

2010

The affective properties of keys in instrumental music from the late nineteenth and early twentieth centuries

Maho A. Ishiguro

University of Massachusetts Amherst

Follow this and additional works at: <https://scholarworks.umass.edu/theses>

 Part of the [Composition Commons](#), [Musicology Commons](#), [Music Practice Commons](#), [Music Theory Commons](#), and the [Other Arts and Humanities Commons](#)

Ishiguro, Maho A., "The affective properties of keys in instrumental music from the late nineteenth and early twentieth centuries" (2010). *Masters Theses 1911 - February 2014*. 536.

Retrieved from <https://scholarworks.umass.edu/theses/536>

This thesis is brought to you for free and open access by ScholarWorks@UMass Amherst. It has been accepted for inclusion in Masters Theses 1911 - February 2014 by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

**THE AFFECTIVE PROPERTIES OF KEYS IN INSTRUMENTAL MUSIC
FROM THE LATE NINETEENTH AND EARLY TWENTIETH CENTURIES**

A Thesis Presented

by

MAHO A. ISHIGURO

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

MASTER OF MUSIC

September 2010

Music

THE AFFECTIVE PROPERTIES OF KEYS IN THE TWENTIETH CENTURY

A Thesis Presented

by

MAHO A. ISHIGURO

Approved as to style and content by:

Miriam Whaples, Chair

Brent Auerbach, Member

Robert Eisenstein, Member

Jeffrey Cox, Department Chair Music

DEDICATION

I dedicate my thesis to my father, Kenzo Ishiguro.

ACKNOWLEDGEMENTS

I would like to thank my advisor, Prof. Miriam Whaples from the Music Department at UMass Amherst for her endless patience and guidance throughout the past years. I am forever grateful to many of my friends for their enormous support in the process of writing this thesis: William Wood, Sean Norton, Steven Christensen, Rachel Mascetta, and Aaron Chandler-Worth.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
LIST OF TABLES.....	viii
CHAPTERS	
I.INTRODUCTION.....	1
II. HISTORY OF AFFECTIVE PROPERTIES OF KEYS.....	4
Section 1: Octave Species and the Ancient Greek.....	4
Section 2: Modes in the Middle Ages and Renaissance	12
Section 3: Keys in the Baroque, Classical and Romantic Periods.....	21
Classical and Romantic Periods.....	26
III. AFFECTIVE PROPERTIES OF KEYS IN THE LATE NINETEENTH AND EARLY TWENTIETH CENTURIES	38
Section 1: Music Scholars.....	38
Adolf Bernhard Marx, <i>Theory and Practice of Musical Composition</i> , 1853	38
Edward Hanslick, <i>The Beautiful in Music</i> , 1854	40
John W. Moore, <i>Complete Encyclopedia of Music</i> , 1854.....	43
Henry Edward Krehbiel, <i>How to Listen to Music; Hints and Suggestions to Untaught Lovers of the Art</i> , 1869.....	46
Ernst Pauer, <i>the Elements of the Beautiful in Music</i> , 1876	47
George Grove, <i>A Dictionary of Music and Musicians</i> , 1880	51
Edmund Whomes, “Key Colour,” Proceedings of the Musical Association, 13th Sess. 1886-1887.....	53
Franz Gronings, “Key Colour,” <i>The Musical Times and Singing Class Circular</i> , Nov. and Dec. 1886, Nov. 1887 and Apr., 1888	56
Hugo Riemann, <i>On the Imagination of Tone and Analysis of Bach’s Wohltemperirtes Clavier</i> , 1893	61
Albert Lavignac, <i>Music and Musicians</i> , 1907.....	76
Ralph Dunstan, <i>A Cyclopedic Dictionary of Music</i> , 1925	78
Sir Donald Francis Tovey, <i>Beethoven and “Tonality”</i> (1928)	82
Otto Rudolph Ortmann, “What is Tone-Quality?” <i>The Musical Quarterly</i> , 1935	84
Harry Farjeon, “The Colour of Keys, and The Color of Notes,”	

