The voices built around this tenor voice, which controlled the length and structure of the piece, with some adaptation.

Machaut further employed the indigenous fourteenth-century technique of isorhythmic construction in the tenor voice, indicative of the medieval literati and their
Machaut arranged the tenor in carefully repeating patterns of talea (rhythms) and color (pitches) of different length. These patterns cyclically progress in different phase relationships. The movement ends when the cycles phase together for a cadence.

Machaut employed the cantus firmus isorhythmic technique in movements 1, 4, 5, and 6.

The use of the tenor melody as a significant source of information applied to several compositional decisions in *The Warp* to create unity from the same type of integrated control in pitch, rhythm, form, and texture. *The Warp* derives from the tenor line from several places in the mass. The string work captures the environment of fourteenth-century liturgical music, juxtaposing the contrasting austerity of chant style and the comparatively lush polyphonic design. The simplicity of vocal chant pairs Machaut’s complex rhythmic interchanges and developments to embody a vibrancy applied in *The Warp*’s subtle counter-rhythms.

Machaut Extrapolated: The Source for

*The Warp and the Weft of Fabric*

A single-faceted analysis of Machaut’s work functions as the guideposts of the framework, extracting and situating in the same design style as isorhythmic structures built from a centuries-old tenor line. These primary points drawn from the mass rest on a

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15The psyche of a period several centuries removed is easy to oversimplify. Although no one mind set can be said to be pervasive, certain trends are noticeable. The fourteenth century balances between the Middle Ages and the Renaissance. The complex blend of ruthlessness and sophistication gave rise to secret societies, adventurous intrigues, and circuitous relationships among peers. This fondness for intricacy revealed itself in many of the subtle nuances of literature and art. Isorhythmic construction is one such example.
foundation of three basic precepts: pitch, motivic style, and rhythm.

Pitch

Machaut's Mass has a limited pitch selection, with strong dominance of modal allegiances. It has a unique nonharmonic approach to pitch usage that reflects the hexachord analysis in vogue in fourteenth-century musical circles. The pitch selection deviates from a strict interpretation of the framework for consideration of the linear melody. In The Warp this variation coincides with the use of musica ficta in modal environments, reflecting "soft" and "hard" hexachord allegiances. Some sections exploited the unique subtle contrasts between hard and soft scalar melodies. Historically, coniuncta, or the chromatic alterations on individual pitches, created both horizontal and vertical intervalic relationships. Both types of intervals emphasized musica ficta melodic variations reflective of the spirit of the coniuncta.

Machaut's pitch hierarchy forms a central element in the framework design of the contemporary work. The modal design of all pitch lines of the fourteenth century contributes to an understanding of each pitch structure and melodic line. A deeper principle exists beneath the surface of strict modality. The fourteenth century was long before the concept of tonality. The logical approach to linear relationships developed from the solmization of the melody using hexachord. This six-note pitch organization is based on modal allegiances and the range of the line. The choice of pitch at B and F seems at first to reflect the coming major scale; however, the use of Bb in Lydian mode and the F# in mixolydian are reinforcements to the finalis. Rather than a key center, the goal emphasized pitch dominance and relationship to the hexachord analysis of the
passage. The application of this principle in a polyphonic texture caused some ambiguity in vertical alignments. The shift between B and Bb occurred quickly within a given section as melodic lines shifted hexachords.

This variation in hexachord center provided a useful method of creating melodic interest in *The Warp and Weft of Fabric*. Linear intervals alternate between diatonic distances-based numbers of half steps and modal relationships in intervals of a third or fourth within the existing "key."

*Motivic Style*

A strong unity of style carries over between Machaut’s movements, especially noteworthy given the noncontiguous likelihood of composition. Similar motivic figures and rhythmic patterns exist in each of the movements. These devices function similarly in each movement. Extending beyond the natural tendency of a composer to use favorite styles and patterns, it indicates an effort of homogenous treatment of similar sections

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**Figure 5. Le Messe de Notre Dame**, by Guillaume de Machaut. *Credo Amen*, ms. 10-11. Leech-Wilkinson Transcription.

xxx
within the mass. Some rhythmic patterns serve as ornamental figures in diminution, based on the same pattern augmented in the tenor-countertenor voices. The similar patterns within structural and melodic lines integrate a unifying factor throughout several levels of the composition (fig. 5).

Machaut made a significant attempt to create elements of contrast to counter the monophonic nature of plainchant present in the mass. The church historically endorsed little variety in the presentation of the service, but allowed creative adaptations of the Ordinary. Machaut took advantage of his opportunity in the polyphonic Ordinary to provide dramatic interest arising from the abrupt transitions and bright contrasts of sound. He derived contrast from manipulation of texture, timbre, and intravoice design.

