Creativity and Theory in Musicianship

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By

Guerino Mazzola, Yan Pang, Jason “J-Sun” Noer and Jordon Goebel

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Dedicated to Lianne La Havas
Who has given us back the depth of signification
By her beauty in vibrato.

Photo and © by John Paul Pietrus

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Preface

In their careers, composer Yan Pang, music theorist Guerino Mazzola, choreographer and dance scholar Jason "J-Sun" Noer, and composer Jordon Goebel found that musicianship courses primarily focused on Western classical music theory.

The authors found these courses fell short without a global/cultural perspective and various music creativity practices. This deficiency was identified through the techniques these authors found themselves using after completing a traditional Western classical music education. After this realization, Pang, Mazzola, Noer, and Goebel were eager to start developing this material to assist their teaching practice.

This book introduces readers to musicianship by exploring new theories of musical creativity. We will begin with a classical music theory framework and explore global perspectives. The classical components of composition, performance, music theory, and technology are the foundations on which creativity is built.

Our tutorials unfold a culturally diverse spectrum of musical styles and traditions, from Western classical music to Asian and African approaches, including improvisation, score writing, and contemporary technology. The reader is introduced to concepts, instruments, and theories in order to attain the basic vocabulary and toolset for understanding the structures underlying the repertoire and its embodiment in performance.

These new skills will help the reader illuminate their process in music-making and equip them with the essential tools necessary to succeed in subsequent levels of musicianship.

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Minneapolis, March 2022

Guerino Mazzola, Yan Pang,
Jason "J-Sun" Noer, and Jordon Goebel

Part I

Introduction of Creative Musicianship

Chapter 1

General Philosophy about Musicianship

Summary. We give a theoretically founded presentation of creativity, including its history, present trends, and our own approach in chapters 3, 10, and 11. We also want to describe here the essentials of our approach to creativity in practical terms to be used in the tutorial.

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1.1 Definition of Musicianship

According to the Cambridge Dictionary (39), musicianship is "a person's skill in playing a musical instrument or singing." This reductive definition does not acknowledge the fullness of the musician's artistic sensitivity, life experiences, and the multiple relationships in their career. In the Western classical world, there is a typical misconception that musicians are solely defined as performers who execute work by composers. However, in the global practice of music, there has been much less of a distinction between composers and musicians. Our goal with this book is to expand and muddy the waters of music creation, blur the lines between exclusive definitions of musicianship, and offer a critical lens with which to investigate multiple creative musical activities.

Let us also focus on the question of the basic principle of making music. Basic not in the ideological sense, but as a transformation of human realities. In this sense, music is about sonification, i.e., the transformation of ideas into sounding reality. This process can start from metaphysical ideas, such as Pythagorean approaches, or religious imagination, as realized in Christian Gregorian music, philosophical approaches from Beethoven to Cage, etc. This principle should be observed whenever one judges music: it is the communicative dimension between the poiesis (the maker's role) and the aesthesis (the receiving audience). This communication is two-way (bidirectional) because the receiver interprets the musical message, and the maker should be receptive of this interpretation. This relationship of sharing ideas should result in a collaborative dance of sound. Of course, the sonic medium enables a representation of ideas that would be ineffable visually, and the medium's own message style may embody ideas that remain unheard elsewhere.

1.2 Object versus Action

The traditional distinction between composer and performer is distinguishing the product (the composition) from its actively sonified projection (the performance). It separates the creative quality of the composer from the performer's reproductive quality of mapping the result of a creative input into acoustical reality (see Chapter 10.1.1.4 for an in-depth discussion of these dilemmas). And it separates the object of the compositional work from the action of the performer's movement. This double distinction of object/action and creativity/reproduction is an outcome of the industrial architecture. It idealizes the objective result and attributes it to the one and only creator, the composer.