The Musical Times, May and July 1938	85
Percy A. Scholes, <i>The Oxford Companion to Music</i> , 1955.....	90
Hans Keller, “Key Characteristics,” <i>Tempo New Series</i> , No.40, 1956	93
Donald N. Ferguson, <i>Music as Metaphor: the Elements of Expression</i> , 1960	97
James O. Young, “Key, Temperament and Musical Expression,” <i>The Journal of Aesthetics and Art Criticism</i> , 1991	98
Section 2: Scientists’ Views and Approach	102
Hermann von Helmholtz, <i>On the Sensations of Tones</i> , 1863.....	102
Gene Revesz, <i>Introduction to the Psychology of Music</i> , 1953.....	107
Phillip Ewart Vernon, “The Individuality of Keys,” <i>The Musical Times</i> , 1942.....	110
Section 3: Composers’ Views	113
Vincent d’Indy.....	114
Composers and Synaesthesia in the Twentieth Century	116
Arthur Bliss	120
Arnold Schoenberg	122
Alexander Scriabin.....	127
Olivier Messiaen	132
IV. SUMMARY AND CONCLUSION	141
BIBLIOGRAPHY.....	145

LIST OF TABLES

Table	Page
1. Ernst Pauer's Analysis of Keys in Certain Compositions	48
2. Hugo Riemann's Interpretations of Keys in J.S.Bach's Well Tempered Clavier Vol.1.	63
3. Analysis of Hugo Riemann's Interpretations of Keys (Using the Sharp-Flat Principle)	72
4. Albert Lavignac's Analysis of Characteristics of Keys	77
5. Ralph Dunstan's Analysis of Characteristics of Keys (from A Cyclopedic Dictionary of Music, 1925)	80
6. Harry Farjeon's Analysis of Characteristics of Keys	87
7. Key-color description by Rimsky-Korsakov and Scriabin (from Scholes's <i>Oxford Companion to Music</i> , 1955).	92

CHAPTER I

INTRODUCTION

The concept of affective properties of keys is based on the assertion that different tonalities are able to provide particular moods to music. Discussions regarding the existence and validity of this phenomenon have always been controversial because of the lack of universal agreement and satisfactory explanations for its occurrence.

Nevertheless, references to key characteristics have appeared in various fields of study over many centuries: the Greek doctrine of ethos, the writings of Guido d'Arezzo, Jean-Philippe Rameau's *Traité de l'harmonie*, scribbles in Beethoven's sketches, and several passages in Hermann von Helmholtz's *On the Sensation of Tones*.

The attitudes and opinions towards key characteristics have varied in each period of its history. Among the ancient Greeks and Romans, the characteristics of octave species were discussed among philosophers, namely Plato, and Aristotle. They were believed to influence moral development and were also associated with mysticism. In the Middle Ages and Renaissance, references to key characteristics can be found in the writings of numerous theorists, including Gioseffo Zarlino and John Cotton. The studies and discussions of key characteristics in those periods became so well explored as to result in the first appearance of a list of the characteristics of each mode.

In Germany and France especially, the discussion of key characteristics reached its peak in the first half of the eighteenth century, when it was studied as a part of

rhetoric. Theorists and composers alike showed their interest in the elements each key could offer to music and how to use those keys advantageously in order to enrich the musical experience of the listener.

While key characteristics were studied commonly as a vital subject by composers in the eighteenth century and as a fundamental part of musical education by many young musicians in the early nineteenth century, this tradition had all but disappeared by the middle of the twentieth century. The concept of affective properties of key is no longer commonly taught in our musical institutions, and this desertion of such a traditional discipline has been particularly curious event to me. In this thesis, I will focus on writings from the latter half of the nineteenth century and the first half of the twentieth to explore the various paths taken in the study of key characteristics. I will investigate the writings and discussions of three scholarly groups—music theorists, composers and scientists—from the late nineteenth and early twentieth centuries and discuss how the survival of the study of key characteristics was influenced by aspects of the time.