*The Warp* uses different sections of the mass for a variety of purposes. It places some sections of the mass as structurally useful and applies them as quoted material.

![Musical Notation]

Figure 6. *Le Messe de Notre Dame*, by Guillaume de Machaut. Gloria, ms. 93-97. Leech-Wilkinson Transcription.
This is the case with one, two, and four voices of the section. One prominent example is the statement in the Gloria of the text “Ihesu Christe.” The brisk treatment of the syllabic movement suddenly gives way to long-held notes, reflecting adoration and reverence. This significant phrase is extracted and quoted in all four voices (fig. 6).

Machaut used the Cantus firmus technique for four of his movements. This form incorporates the chant appropriate for the section of the Ordinary as the tenor line. The tenor is organized in an isorhythmic structure that unifies the entire work. This technique applies to all the melismatic sections in which form is more subjective. The structure of the talea/color ratios integrates the various movements into common segments easily analyzed as a cohesive work.

Machaut organized the two syllabic movements similarly, with a strophic design that treats the larger volume of text with shorter musical phrases functioning as strophic...

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sections within a larger framework. These sections divide into subphrases delineated by cadences. The sections themselves are separated by a rhythmic interjection of strategic importance. This short single-measure phrase with no text in a syllabic setting uses the two lower voices in a full-voice texture, darkening the color in an otherwise bright movement. The element of abrupt contrast is integral to the significance of Machaut’s work. In The Warp and Weft of Fabric, it is extracted from among the primary elements

![Musical notation](image)

Figure 8. Le Messe de Notre Dame, by Guillaume de Machaut. Christe, ms. 1-6. Leech-Wilkinson Transcription.

for foundational concepts (fig. 7).

**Rhythm**

Rhythm elements at micro-level and macro-structures form motivic devices that apply to multiple layers of The Warp in form, melody, and rhythmic control (fig. 8).

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Rhythms from the Christe create diminution/augmentation relationships in similar figures. The syncopated pattern occurs frequently in the accompaniment and melody of *The Warp*. This section also includes the 3-1-2-3-0 duration ratio of the tenor. Analysis and extraction of any aspect of Machaut's work created data applied to elements of *The Warp and Weft of Fabric*, integrating micro-structures with the overall composition.

Other incorporated elements from the Machaut work include the timbral relationship of four-voices in near-pitch imitative style, the ethereal style, the high

![Musical notation](image)

*Figure 9. Le Messe de Notre Dame, by Guillaume de Machaut. Kyrie 3, tenor-contrateneor ms. 1-8. Leech-Wilkinson Transcription.*

contrast design among similar elements, voicing in four-part textures with interjections of paired elements, and the reverential mood of the entire work. All these elements of style and design created a new work from the old.

*Machaut Applied: Overview*

Applications of directly quoted material exist many places in the new work.
Machaut's compositional decisions were duplicated in a twentieth-century context. The exemplary forms chosen include paired movements with internal framework taken from talea rhythm (fig. 9). Pitches gleaned from direct quotation in vertical and horizontal situations create extracted and inverted intervals for use as The Warp's pitch line.

Rhythmic elements from tenor talea become linear intervals in new melodies in the

![Musical notation](image)

Figure 10. *Le Messe de Notre Dame*, by Guillaume de Machaut. Sanctus, ms. 1-5. Leech-Wilkinson Transcription.

second movement. Rhythmic cells (i.e. 3-1-2-3-3 0) apply to pitch selection, rhythm sections, and structural form (see table 2). This creates a pervasive unity that holds together many elements of a diverse composition. The hexachord technique varying hard and soft modal shifts was used in quotations in the second movement and applied throughout the work (fig. 10).

Several specific sections from Machaut were taken for their mood and the character of their setting. Rhythmic elements of the Credo Amen placed in...
similar circumstances evoke the same bright feeling (figs. 11 and 12). The “Thesu
Christe” statement of the Gloria, quoted in the third movement, brings its
plaintive quality to the entire piece.

In the broadest terms, the goal of *The Warp* is the basis of the perception
of its consonance and dissonance entirely on an arbitrary outside source. The

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121-23.
elements that lend quality and greatness to Machaut’s Mass impart the same
classification to the string composition. Within the framework made by the structure
of referability was designed a new composition that exists as a separate entity and
has its own life, style, substance, and purpose.

In a sense, Machaut’s fourteenth-century mass built a foundation for all
cyclic masses that followed. It also provided resources for a blueprint of
foundation, support elements, material specifications, and architectonic style to
create a space for a new musical work.