On one hand, this reflects the pseudo-romantic ideology of geniuses versus transmitters; on the other, it reproduces the basic economic mechanism where economy only works in the form of an exchange of objects. The composition in its scored form, also comprising lead sheet representation of improvisational jazz, the media representation on LPs, CD, streaming media, is the object that can be commercialized. Action cannot be put on the shelf, the CD of an improvisation by John Coltrane is just a photograph of creative reality, the improvisational action is not captured. Sergiu Celibidache compared a CD to "going to bed with a photography of Brigitte Bardot." (42).

This separation between creative action and objective output is however an unreal perspective: Many composers create their compositions as performers. Even though one would not expect it, Mozart, Beethoven, and Coltrane are famous examples of improvisation in the composition process. Without the creative impact of the performers' actions, the work object remains a fictitious deep-frozen idea.

1.3 Steps of Creativity

There is a myth in music that creativity only comes from a mysterious or divine intervention (and a corresponding myth that drugs can include this ecstatic experience). Creativity typically is a process of discovery and invention that begins with an open question and continues with a run through a sequence of well-defined operational steps. Tapping into our creativity does not guarantee we find an answer right away. However, if we continuously repeat and start over the process, we will find a solution. There are good reasons for approaching creativity based upon a clear strategy.

We have previously identified many examples of successful creativity in our theoretical framework. Here, we aim to highlight the roadmap that serves as the basis for our practical work for our readers. In Mazzola's Creativity book (190), the process is composed of the following steps:

1. Exhibiting the open question
2. Identifying the semiotic context
3. Finding the question's critical sign or concept in the semiotic context
4. Identifying the concept's barriers and limits
5. Overcoming barriers and limits to display new perspectives
6. Evaluating the new barriers and limits

Let us give a simple example: 3M's Post-It invention (see Figure 1.1).

Figure 1.1 – The Post-It notes.

Step 1 exhibits an open question. The start of creativity should be the will to find something new that answers an open question. It has an objective.

Example: A chemist at Minnesota's 3M company, Dr. Spencer Silver in 1968 developed an adhesive, but it did not glue as expected. Spencer did not know how to apply it. What could be the application of a glue that didn't stick?

Step 2 means identifying this question's context. We want to learn about the question's generic position. It may be trivial to some and a major challenge to others. Moreover, we observe that the context is a semiotic one. What do we mean by this? We want to say that the context should be part of the meaningful things, thoughts, and signs. The open question then would be such that it creates new content when answered. It would amplify the given meaningful context. In other words, our concept of a creation is about building new content, more than forms.

Example: Our context is M3, a part of the chemical industry, including a variety of more than 50,000 products.

Step 3 defines the focus on a specific location in our context, i.e., a critical concept or thing where we hope that the open question could be made more precise.

Example: The critical concept in our example was "adhesive." Dr. Silver invented an adhesive that was problematic—it would not glue as expected."

Step 4 is decisive. We are asked to identify the concept's walls. Walls represent a metaphor for properties and characteristics that describe the concept in a more explicit form. This is a delicate task because some properties might be too subtle to be recognized.

Example: The barrier of the concept "adhesive" was that an adhesive has to glue, meaning 100%, nothing less. It was a wall because it was evident that an adhesive had to glue, by its very definition!

Step 5 makes us consider the barriers and try to overcome them. The barriers might be cultural or technological, whatever. This means that we ask to what extent these barriers are necessary for the critical concept and whether we could discover ways to open them and understand new perspectives on the opposite side of the given barrier.

Example: The softening of the "glue" wall means that one has to question this strong requirement of sticking firmly 100% of the time. Arthur Fry attended one of Silver's seminars, and he successfully opened that wall. He was in a church choir and was always frustrated with the paper

bookmarks he was using to mark the songs in his hymnal: they would not stay put. Fry realized that Silver's adhesive met precisely his needs.