This study spans four chapters in this thesis. In Chapter Two, we will visit historical views on affective properties of scale systems appropriate for three different periods of time. Section 1 presents the very beginning of the tradition of key characteristics in which octave species were considered to affect the morals of audiences in ancient Greece. Section 2 describes the inherited concept of affective properties of a scale system in the Middle Ages and Renaissance. Section 3 surveys a number of events in the Baroque, Classical and Romantic periods that resulted in changes in the attitude and opinions of music scholars toward the principle of key characteristics.

In Chapter Three, I present a collection of articles and writings by music scholars and scientists, and my research on works by a number of composers, to display the continued views as well as changed attitudes which correspond to the current issues in music and science at the time. In Chapter Four, as a conclusion, I present my explanation for the decreasing validity of the concept of affective properties of keys in the mid-twentieth century.

CHAPTER II

HISTORY OF AFFECTIVE PROPERTIES OF KEYS

Section 1: Octave Species and the Ancient Greek

The exploration and discussion of the affective properties of keys go back to the ancient Greeks, for whom music was not only socially valuable and entertaining, but also an entity that reflected the gods' creations and their perfect beauty. According to Thomas Mathiesen, music in ancient Greece "...embodied larger universal principles and served as a vehicle for higher understanding."¹ The discussions of the notion of affective properties of keys have been found in a few writings from the ancient Greek period. It is evident that music and octave species were selected appropriately for specific events and audiences.

In various Greek treatises on music such as Plato's *Republic* and *Timaeus*, one frequently comes across the term *harmonia* in connection with a state of minds affected by music. *Harmonia* signified several different meanings over the history of the ancient Greeks. During Plato's time, the term was interpreted in two ways: a synonym for *tonoi* (scales), or octave species that were obtained from the Greater Perfect System. Currently,

¹ Oliver Strunk, *Source Reading in Music History* Vol.I (New York: Norton, 1998), 5.

harmonia is often translated as “tonal structure,” which is closer to what we call keys and modes, an octave species with a certain tonal center.²

Plato employed the term *harmonia* differently in the *Republic* and *Timaeus*. Here I will focus on the one found in the *Republic*, where *harmonia* was “used in conjunction with the various ethical characterizations of musical types-- Dorian, Phrygian, Lydian-- and it also refers to the harmonious state of the individual soul effected by music.”³ This use of the term *harmonia* connects the ancient Greek theories of the effect music has on human emotions with octave species, in which music had its most basic framework. This idea corresponds to the doctrine of ethos (originated in ancient Greece), a belief that the foundation of music, pitches and rhythms, possess qualities that affect moral character and the behavior of people.

Plato was deeply aware of the power of music, and recommended usage of certain octave species. Concerning the use of music in education, he believed that certain octave species had an inappropriate effect on the morals and behavior of the young.⁴ The most favorable octave species such as the Dorian, were recommendable for use in education while the Mixolydian, described as “a dirge- like key” and the Lydian, “high strung,” were considered appropriate only for entertaining and to be avoided in educational settings.⁵

There are various thoughts among modern music scholars on how to interpret the ethical characteristics of octave species. According to the historical account by

² Gustave Reese, *Music in the Middle Ages with an Introduction on the Music of Ancient Times* (New York: W.W. Norton & Company, 1940), 44.

³ Strunk (1998), 15.

⁴ Rita Steblin, *A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries* (Rochester: Univ. of Rochester Press, 2002), 13.

⁵ Strunk (1998), 22-23.

Athenaeus, the qualities of octave species reflected the characteristics of tribes with whom the ancient Greeks had contact and after whom each octave species was named.

Dorian harmony exhibited the manly vigour, magnificent bearing and temperate nature of the true Hellenic race. Aeolian and Ionian keys mirrored the characteristics of their respective Grecian tribes. Two keys were possibly adopted, brought by the barbaric Phrygian and Lydian invaders. To these keys were imparted respectively orgiastic and threnodic qualities... The Dorian key was associated with kithara, Apollo, peace and objectivity, while the Phrygian key was associated with the aulos, Dionysis, excitement and subjectivity.⁶

Otto Gombosi argues that since the passion found in the Lydian and Phrygian octave species was not a quality with which the Greeks wanted to be associated, the names of the foreign tribes were used for these two keys. Additionally, particular forms of poetry were associated with each octave species.⁷