*The Warp and Weft of Fabric*

A brief examination of the layout and design of *The Warp and Weft of
Fabric* may prove helpful at this point.

**Movement 1**

Movement 1 is a series of colors on a single pitch, the hierarchy center D,
in various voices and production method. It gradually embellishes and develops
into a denser note structure, preparing for the opening ritornello.

The first movement begins with a repetition of a single pitch. This “D”
creates the tonal focus, primary mode, and pitch reference of the entire
composition. The pitch “D” serves as the finalis of the Dorian mode of Machaut’s
movements 1, 2, and 3. This opening note links with the references and
quotations from the mass. The initial section unfolds in many registers, attacks,
and cut-offs. A variety of timbres creates a multifaceted view of the urge and
focus of the devout nature of the Machaut Mass. That spirit of devout emotion
captures the plaintive repetition through timbral permutations.

Table 1. Timbres appearing in the opening section single-pitch "color" passage.

<table>
<thead>
<tr>
<th></th>
<th>Violin 1</th>
<th>Violin 2</th>
<th>Viola</th>
<th>Violoncello</th>
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<tbody>
<tr>
<td>ms. 1-6</td>
<td>upper register sul D</td>
<td>upper register sul D</td>
<td>upper register sul D</td>
<td>upper register sul A</td>
</tr>
<tr>
<td>ms. 7-8</td>
<td>touch-4 harm sul A</td>
<td>touch-4 harm sul A</td>
<td>touch-4 harm sul A</td>
<td>touch-4 harm sul A</td>
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<tr>
<td>ms. 9-11</td>
<td>touch-3 harm sul A</td>
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<tr>
<td>ms. 12-14</td>
<td>grace note on attack</td>
<td>grace note on attack</td>
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<tr>
<td>ms 15-17</td>
<td>quarter tones adjacent pitch</td>
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<tr>
<td>ms 18-26</td>
<td>upper register sul G</td>
<td>quarter tones adjacent pitch</td>
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<tr>
<td>ms. 27-32</td>
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<td>touch-4 harm sul A</td>
<td>touch-4 harm sul A</td>
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<tr>
<td>ms. 33-38</td>
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<td>natural-5 harm sul G</td>
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<tr>
<td>ms. 39-41</td>
<td></td>
<td>natural-8 harm sul D</td>
<td>natural-8 harm sul A</td>
<td>natural-8 harm sul D</td>
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<tr>
<td>ms. 42-46</td>
<td>double stops adjacent pitch</td>
<td>adjacent pitch</td>
<td>double stops adjacent pitch</td>
<td>double stops</td>
</tr>
<tr>
<td>ms. 47-50</td>
<td>double stops quarter tones</td>
<td>adjacent pitch</td>
<td>double stops</td>
<td>double stops natural harm</td>
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</table>

As the first section progresses, new pitches add a complement to the opening, reinforcing the centrality of D. The simple color tones gradually give way to tentative
statements of the melody of the second section, based on the vertical relationships and melodic contours of the opening phrases of the Sanctus. This brief appearance foreshadows a further development of the theme in movement 5 of *The Warp and Weft of Fabric*. The brisk closing section introduces greater rhythmic complexity, using motifs in diminution against themselves.

Movement 2

Contrasting elements highlight this simple companion movement. Thin textures and longer note values pair with quick, asymmetric statements that employ fuller textures and larger dynamics. The pitch contour introduces strong Lydian influences that are used significantly later.

Movement 3

Movement 3 opens with a brisk, completely *col legno* section that intersperses the melody among all players. The melody is based on the tenor cantus firmus from the *Ite Missa Est*. The primary section of this movement repeats the music from the elongated phrase "*IHESU CHRISTE,*** interjected twice into the fast-paced *Gloria* movement. The similar phrases provide two cadence drone figures. The four strings play this slow chorale style *sul tasto non vibrato*. The note durations shorten increasingly throughout the section, accelerating the tempo of the foundation level while leaving the upper layers of material unchanged.

A further quotation provides rhythmic interest and melodic variety. The two-voice interjections from the *Gloria* exchange voices freely in *The Warp* in several different pairs. These pairs sit atop a placid layer of undulating *Ihesu Christe* chords.
The final section mixes a pair of contrasting styles and techniques. The melody from the Introit to the Gloria emerges first in slow tremolo. A marcato, imitative style follows quickly and aggressively, displaying high contrast.

Movement 4

This fantasia on a theme, based on the same modal elements as the second movement, uses twenty-three overlapping statements. Twenty-three is the number of pitches in the Ite Misse Est tenor. The theme was developed from phrase characteristics in the Amen of the Gloria, namely the lydian fourth that dominates the section in Machaut's work, and the descending figure from measure 13 of the Leech-Wilkinson edition.