Step 6 is the terminal step. It consists of an evaluation of wall extensions one may have discovered in step 5, and then the judgment of this evaluation's outcome. Is it a successful extension of the original critical concept, or could we not find the answer to the open question? If we are successful, everything is OK; if not, we have to go back to step 4 and find new walls and new extensions, or even to step 3 and look for new critical/problematic concepts.

Example: In 1980 Post-It Notes were introduced nationwide in the U.S. and became a big success.

Remark 1 Of course, it is easy to give an example of a creative strategy that probably would not be successful. Consider an open question in number theory. The critical concept would be "number," and the wall one may discover could be "the number's color" when you write it down on paper, on a blackboard, or a computer screen. One could have the 'ingenious' inspiration that the number's color might be extended from the usual black, blue, or red to any fancy color. But it is quite clear that such an extension would not solve the given number-theoretical question.

Remark 2 We should not terminate this introduction to our creative process scheme without pointing out the deep relevance of representing ideas and methods sensually (touch, smell, taste, hearing, sight). We already introduced the sight- and touch-oriented metaphor of a wall described in steps 4, 5, and 6. When explaining creative processes, we should always immerse our activity in an object-oriented environment, where we feel at home. Humans don't think in abstract categories without using sensual metaphors. Even abstract mathematical thoughts are always embodied in objects that can be manipulated by human gestures. This is one of the secrets of successful mathematicians. Albert Einstein admitted that his thoughts were always performed together with intense chewing activity. He was literally chewing ideas!

Creativity cannot be guaranteed—creativity always involves the unforeseen or unexpected. However, this is the strongest motor of human propagation. For a successful creation, the feeling should be warm and loving[1]; creation out of hate or indifference never propagates life. *A creation is a mental baby; it needs a 'mother' and her carrying body.*

[1]Sidney Lanier says, "Music is love in search of a word."

Chapter 2

Gestures and Alphabets in Creative Musicianship

Summary. Music creators are aware that gestures are essential. However, there are not many examples of standard gestural language. Therefore, we offer Mazzola's gestural theory (199) as a way to connect movement specificity to the music score.

We begin with an introduction to the history of gestural expressivity. We then move into the Greek time concept, which dictates the time structure of language neumes to Western classical music notations, whereas gestures are already given in Chinese language.

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2.1 Introduction to the History of Gestural Expressivity

In our discussion of musical structures and creativity, we shall use the gestural language to express connections between notes that are not automatically given in the Western notation. For example, a melody would be denoted as a set of notes in a score, but it could additionally be understood as a gesture that connects the subsequent note "points". The phenomenon and conceptualization of gestures has been around since the Middle Ages, as defined by Hugue de Saint-Victor in the 12th century, stating that "a gesture is the movement and figuration of the body's limbs with an aim, but also according to the measure and modality proper to the achievement of all action and attitude." (199, p. 847)

In comparing the development of Western musical notation and Chinese musical notation, an interesting phenomenon becomes observable. It is worth noting that the generic approach is not automatically a semiotic one. Gestures can be generators of contents without being signs (having meaning); they can be pre-semiotic entities. While in the Western tradition, notations are signs that stand for symbolic events, while in the Chinese tradition, they are characters that stand for instructional gestures.

In our musically motivated discussion of gestures, we want to present a conceptualization that focuses on musical creativity and less on general philosophical aspects. Following Saint-Victor, we view a gesture as being defined by a configuration of a body's limbs, but the body needn't be the physical body; The body's space can be the usual 4D space where humans move when making music, or else a more abstract space of musical parameters, for example, the space of onset, pitch, duration, and loudness of a standard Western score. A gesture g is a map $g : \Gamma \to X$ from a directed graph Γ, the gesture's skeleton, with values in its body space X. The skeleton,

denoted by $\Gamma(g)$, is a directed graph Γ, namely a set $V(\Gamma)$ of points, the vertices of Γ, together with a set $A(\Gamma)$ of arrows between vertices. The following figure shows such a skeleton to the left (see Figure 9.1).