In the *Republic* Plato also gives his interpretation of the qualities of each octave species as well as their proper use. In the conversations between Plato and Glaucon, they agree that the Mixolydian is the “dirge-like harmoniai,” and also find Lydian “intense.”⁸ They feel that “[they] must do away with [these keys]...for they are useless even to women, who are to make the best of themselves, let alone to men.”⁹ Ionian and Lydian were found to be “the soft and convivial *harmoniai*” and would never be any use for warriors.¹⁰ On the other hand, Dorian and Phrygian “would fittingly imitate the utterances and the accents of a brave man who is engaged in warfare or in any enforced business...

⁶ Ibid., 16.

⁷ Ibid., 16

⁸ Ibid., 10-11.

⁹ Ibid., 10.

¹⁰ Ibid., 11.

[they] will most beautifully imitate the utterances of men failing or succeeding, the temperate, the brave.”¹¹

Aristotle, to whom Plato passed down his concern about the power of music, also discusses, in *Politics*, his thoughts on the octave species of the Greeks:

Even in the nature of the mere harmonies there are differences, so that people when hearing them are affected differently and have not the same feelings in regard to each of them, but listen to some in a more mournful and restrained state, for instance the harmony called Mixolydian, and to others in a softer state of mind, for instance the relaxed harmonies, but in a midway state and with the creates composure to another, as the Dorian alone of harmonies seems to act, while the Phrygian makes men enthusiastic.¹²

Particular forms of poetry were also associated with each octave species.¹³ The qualities provided by the meter and the structure of the poems could also have enhanced, in the minds of the audience and musicians, the characteristic qualities found in music in each octave species.

Certain octave species were also associated with instruments: Dorian with kithara, and Phrygian with aulos. Kithara is an instrument of Apollo, god of the sun, truth, prophecy, and music and poetry.¹⁴ Aulos is an instrument of Dionysus, also known as Bacchus, the god of wine. Dionysus who finds liberation in madness, ecstasy and drinking wine, was also known as “the god who comes,” a foreign one to the Greeks.¹⁵ While the Dorian is associated with kithara which is linked with qualities of peace and

¹¹ Ibid., 10- 11.

¹² Oliver Strunk, *Source Readings in Music History: from Classical Antiquity through the Romantic Era* (New York: W.W. Norton & Company, 1950), 19.

¹³ Strunk (1998), 16.

¹⁴ John Hazel and Michael Grant, *Who's Who in Classical Mythology* (New York: Oxford University Press, 1993), 38-39.

¹⁵ Ibid., 112-113.

the native tribe of the Greeks, the Phrygian is associated with the aulos which is linked with qualities of violent excitement and emotions.¹⁶

Some scholars also consider that the timbres of instruments associated with certain octave species contributed to the characteristics. The lyra and kithara, in the absence of a fingerboard, produced tones more muffled than those produced by open strings.¹⁷ Contrasting with excitement from the aulos's music and its associated octave species (Phrygian), the characteristics of lyra and kithara music and their associated octave species (Dorian), are described as peaceful and calm.

There are two main branches of thought on the structure of the octave species found in the Greek music. One confirms all octave species to be modal, thus each octave species has its own tonic.¹⁸ The other is found in *Problems*, by the pseudo- Aristotle that in all octave species the mese (the modern pitch a) in the Greater Perfect System acted as a tonic.¹⁹ Gustave Reese considers this mese and a few other pitches in its proximity as a “tonal nucleus” in his *Music in the Middle Ages*.²⁰

This tonal nucleus is found in different positions in each octave species: for Mixolydian, it comes in high within the octave, while in the Dorian it is found in the medium region, and in the hypodorian it is found in the low region of the octave.²¹ Rather than the associations with tribal characters, Gombosi finds that the pitch region was more influential to the interpretation of octave species. Low register provoked “manly, serious,

¹⁶ Steblin, 16 and 23.

¹⁷ Reese, 45.

¹⁸ Ibid., 47.

¹⁹ Ibid., 45-46.

²⁰ Ibid., 45.