Movement 5

The first section involves a lament with plaintive solo statements accompanied by descending ornamental figures and behind-the-bridge "color" drones. These support

![Musical notation]

three iterations of *Ite missae* chant in a, g, and c; the first is stated solo, the second divides the melody among separate voices, third is a tutti statement, in doubling with imitative entrances.

The second section features a ritornello-like return of the motivic material used in the second and fourth movements, melody and rhythm derived from the superius of the Gloria, Amen. But here, a counter melody accompanies the reorganization of melody that comes from the tenor of the Gloria, Amen.

The third section uses pizzicato in all four instruments on a different rhythm taken from the Gloria, Amen, from the cello (fig. 13) for a primary rhythm pattern (fig. 14). The pattern accompanies itself in diminution in the secondary role of Machaut’s upper voices. The distribution of the rhythms into layers serves as restatements of the pattern and accompaniment figures. This reflects the structure of the Machaut Amen.

Distribution of rhythmic assignments organize a complex pattern derived from the

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tenor note durations in the Agnus. The pattern plays fully in the cello and then plays in retrograde. The other instruments play shortened variation of the same pattern. The pitch developed by linear intervals derives from the talea rhythm of the same tenor line.

Table 2. *The Warp and Weft of Fabric* texture and form in the fifth movement, third section, ms. 143-84, derived from tenor rhythm in Agnus

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<td>Vln 2</td>
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Movement 6

Opening with a cello contemplation on the *Deo gracias* of the last movement, the following four-voice section shares a melody on the *Ite missa est* tenor, each note in the line played and held by a different instrument.
The Warp and Weft of Fabric Analysis

Form and Texture

*The Warp and the Weft*, a string quartet in six movements, was designed in three paired groups. The primary movements, 1, 3, and 5, are multisectional, and the accompanying shorter movements are simple or two-part form.

Table 3. *The Warp and Weft of Fabric* form and pace

<table>
<thead>
<tr>
<th></th>
<th>Slow, ms 1-50</th>
<th>Moderate, ms 51-96</th>
<th>Fast, ms 97-164</th>
<th>Slow, ms 165-79</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>Slow, ms 1-12</td>
<td>Slow/Fast alternate, 9 pairs ms 14-58</td>
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</tr>
<tr>
<td>3</td>
<td>Fast, ms 1-14</td>
<td>Slow, ms 15-113</td>
<td>Slow/Fast/Slow /Fast/Slow, ms 120-64</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Fast, 23 statements, ms 1-54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Slow, ms 1-59</td>
<td>Moderate, ms 60-80</td>
<td>Moderate, ms 82-142</td>
<td>Fast, ms 143-88</td>
</tr>
<tr>
<td>6</td>
<td>Slow, ms 1-27</td>
<td>Slow, ms 28-47</td>
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<td></td>
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</table>

The first movement opens with an introductory color progression that explores various timbral creations of single pitch. Although not an attempt at *Klangfarbenmelodie*, the drone section moves forward with energy and line created by the variety of methods used to produce the pitch D. Adjacent pitches are added to contrast,
conflict, and resolve. The pitches include quarter tones that are placed above the D with a lowered Eb. The second section states a theme used significantly in this work. The primary theme comes from the Machaut Gloria, Amen in the superius melody. This melody is useful for its descending-ascending structure, its musica ficta, leaning lydian fourth, and its staggered waltz rhythm. The slow section displays the same texturing as the Gloria, duets of melodic material paired with a double accompaniment. However, these elements are constantly shifting voices, making the framework malleable.

The third section is briskly imitative. The pitch is rigorously controlled in the manner discussed earlier. The form depends on continuous restatements of the opening rhythm, not unlike the Gloria passage in its rhythmic repetitions in the contratenor (fig. 15). The closing return of the primary theme develops a statement that is the harbinger of the theme's use in the fifth movement.

The second movement emphasizes melodic lines of paired voices, a central

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Figure 15. The Warp and Weft of Fabric, by Michael McBride. Movement I, ms. 135-38.
component of Machaut’s textural design. The slow-to-fast contrasting statements demarcated by the mixed meters build on another of Machaut’s significant principles. The drama of the juxtaposition of differing elements and rhythmic figures highlighted the fourteenth-century work (figs. 16 and 17).

The introduction of the third movement states in *col legno* a melody based on 3-1-2-3 intervals from the tenor of the Kyrie. These melodic elements are found throughout the string quartet and are considered a return to a “tonic” position, one of fundamental importance. The following repetitions of the *Ihesu Christe* quote provide the basis of an undulating drone of more primary material. Utilizing quotations from the interjections in the Gloria mass movement, contrast was achieved with some of the same material that Machaut placed in sections requiring high contrast. The brief two-voice exclamations punctuate a consistent unvarying texture. In the *Warp*, the voices merely rise out of the ebb and flow of the base pattern to create peaks of interest in the overall wash of sonority.