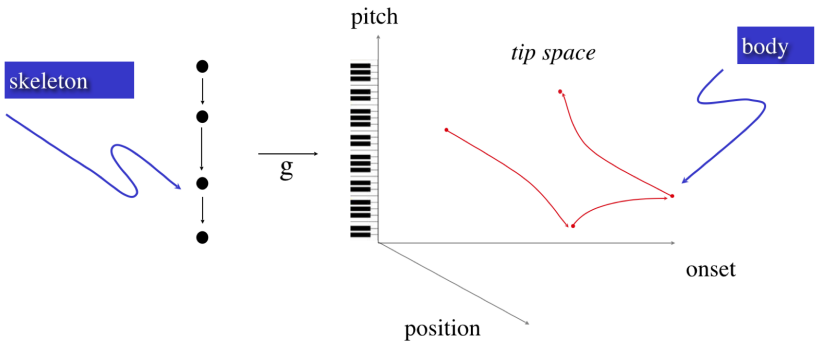

Figure 2.1 – A gesture, left the skeleton, right the body.

This map sends each vertex to a point in the space X and each arrow to a curve in X. In a music context, space X describes notes as points with their music parameters such as onset, pitch, loudness, duration, etc. The gesture moreover contains its body, which means that in a musically defined space, every vertex of Γ is represented by a point in the body's space X, while every arrow of the skeleton is represented by a continuous curve between the arrow's points. The body of g is shown to the right of the above picture. We often denote g as a function $g : \Gamma \to X$.

A musical example of a gesture could be a glissando, being represented by the skeleton $* \to *$ with its body in the space of standard Western notation, the curve of the arrow $\to$ being the curve from the initial note to the final note of the glissando, see also Figure 2.2 and (193).

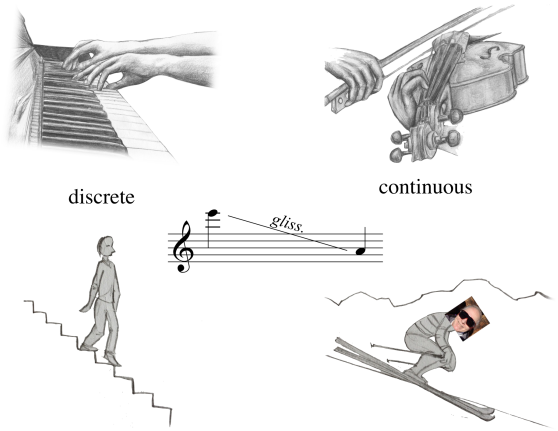

Figure 2.2 – A glissando.

Another example, namely sustained note, could be the movement of the tip of the index finger when moving down to the key, keeping it down for the duration of the note, and moving back when the note is finished.

This example would have the skeleton $* \to * \to * \to *$, the first arrow for the down movement to the key, the second one for the time where the index tip stays on the key, and the third arrow for the movement back up from the key. In this example, the body's space is the usual 4D space with its three geometric coordinates and the time coordinate. We see here that time is not necessarily given by the curves' parameterization; gesture curves are parametrized by abstract curve parameters. For example, if you describe your arm's geometry as a curve from the shoulder to your fingers, this curve has no temporal or time coordinates, it is purely geometric.

We can take this idea even further. In music practice, gestures of gestures, which we call hypergestures, are also important. In our conceptualization, the set $\Gamma@X$ of all gestures with skeleton Γ and body space X is also a space, i.e., we can view these gestures as "points" in $\Gamma@X$. We may then consider gestures $d : \Delta \to \Gamma@X$, i.e., their body is a system of curves whose points are gestures in $\Gamma@X$. This is what we call *hypergestures*—gestures of gestures.

In music theory and practice, hypergestures are very frequent. For example, in (first species[1]) counterpoint, one considers sequences of intervals. These intervals can be viewed as gestures of skeleton $* \to *$, whereas the sequence of intervals would be a gesture of intervals with skeleton $* \to * \to * \ldots * \to *$, where every vertex represents an interval.