²¹ Ibid., 45.

warlike qualities,” while the middle register was associated with “ecstatic, worldly, religious affect” and high pitch with “a threnodic, intimate affect.”²²

Reese rises one interesting question in interpretation of the derivation of ethos in octave species. In Plato’s *Republic*, the Dorian and Phrygian and Lydian were found to have significantly different characteristics from one another. However, the mese and the tonal nucleus in these three octave species exist only one or two degrees apart. The mese in the Dorian is the fifth degree in the octave species while in the Phrygian it is the sixth degree and in the Lydian the seventh. The mese exists in close proximity in all three octave species, although, they are found to have distinctively contrasting characteristics.

One of the answers to the cause of the ethos of octave species, provided by Reese, is that the different locations of mese in each octave species influence the possible voice leading, especially around the cadential passage.²³ Aristides also discusses melodic compositions and explains how “the notes of the selected scale... by omissions and repetitions, by use of certain of them as initials and finals, produces the desired effect...The species of the octave...owe their quality to the varying successions of intervals.”²⁴ This passage signifies that it is, in fact, the organization of pitches that provide a given effect in music. Abraham Zvi Idelsohn agrees with Aristides and defines modes as “composed of a number of motives.”²⁵ Considering that the Greeks are said to

²² Steblin, 16-17.

²³ Reese, 45.

²⁴ R. P. Winnington-Ingram, *Modes in Ancient Greek Music* (London: Cambridge University Press, 1936), 56-57.

²⁵ Reese, 46 and Winnington-Ingram, 3.

have had a highly developed sensitivity toward melody, melodic elements are another possible candidate for providing an octave species its characteristics qualities.²⁶

James O. Young, however, suggests that it is the register of each octave species that provides various characteristics to octave species. Greek music typically involved vocal performances with the accompaniment of some musical instrument. As Lydian spanned the high register and was associated with a higher pitch, it was thought best to be sung by women. On the other hand, Dorian, which is located in the lower register of the Greater Perfect System, was more suitable for voices of men. Since women were also associated with the imitation of expressive activities, Lydian and other modes in higher register came to be considered to provide similar qualities.²⁷ Typical characteristics thought to be found in females or males were associated with difference in pitch register of octave species.

Associations between scales and characteristic qualities have been found not only in the musical culture of ancient Greek and future western cultures, but also in the music of China, Java, Bali, India and Arabian nations.²⁸ Concurrently, there have always been writers who doubt the validity of the concept and existence of any ethical component in musical scales, from the ancient Greek to the modern period, in Western and other cultures. This controversy is mainly due to the conflicting interpretations of qualities found in octave species by individual scholars as well as the indeterminate nature of the phenomenon.²⁹

²⁶ Reese, 45.

²⁷ James O. Young, "Key, Temperament and Musical Expression," *The Journal of Aesthetics and Art Criticism*, Vol. 49 (Summer, 1991), 236.

²⁸ Steblin, 14.

²⁹ *Ibid.*, 17.

During the time between after the age of Plato and Aristotle, and of neo-Platonists in the third century A.D., classical scholars lost interest in the idea that music affects behavior and morals of an individual, and the ancient Greeks did not establish any standardized dogma on the subject.³⁰ Furthermore, a few skeptical philosophers in the second century C.E. disagreed with the claim that music affects human behavior, and argued against the theories posed by earlier scholars.³¹ Until revived by the neo-Platonists, the amount of discussion of the affective power of music decreased dramatically.³²

³⁰ Ibid., 17.

³¹ Strunk (1998), 5.

³² Ibid., 5.