![Musical notation]

*Figure 16. Le Messe du Notre Dame, by Guillaume de Machaut. Gloria, ms. 41-47. Leech-Wilkinson Transcription.*
The contrasting sections that end the movement, with a slow tremolo pairing the fast Marcato, continue the same goals of abrupt change for dramatic purpose. Both sections are based on the theme from the introit to the Gloria polyphonic movement.

The fourth movement's form resembles a theme and variations on material from the Credo represented twenty-three times in sometimes overlapping statements. The twenty-three refers to the number of pitches in the *Ite missa introit*. This number figures prominently in the formal structure of the *Warp*.

The color and flourish of rhythmic figures, ornamental turns, and harsh tritone outlines accompany the melody of the often-stated *Ite missa est* tenor for the opening of the fifth movement. The length and breadth of the section spreads out with spacious presentations of each element and the use of colorful behind-the-bridge bowing in various instruments over long-duration notes of the *Ite missa* tenor melody. The first section

![Musical notation](image-url)
concludes with a homophonic section based on this melody with its rhythm stated in a
singable manner.

The main section, a chorale with obligato on the opening Gloria superius phrase
was developed further and harmonized in a more traditional manner than the original
setting. Machaut often used the technique of diminution and augmentation of motives
explored in the pizzicato of the third section. Based on a pattern of intervals 3-1-2-3-0
derived from the rhythm of the Kyrie tenor, the motifs form a connective tissue between
several sections.

A solo cello section opens the sixth movement with double stops, linear intervals,
and pitch reinforcement of D-A, prominent pitches in the first three Machaut movements.
Similar intervals are explored vertically in four voices in the last section.

**Pitch**

Pitch material develops in a variety of ways, originating from two basic
approaches. Pitch can be based on actual notes that are quoted and then repositioned
within a texture. This creates similar scalar material and modal composition
techniques.

In addition to direct quotes, various elements of the Machaut were analyzed
for aspects used as control data. These data in turn were applied to linear intervals.
The repeated cells develop characteristics from the mass but are unique and unlike it
in sound. The intervals are applied in two ways that invoke the usage of musica ficta
to create “hard” and “soft” hexachord interpretations. The hexachord selected for a
passage affects the pitches of F and B. These notes were altered to emphasize the
“ut” of the hexachord chosen. This was not to create a major scale in form. Through the avoidance of a tritone interval, fulfilling the intended function of shifting pitches, the hexachord pattern was framed to reinforce the primacy of pitch F in the soft hexachord’s use of Bb. The G hexachord, with a “hard” B natural, was additionally altered with an F# as needed to avoid the devilish tritone in vertical relationships or linear writing. This technique of subjective pitch alteration was put to use in a variety of ways in The Warp and Weft of Fabric, from melodic variation to subtly-shifting coloration in background figures.

Taking a cue from the Kyrie, the primacy of D, established in the opening section, was emphasized with harmonics, near pitches, quarter tones, and many different timbres and methods of production. Pitch intervals chosen from the Gloria Amen establish a melodic source of quotation that is malleable for new settings.

The interval-content pattern using 3-1-2-3-0 from the Kyrie tenor creates the melodies in the third section of movement 1. “Hard” hexachord material states the lines

![Cello notation](image1)

Figure 18 The Warp and Weft of Fabric, by Michael McBride. Movement 1 Cello, ms. 151-57.
with literal interpretations of the intervals as numbers of semi-tones. The material “softens” in statements, using the thirds and seconds as staff distances with no modal variation (fig. 18).

In the last section, the melody from the second section paired with tempo from the first creates more complex interrelationships within the movement.

The second movement, primarily a “quotation-based pitch selection” in D Dorian extends the quote and development of the Machaut section without deviating significantly from the pitches of the source. A quote from the Gloria, Amen emphasizing a D-A range was exploited for its “Lydian” fourth. Not truly in the Lydian mode, the interesting variation provides a melody that emerges in a number of sections throughout the work.

Movement 3 utilizes “quotation-based pitch selection,” as well as other passages from the Machaut used prominently, the *Ite missa est* Introit, the “Ihesu Christe” quotation, and the interjection from the Gloria (fig. 19-20). These sections were extended, adapted, and relaid in new textures as elements that formed new structures from the old, recognizable material.