The most important fact about hypergestures is the Escher Theorem, stating that the spaces $\Delta@\Gamma@X$ and $\Gamma@\Delta@X$ are essentially the same. For the above counterpoint example, this means the above sequence of intervals[2] can also be interpreted as an interval of sequences. And this musically means that we have an interval $* \to *$ whose vertices are the cantus firmus sequence and the discantus sequence. This is a famous double understanding in counterpoint.

In a creative approach to musicianship, gestures will be added to the traditional notes as creative elements that are not driven by those notes. Similar to traditional musical notations, the presence or absence of gestures in languages reflect and influence how music is notated, thus playing an important role for musical creativity.

2.2 The Greek Tradition of Alphabetical Notation

The following discussion deals with the alphabetic notation as a formal tool to describe reality. In music, the European alphabetic notation is essential, therefore, we briefly digress into the power of alphabetic representation within human theory-building.

Atomism was first conjectured by the Greek philosopher Democritus (460-370 B.C.), and now it represents a commonly accepted theory of matter and the order of the physical world. He followed the materialistic tradition of Leucippus, which states that our perception of smell, light, and other physical phenomena all goes back to elementary objects, called atoms (what cannot be split into parts), and empty space.

Our interest in this ancient philosophical claim stems from the question why this approach was enabled in Greece and not in China, for example. Of course, our answer is not a mathematical theorem, but it suggests some deeper reflections.

The Greek thought style is related to language. This relation is also true for Chinese thought, here we don't recognize a difference. But the representation of language is radically different: Greek is represented in written form by the combination of a simple alphabet $(\alpha, \beta, \ldots)$ to words that symbolize the acoustical representation of language. Such a symbolic representation is inexistent in Chinese language. Chinese characters represent monosyllabic Chinese words or morphemes. In 100 AD, the famed Han dynasty scholar Xu Shen (许慎) classified characters

[1] In the first species counterpoint, we begin with a cantus firmus (new or existing) and compose a single new line—called the discantus—above or below the cantus firmus. The intervals between cantus and discantus are all consonances.

[2] Pitch space between two notes.

into six categories, namely pictographs, simple ideographs, compound ideographs, phonetic loans, phonetic compounds and derivative characters. The Dictionary of Chinese Variant Form （异体字典） from 2004 represents 106,230 signs. This is opposite to the Greek alphabetic system. You can build words with only 26 “atomic” letters. For word lengths up to 10, you can a priori build $26^{10} \sim 1.41 \ldots 10^{14}$ words. This huge variety is quantitatively superior to the Chinese graphical approach. But it also generates a basic atmosphere of thoughts which starts from a combination of a small number of “language atoms”.

We believe that this basic alphabetic language architecture also shaped Greek philosophy. In other words, the linguistic alphabet induced the idea of a “physical alphabet” of atoms.

2.3 Alphabetic Approach to Music Theory

The alphabetic approach to language and its underlying style of thoughts has been very successful in physics, but this does not prove that it would be successful in all possible fields of thought. This caveat is very important since the alphabetic principle has deep implications for the style of understanding reality.

In the 13th century, when measured symbolism was introduced, they generated a vocabulary of discrete words composed of note “atoms” with onset, duration, pitch, loudness, and instrumental voice parameters. This “alphabet” was crucial for the understanding of musical objects. Chords, rhythms, and melodies were understood in this “atomic language. Harmony and counterpoint were theories built upon this atomic language. In particular, dominant, tonic, subdominant functions, interval categories and the like, were built to describe musical logic.

However, the original neumes, gestural entities, were replaced by such alphabetic constructions and thereby their gestural nature was destroyed, see Figure 9.2.