Section 2: Modes in the Middle Ages and Renaissance

By the Middle Ages, the dominant modal system was described in treatises such as *Musica Enchiriadis* and Guido d'Arezzo's *Micrologus* (1025/28).³³ The theories and philosophy of music from the ancient Greek era were being retraced and reconstructed, and a few of their traditions were inherited during the Middle Ages and Renaissance.³⁴

Treatises on music from the ancient Greeks were rediscovered and introduced to the West by scholars such as a Christian philosopher Boethius (480-524), a Roman statesman and writer Cassiodorus (485-585), a Spanish Archbishop Isidore of Seville (560-636) and a composer, music theorist and astronomer Hermanus Contractus (1013-1054). In the early part of Middle Ages, their efforts were focused on reviving the principles of the Greek musical system, defining technical terms found in Greek writings, and delving into the larger issue of their philosophy of music.³⁵ These scholars' primary concern barely included or extended to the discussion of actual practiced music. It was not until the ninth century that principles of music and actual practice of music were

³³ Donald Jay Grout and J. Peter Burkholder, *A History of Western Music* (New York: W.W. Norton, 2006), 45.

³⁴ Calvin M. Bower, "The Transmission of ancient music theory into the Middle Ages" from *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (New York: Cambridge University Press, 2007), 136-138.

³⁵ *Ibid.*, 151.

merged as scholars moved to isolated monasteries. As the singing of liturgies played a central role in monastic life, monastic scholars, instead of studying music as a matter divorced from the actual performance, connected musical practice with abstract musical concepts.³⁶

It was of great importance for medieval scholars to link their music theories to that of the Greeks, since Greek tradition was considered prestigious and authoritative.³⁷ In the course of transcribing Greek theories of modes, however, medieval scholars made a few critical mistakes. The first of these mistakes occurred in pitch collections for medieval church modes, which medieval scholars constructed by employing a tetrachord that differed from the one used by the Greeks as the foundation of their octave species. In *Musica Enchiriadis*, the four pitches-- protus, deuterus, tritus and tetradus -- are introduced. These four pitches, with certain intervallic relations among them, created a tetrachord; the basic building block of music.³⁸ As a tetrachord, too, was used in order to construct octave species in the Greek system, medieval scholars posited that their modes were inherited from the Greeks.³⁹ While the basic tetrachord found in the *Enchiriadis* had a semitone in the middle position, the basic tetrachord in the ancient Greek tradition placed the semitone in the lowest position.⁴⁰ Having used a tetrachord of a different construction from the one in the Greek system, pitch collections of the eight church modes turned out differently from their progenitive octave species.

³⁶ Ibid., 151.

³⁷ Grout, 46.

³⁸ Bower, 155.

³⁹ Mathiasen, 124, Bower, 155 and Grout, 46.

⁴⁰ Bower, 155.

Moreover, the fundamental natures of octave species and modes are significantly different: Modes are based on final and tenor, while octave species had no final, the principle note on which a melody was expected to end.⁴¹ Yet, desperate to link their theories with an authoritative source, medieval scholars assigned numbers to their eight modes, identical to the octave species of the Greek system. A mode and an octave species matched up under the same assigned number, however, they did not have the same pitch collections.

Scholars from the tenth century also made an attempt to apply tribal names found in the octave species of the Greek system to their corresponding modes. Doing so, these scholars misread the Greek sources and, as a result, applied tribal names to modes in completely the wrong order.⁴² In the end, both under the number system and the tribal naming scheme, the eight church modes and the octave species have relatively little relationship⁴³.

Medieval music theory also inherited from the Greek tradition the concept that modes carried with them a certain characteristic and impact on an audience. Descriptions of the characteristics of church modes can be found in many medieval treatises. However, it appears that characteristics found in octave species do not correspond to the characteristics of modes in these medieval sources.⁴⁴ In other words, the characteristics associated with Dorian in the Greek system are not those characteristics found in the Dorian mode of the church mode system. Therefore, it is

⁴¹ Grout, 46.

⁴² David E. Cohen, "Notes, scales and modes in the earlier Middle Ages," in *The Cambridge History of Music Theory*, ed. Thomas Christensen (New York: Cambridge University Press, 2007), 333-334.

⁴³ *Ibid.*, 333.

⁴⁴ Steblin, 19-20.

evident that while medieval scholars attempted to match their system of scale to that of the Greek system, they had their own interpretation of the characteristics of their eight church modes.