![Figure 19. Le Messe de Notre Dame, by Guillaume de Machaut. *Ite Missa Est*, Tenor. Leech-Wilkinson Transcription.](image-url)
The fourth and fifth movements employ "quotation-based pitch selection," but extract different emphases from each. The Gloria, Amen with recurring statements emphasized C-G. The melody manipulated from the Ite Misse Est tenor contains a tritone from "soft hexachord" application. The Gloria opening, with its pitch outline and rhythmic phrasing, forms the basis for many motives in the final three movements. The last section of the fifth movement uses the interval derivation method derived earlier from the Kyrie tenor. The last short movement emphasizes modal relationships and the Ite Misse Est tenor notes. The variety and complexity of treatments of material from fairly common sources create a highly diverse, but integrated pitch environment.

Figure 21. The Warp and Weft of Fabric, by Michael McBride. Movement 4, ms. 8-12.

Table 4. Structural elements in The Warp and Weft of Fabric

<table>
<thead>
<tr>
<th></th>
<th>Timbre</th>
<th>Rhythm</th>
<th>Tempo/Meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1) Harmonics in various configurations- different strings, nodal points and registers; on D</td>
<td>Long-breathed non-metric, only varied for tonal accent</td>
<td>36 4/4 nonmetric</td>
</tr>
<tr>
<td></td>
<td>Timbre</td>
<td>Rhythm</td>
<td>Tempo/Meter</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>2)</td>
<td>Melody and accompaniment texture</td>
<td>Fast syncopated</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>repeated notes</td>
<td>4/4 nonmetric; quote</td>
</tr>
<tr>
<td></td>
<td></td>
<td>contrasting long</td>
<td>in 3 in 4th measure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>melodic line</td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>Polyphonic texture</td>
<td>Imitative rhythmic</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>motif with new</td>
<td>4/4 metrically based</td>
</tr>
<tr>
<td></td>
<td></td>
<td>accompaniment melody</td>
<td>5/4 breath</td>
</tr>
<tr>
<td></td>
<td></td>
<td>based on 3-1-2-3 cell</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Homophonic texture</td>
<td>Diminution and augmentation</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4/4 with 3 melody</td>
</tr>
<tr>
<td>2.</td>
<td>Homogenous attacks with contrasting figures</td>
<td>Asymmetric melody</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>in various attacks and accents</td>
<td>reflected in meter</td>
<td>3/2</td>
</tr>
<tr>
<td>2)</td>
<td>Grace notes- II, 36, staccato II, 42</td>
<td>Diminution and augmentation</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mixed meter</td>
</tr>
<tr>
<td>3.</td>
<td>Coll'egno entire section</td>
<td>Melody separated and</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td></td>
<td>scattered through voices</td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td>Arco sul tasto non vibrato, interjected</td>
<td>Syncopation in</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td>with vibrato ordinario</td>
<td>interjections</td>
<td>actual meter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>shortened in note duration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>progressively</td>
</tr>
<tr>
<td>3)</td>
<td>Tremolo vibrato ordinario sections,</td>
<td>Silence punctuates in</td>
<td>72/96</td>
</tr>
<tr>
<td></td>
<td>Marcato bold accent polyphonic section</td>
<td>fast Marcato section; asymmetric</td>
<td>4/4 metered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>construction</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Hard attacks mark each phrase variation</td>
<td>Rhythmic demarcation of each statement with</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sfz attacks (Figure 21.)</td>
<td>mixed meter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4/4 5/4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/4</td>
</tr>
<tr>
<td>5.</td>
<td>Notated glissando; color tones- high and</td>
<td>Notated glissando;</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>pensive, behind the bridge, imitative</td>
<td>long spaces lines with</td>
<td>4/4 nonmetric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>no movement</td>
<td></td>
</tr>
</tbody>
</table>
The element of contrast so fundamental to the Machaut embodies another aspect germaine to the textural design of *The Warp*. A brief layout of the variety of components present in the materials from the Machaut is seen below. In part, these were taken from Machaut's own use of texture, and in part, they are interpretations of the mood and climate subjectively experienced from the piece. However derived, the emphasis on advantageous placement creates a sense of the awe and richness that *Le Messe de Notre Dame* evokes.