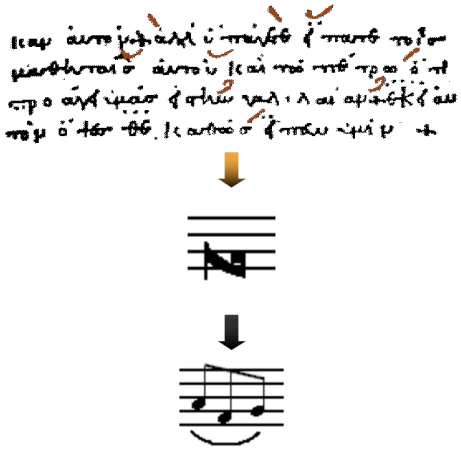

Figure 2.3 – From neumes to notes.

Nevertheless, musical creativity is never limited to alphabetic atomism. The absence of a gestural theory in music has been observed by Robert Hatten, Theodor W Adorno and other theorists.

A gestural theory of music is now being (re)built, and it covers a number of theoretical issues, such as tonal modulation theory or performance theory. We should therefore deal with this perspective in music theory. In physics, the atomistic approach has also been embedded in a

quasi-gestural approach in field theories of Quantum Mechanics. It is important to achieve such a transition in music theory and the associated theory of musical creativity.

2.4 Ancient Chinese Gestural Notation

Ancient Chinese music notation is based on gestures represented by visual symbols – emphasizing the instruction, in contrast to the Western music notation, which represents the sound and emphasizing the facts. Thus, Chinese written language is based on visual symbols (representing instructions) whereas English written language is based on alphabet sound representation, for example, the evolution track of a person (人).

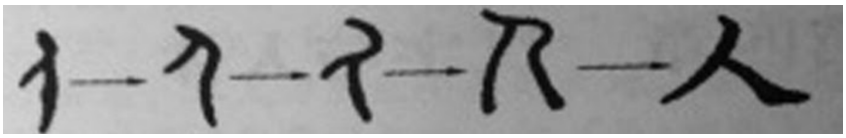

Figure 2.4 – "Body Movements and the Creation of Early Chinese Hieroglyphs" by Jie, Zhang and Xiaoming, Hu.

The earliest record of ancient Chinese notation is the abbreviated character notation (减字谱) for the Chinese instrument qin (古琴) (see Figure 2.5). Its numbers refer directly to the means of production and only indirectly to the sound produced. The strings of the qin can be stopped at studs which serve as frets, or at points between them (see Figure 2.5) (201)).

Figure 2.5 – Chinese instrument Guqin.

Because Chinese instruments were mainly for solo performance, there is no expectation or requirement for precise beats. The analogy might be this: while in Western concert dance, individuals rather correspond to the rhythmic pattern from the music outside of their own bodies which is written in this notation, in tai ji (太极), individuals move in response to their own inner mood, which makes the gestural message so difficult to grasp from classical Western notation.

A simple example of the symbolic absence of the gestural movement is shown when looking at rotation in mathematics. This movement is represented by a matrix formula, but the rotational movement is invisible there, the insight of the underlying rotation is hidden in the matrix. The mathematics showing the movement is not evident and requires some work involving eigenvalues and is not automatic (see Figure 2.7).

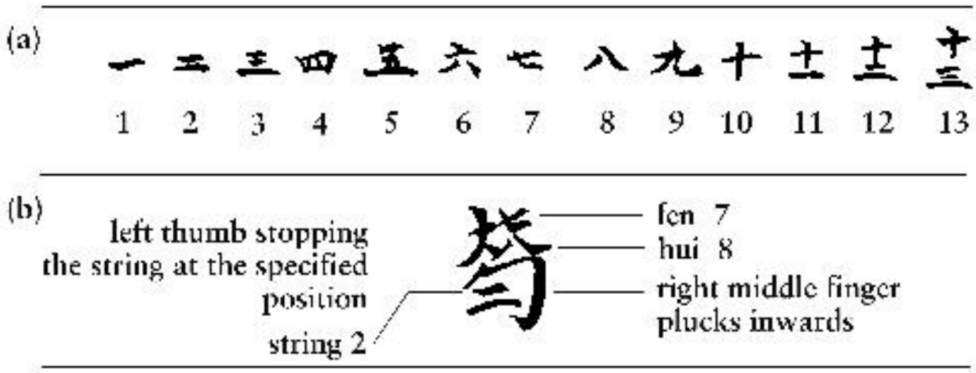

Figure 2.6 – Oxford Music Online, notation.