Medieval scholars put great faith in the power music has upon human behavior and its ability to stir emotions. This belief is evident in several passages found in Boethius's *De Institutione Musica*, Guido's *Micrologus*, and John Cotton's *On Music*. In Chapter 17 of *On Music*, titled "On the Power of Music and Who First Used It in the Roman Church," Cotton presents medieval opinions on music in general and the tradition of using certain chants for their effect upon members of the Church:

Since music has such power to affect men's mind, its use in the Holy Church is deservedly approved...chants have great power of stirring the souls of its hearer, in that it delights the ears, uplifts the mind, arouses fighters to warfare, revives the prostrate and despairing, strengthens wayfarers, disarms bandits, assuages the wrathful, gladdens the sorrowful and distressed, pacifies those at strife, dispels ideal thoughts and allays the frenzy of the demented.⁴⁵

Similarly, Guido considered that sounds, sights, tastes and smells influenced "the well-being of both heart and body," because "through the windows of the body... things entered wondrously into the recesses of the heart."⁴⁶

A number of anecdotes on the power of music that survive in the writings of the medieval period are, in fact, inherited from the ancient Greeks, and some of them can even be traced back to those found in the writings of Plato and Aristotle: a story of the physician Hippocrates, who played a certain melody to recall a madman from insanity

⁴⁵ Claude V. Palisca, *Hucbald, Guido and John on Music: Three Medieval Treatises*, trans. Warren Babb and ed. Claude V. Palisca (New Haven: Yale University, 1978), 135-146.

⁴⁶ *Ibid.*, 70.

(From Boethius's *De institutione musica* and Cassiodorus's *Institutiones*);⁴⁷ a man who was roused by the sound of the kithara in one mode and made to feel remorse in another (from St. John Chrysostom's *Exposition of Psalm XLI*);⁴⁸ King Saul who was soothed by David's singing with his harp (from Guido d'Arezzo's *Micrologus*, chapter 14);⁴⁹ a legend of Pythagoras who encountered a youth whose passions were disordered by the quality of the music he listened to (from Cotton's *On Music*, chapter 17).⁵⁰ In the same way that anecdotes were passed down from Greek sources, the belief in the power of music was also clearly inherited by medieval scholars.

Boethius's *De Institutione Musica* is considered to be one of the more authoritative documentations of the theories and systems of Greek music and it became a wellspring knowledge and source of further texts by Gaffurius and Glarean over the next century. Boethius opens his book with remarks on modes and their effect on the human mind:

A lascivious mind takes pleasure in the more lascivious modes, or often hearing them is softened and corrupted. A sterner mind either finds joy in more stirring modes or is aroused by them.⁵¹

These anecdotes and general thoughts on the power of music were not the only ideas inherited from the ancient Greeks. Boethius's passage maintains also that it is modes that provide such emotional and behavioral effects.

Guido and Cotton expand on the notion of modes and their effects in their writings. Guido's *Micrologus*, dated most likely between 1026 and 1028, consists of

⁴⁷ Strunk (1950), 79 and 91.

⁴⁸ Ibid., 70 and 136.

⁴⁹ Palisca, 70.

⁵⁰ Strunk (1950), 136.

⁵¹ Ibid., 80.

introductions for writing *organa*, on examination of modes and how to compose melodic lines.⁵² Using the Greek numeric names for each mode instead of their tribal names, Guido finds sweetness in the plagal tetrardus, volubility in the authentic tetrardus, and intermittent leaps in authentic deuterus, and delightfulness in the plagal of the tritus.⁵³

A music theorist John Cotton, another advocate of the effects of the modes and their affects, was possibly of English origin. His *De Musica*, written around 1100, was one of the most widely copied and distributed music treatises of the middle ages. Similarly to Guido's *Micrologus*, *De Musica* functioned as a manual for educating the boys of a cathedral, as it touched on the singing of plainchant, improvisation of *organum*, and developing good voice leadings.⁵⁴ Cotton stressed the necessity, in writing chants, of the musician's awareness of the various impacts modes could deliver: "In composing chants, the duly circumspect musician should plan to use in the most fitting way that mode by which he sees those are most attracted whom he wishes his chant to please."⁵⁵ As the body of knowledge of modes and their effects are found in the pedagogical writings on music, it is evident that the idea of modes giving music its affective ability was a widely accepted piece of general knowledge among the music educators and students of Cotton's and Guido's time.