**Table 5. Elements of contrast and unity in *The Warp and Weft of Fabric***

<table>
<thead>
<tr>
<th>Description</th>
<th>Elements of contrast and unity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1) Colors of pitches; 4 voice independent entrances</td>
<td>High Contrast between drone and silence; contrast between voices; contrast in texture between sections</td>
</tr>
<tr>
<td>2) Imitative melody; rhythmic accompaniment</td>
<td>increased unity with imitation; rhythmic figure contrasts primary line</td>
</tr>
<tr>
<td>3) Polyphonic, imitative</td>
<td>voices independent, but low contrast with imitative line</td>
</tr>
</tbody>
</table>

*Contrast and Unity*

Contrast and Unity
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Elements of contrast and unity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4)</td>
<td>Homophonic with individual entrances</td>
<td>Strong unity; homogenous</td>
</tr>
<tr>
<td>2. 1)</td>
<td>Imitative, syncopated chorale</td>
<td>Weak textural unity with sectional contrasts and silence between statements</td>
</tr>
<tr>
<td>2)</td>
<td>Homophonic, with paired voice sections</td>
<td>Strong unity with textural changes for contrast</td>
</tr>
<tr>
<td>3. 1)</td>
<td>Col Legno staccato; sparse texture imitative 4-voice, scattered melody</td>
<td>High contrast between voices entrances with unity in timbre and pattern; high contrast preparation for next section</td>
</tr>
<tr>
<td>2)</td>
<td>Long-breathed 4-voice homophony with paired voice interjections</td>
<td>Strongly unified texture with contrasting counter-lines that are similar in line for strong unity</td>
</tr>
<tr>
<td>3)</td>
<td>Solo; 4 voice imitative, syncopated chorale</td>
<td>High contrast in timbre and style; contrast between voices and sections</td>
</tr>
<tr>
<td>4. 1)</td>
<td>Melody and counterline, 2-voice, 3-voice, 4-voice</td>
<td>High contrast overall; unity in paired voices and return to similar textures</td>
</tr>
<tr>
<td>5. 1)</td>
<td>Single lines overlap accompaniment figures/ imitation</td>
<td>High contrast opening; repetition creates unity that prepares next section</td>
</tr>
<tr>
<td>2)</td>
<td>Homophonic with descant</td>
<td>Strong unity with contrasting obligato</td>
</tr>
<tr>
<td>3)</td>
<td>Imitative with rhythmic accompaniment</td>
<td>High contrast textures; similar figures exchanged between voices for unity</td>
</tr>
<tr>
<td>6. 1)</td>
<td>Cello solo, double stop</td>
<td>Low contrast within section; high contrast with rest of work</td>
</tr>
<tr>
<td>2)</td>
<td>4-voice homophony/ imitative with accents to emphasize pitch series</td>
<td>Unity increases in texture and content to final statement</td>
</tr>
</tbody>
</table>

The contrasts between sections was designed to create a sense of wonder at each new opening statement. Whether abrupt or subtle, the cadences and transitions led the listener through a door into a new experience alien in nature to the twentieth century, yet
full of its vigor and vitality. The degree of diversity complemented the high level of integration in each section.

Performance Considerations

It has been considered that nonscalar music could be written for strings involving a notational system that disregarded all standard clef denotations. The purity of the instruments in virtuoso performance creates a clean environment, free from the entanglements of standard notation. Players are assigned pitch in cycles-per-second and duration in fractions of seconds, with an external monitor for point of reference. However for The Warp, this “logical” approach was considered “illogical” in application and relegated to the arena of computer-controlled devices. The extensive training required for musicians to develop a new method of reading would be prohibitive. Therefore, the musical designs were applied to the existing methods of notation to render the composition playable.

In accordance with that, several concessions were made in the basic notation to facilitate the performers’ quick understanding. Meters not involving a quotation with a specific reference were expressed in common time and with standard durational markings without aleatoric techniques. Tempo was given in standard manner with little rubato or free sections. Alterations to the tempo were generally applied by lengthening or shortening note duration rather than worded style instructions. No key signatures were used, but all accidentals were given in each measure and were intended to be held throughout the measure, in accordance with standard practice. All extended techniques involving “risk” to the instrument such as col legno were grouped together into single

-lix-
movements, allowing a bow switch if required. All untraditional techniques were described verbally at the beginning and were denoted at the time of execution with a symbol and footnote.

Objective and Subjective Measurement

The presentation of a work of music is designed with the specific purpose of creating a controlled environment for listener reception. Care is taken to expose the audience to a pristine performance situation to allow the actual music to be the primary mover. Many elements are considered to suggest moods of anticipation, and expectation fulfilled or defeated is a key element of the success of a work. Whether this environment is perceived or subliminally conveyed, it is built upon with each note of the piece and each aspect of the framework. The Warp and Weft of Fabric creates this environment largely from relationship to its frame of reference.

This ability to key many aspects of the work to the fourteenth-century-based framework serves many purposes. The invocation of a vocabulary much larger than that endowed by an arbitrary form, key center, or style benefits the presentation of the music. The dramatic visions lend austerity and intrigue, whether exposed or discerned intuitively. The cross-cultural style achieve a clash of contrast that was common in the stark days of Machaut’s music, but are rare in thick modern soundscapes. This outside reference also provide an expectation conducive to sonic surprise or aural fulfillment. The use of these references as tool and materials of construction evokes the familiar and remembered through the new and inexperienced.