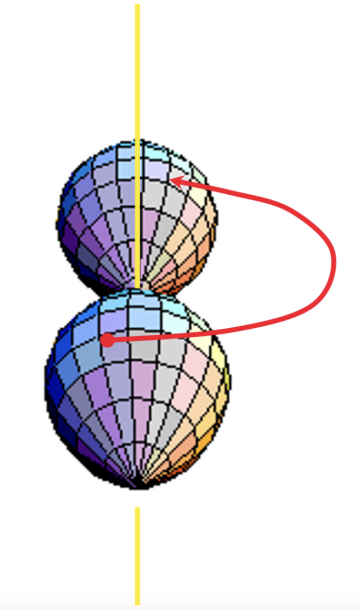

Figure 2.7 – A rotation.

Part II

Theoretical Approach to Musicianship

Chapter 3

Introduction

3.1 Origin of Western Music Theory

Western music theory originated from the desire to notate and replicate music from the Middle Ages of Europe. The Roman Catholic faith incorporated this form of music into their practices and later labeled it Gregorian chant. Originally this tradition was a basic gestural representation of rises and falls of sung notes with often little to no exact pitch accuracy. The pitch representations were called *neumes* and were accompanied with aurally taught melodies, see Figure 3.1. As this notation developed over time, musicians, theorists, and composers innovated ways to be more exact and defined in their ability to share and recreate the sonic product they were attempting to represent.

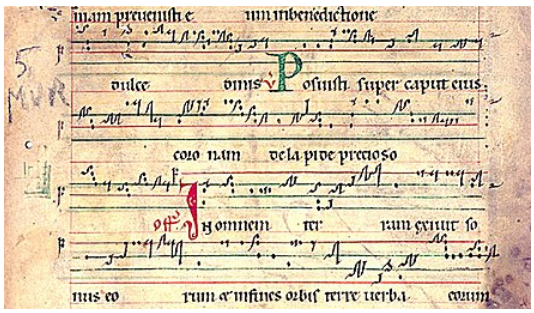

Figure 3.1 – A neumes score.

3.2 The Role of Music Theory in Musicianship

It is not necessary to know traditional music theory to be a good musician or understand the various topics discussed in this book. However, this book aims to be as close to a fully encompassing musicianship methods and topics book, therefore we must cover the realm of tonal music theory. This theory serves as a solid base for critically analyzing music and is often essential when communicating as a professional musician. Understanding the methods of harmony and notation gives a complete perspective of the theoretical history that led music to where we are now. This section splits into subsections that start in the most straightforward manner and

progress to a knowledge expected at the end of an undergraduate music degree.

Before immersing ourselves in Western classical music theory, it is important to identify and challenge its confines. There is a systemic self-preservationist tendency among curricula and the canon of Western traditional music. Moreover, in many non-Western traditional musical cultures, this response pervades the formal and theoretically arbitrary training of musicians within their respective cultures (236). We encourage thinking that pushes against the boundaries of historical categories that exclude musical practices from being contemporary. For example, "World Music" is a category organized by Western musical perspectives. This perspective labels anything outside of Western musical practices as "other," monolithic, static, and "Orientalist." Our hope is that musicianship would recognize and reframe the abundance of musical perspectives.

Chapter 4

Terminology

Summary. This chapter introduces the elementary symbols and notations for classical Western music writing.

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4.1 Sound and Notes

Sound is vibration traveling through the air or another medium and can be heard. In music, sounds with periodic vibrations, their frequency, are important. A note is the symbolic representation of a frequency-specific sound. Notes are used by composers to create musical works. A note needs additional information to recreate the sound it represents, i.e., tuning and tempo.

In a note, the addressed sound's frequency f is represented by its pitch. The note's pitch p is given by the following formula:

$$p(f) = C.log_{10}(f) + Const.$$

The *note's* head on the staff refers to pitch, onset, and duration (length of time), see Figures 4.2 and 4.1.

Figure 4.1 – Notes' structure.

4.2 Staff

The *staff* is the system of lines that indicate pitch, while the horizontal position on the staff indicates the onset time, i.e., the time when a note starts.

4.3 Measures and Barlines

A *measure*, also known as a *bar*, is a specific unit of time defined by a given number of beats.

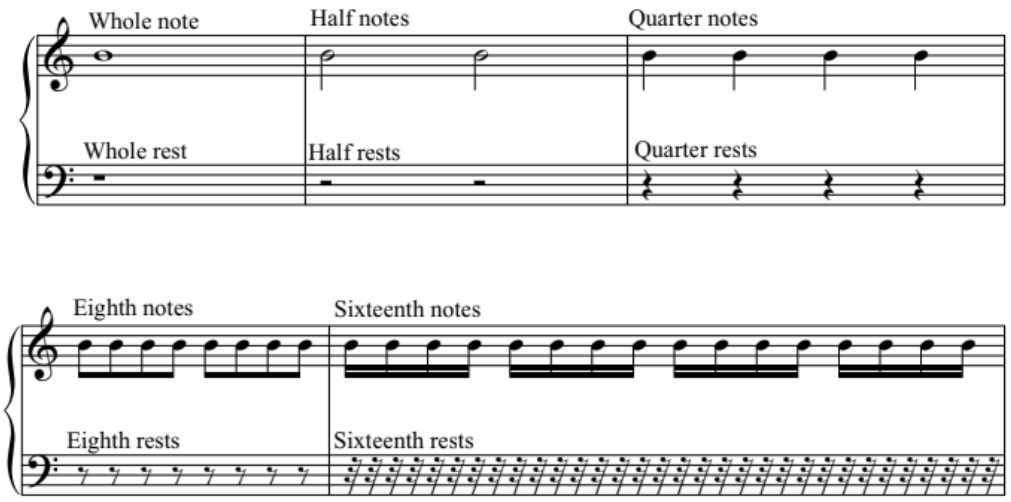

Figure 4.2 – Notes' and rests' durations.

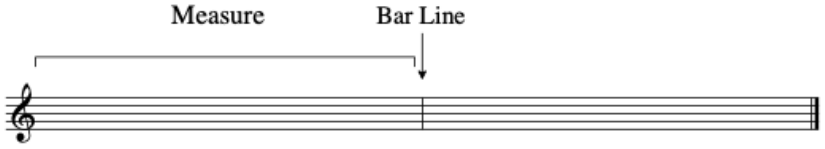

Figure 4.3 – Measures and bar-lines.

4.4 Rests

Rest are given the same values as notes and are shown in Figure 4.2. No sound is made during rests which can discount their significance. Silence, however, is one of the most important aspects of music. Be sure to "play" each rest by observing it as an essential part of rhythmic flow. Each note has its own value, meaning the length of time played, depending on its type.

4.5 Slurs

A *slur* means the notes should be played as legato (as smoothly as possible), with nearly no space in between (see Figure 4.4).

4.6 Ties

A *tie* binds two notes together to sound like a single note with the same pitch, and the duration is equal to the two notes' added values (see Figure 4.5). Ties are used when a note value would otherwise be obscure. The tie symbol may look very similar to the slur; however, a tie only applies when the notes' pitches are the same.