Substructure arising from the application of an external framework onto the fresh
composition integrates microelements within the controlling authority, pleasing the ear as each diverse piece functions within the macrostructure. The discovery of commonality between sectional rhythms and motives reflects the character of the work as a whole. The soundness of tightly integrated forms binds each element into the common piece. Consonance and dissonance take on new meaning as the sense of expectation is altered to follow the flow of the work. Unity and contrast are perceived through convergence and divergence from the focus on the framework. Dissonant attributes defeated the resonance of Machaut's work throughout the piece. Consonance reinforces the sense of place within the larger structure. The patterns that arise from the similarities and contrasts make the design of the whole. These color and content choices become the warp and the weft of the weave. These combine, converge, and disseminate to produce a fabric that has variety in color and texture. The uniqueness of each pass of the shuttle integrates into the cloth as a single whole pattern that is reinforced by each individual fiber.

The achievement of this pattern was measured by an analyzable use of craft, skill, and technique. Creation of measurable data configuration with a logical presentation of quantified similarity within stated goals indicates the achievement of quality in a work. The ease with which a work is moved from paper to performance reflects skill in the design and notation, yet these elements ignores an intangible aspect of a musical composition, the ephemeral measure of art.

Conclusion

Ultimately, true success is a measure of the intuitive elucidation of a deeper
reflection shared by composer/performer/audience-participant. The mark of achievement is in the listener's response, the "fey" perception of a remembered quality cast in a new, enriching light. This reflection communicates between participants not the picture of a landscape, but the experience of one's having stood in that landscape, smelling the grass, feeling of wind, and hearing the movement of branches in full peripheral vision. The emotion is carried, the abstract translated into new elements, different visions with the same breath of response. This intuitive aspect of artistic expression was expounded by James Joyce.

How did he elucidate the mystery of an invisible person, his wife Marion (Molly) Bloom, denoted by a visible splendid sign, a lamp? With indirect and direct verbal allusions or affirmations: with subdued affection and admiration: with description: with impediment: with suggestion.

Both then were silent? Silent, each contemplating the other in both mirrors of the reciprocal flesh of their his no this fellow faces. 17

Joyce's vision was enhanced not by guesswork or hypothesis. The imagination supplies from remembered experience the detail of a vision that is complete in form, but is provoked by the suggestion of that memory, the breath of air from some long-forgotten time. Memory allows a new dream to be born from old ashes when prompted. In The Warp and Weft of Fabric, the effectual elicitation of these new/ancient experiences is the most profound mark of success. Inasmuch as this is achieved by the invocation of Machaut's Le Messe de Notre Dame in a new work, it finds its own place in the historical

17Joyce, Ulysses, 702.
progression of musical literature.
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The Warp and Weft of Fabric
First Movement

Michael McBride

Violin I

Violin II

Viola

Violoncello

\* denotes 1/4 step below standard pitch
Second Movement

Michael McBride

Violin I

Violin II

Viola

Violon Cello

Vln I

Vln II

Via

Vlc
3rd Mvmt

Vln I

Vln II

Vla

Vlc

Vln I

Vln II

Vla

Vlc

-19-
3rd Mvmt

Vln I

Vln II

Vla

Vlc

Vln I

Vln II

Vla

Vlc
3rd Mvmt

Vln I

Vln II

Vla

Vlc

Vln I

Vln II

Vla

Vlc

Vln I

Vln II

Vla

Vlc

-24-
Fourth Movement

Michael McBride

Violin I

Violin II

Viola

Violoncello

Vln I

Vln II

Vla

Vlc

Vln I

Vln II

Vla

Vlc
4th mvt

Vln I

Vln II

Vla

Vlc

-30-
Fifth Movement

Violin I

Violin II

Viola

Violoncello

Vln I

Vln II

Vla

Vlc

* (x) note- play string behind the bridge

+ Don't press string completely to fingerboard
5th Mvmt

Vln I

Vln II

Vla

Vlc

sul D sul pont, highest note possible

non vib.

sul A sul pont highest note possible

Vln I

Vln II

Vla

Vlc

pp

p

mf

pp

p

mf
Sixth Movement

Michael McBride

Violin I

Violin II

Viola

Violoncello

\[ \text{Bar 1} \]

\[ \text{Bar 2} \]

\[ \text{Bar 3} \]

\[ \text{Bar 4} \]

\[ \text{Bar 5} \]