The Renaissance was a period in which culture and learning modeled on Greek and Roman antiquity were revived. As new original Greek sources became available,

⁵² Palisca, 50.

⁵³ Ibid., 69.

⁵⁴ Ibid., 87.

⁵⁵ Ibid., 133.

scholars developed a new humanistic curriculum which included grammar, rhetoric, poetry, history, and moral philosophy.⁵⁶

In the writings of Renaissance theorists such as Tinctoris, Glarean and Morley arose a new trend in the discussion of the power of music: the appearance of contemporary composers and their works.⁵⁷ In *Liber de Arte Contrapunti* (1477), Tinctoris comments on a few contemporary composers:

Jean Ockeghem, Jean Regis...Gilles Binchoys and Gillaume Dufay...Nearly all the works by these men exhale such sweetness that in my opinion they are to be considered most suitable, not only for men and heroes, but even for the immortal gods. Indeed, I never hear them, I never examine them, without coming away happier and more enlightened.⁵⁸

Also in Heinrich Glarean's *the Dodecachordon* (1547), the author who appears to be a fan of Josquin's work touches on the composer's use of certain modes in each section of a piece:

In the motet 'De profundis,' I wish everyone to observe closely what the beginning is like and with how much passion and how much majesty the composes has given us the opening words...with astonishing and carefully studied elegance, he has thrown the phrase into violent disorder.⁵⁹

Among the Renaissance theorists who commented on the power of music, Giovanni di Bardi (1534-1612) deserves special attention, as he explicitly speaks of modes and the effects of their characteristics on music:

Youths should be taught music as a thing seasoned with great sweetness...Music is pure sweetness and...he who would sing should sing the sweetest music and the sweetest modes...If it is magnificent, you will take the Dorian mode...giving the entire melody to the tenor and turning

⁵⁶ Leeman L. Perkins, *Music in the Age of the Renaissance* (New York: W. W. Norton, 1999), 23-30.

⁵⁷ Strunk (1950), 199, 221 and 275.

⁵⁸ Ibid., 199.

⁵⁹ Ibid., 222.

about the mese as much as you can for things that are sublime and magnificent are uttered in an agreeable and intermediate tone of voice. But if the content is plaintive, you will take the Mixolydian mode...giving the principal melody to the soprano part.⁶⁰

Modes are of great concern for Bardi as he thought it was the secret to successful writing of affective music.⁶¹ According to Bardi, when setting music to any poem, such as a madrigal or canzona, one must reflect on the content of the poem and select the correct mode.

The reasons behind Bardi's choice of mode are partially founded in the Greek interpretation of the mode and partially original. Bardi combines the regions of pitch context of each mode with human speech and vocal expressions.

The Dorian mode, lying in the center of the sounds suited to human speech was prized and revered more highly than the rest, while the lower and higher harmonies were less prized, the one being too sluggish, the other too agitated.⁶²

The Greeks found the high register more fitting for women's voices and the low register more suiting to men's, and drew from perceived characteristics of men and women when making association with modes in certain registers. Bardi, on the other hand, simply associates mode in certain registers with one's emotional state.

As previously mentioned, one issue with Renaissance theorists' interpretation of mode is the mismatching of the names of modes and pitch content. Fully aware of medieval scholars' errors in relating modes and Greek octave species, Renaissance theorists found the solution to their mistreatment: to write separate chapters on the

⁶⁰ Ibid., 300.

⁶¹ Ibid., 296.

⁶² Ibid., 298.

characteristics of church modes and Greek octave species.⁶³ Zarlino is one of the scholars who adopted exactly this solution. Abandoning the identification of modes with the tribal names, Zarlino labels twelve church modes with numbers in his *Institutioni Harmoniche*. He interpreted modes 5, 6, 7, 11, and 12⁶⁴ to have a gay and lively character while modes 1, 2, 3, 4, 9 and 10 were associated with sad or languid qualities which “render the entire composition soft.”⁶⁵

To Zarlino, the reason behind the various affective properties found in modes lay in the division of the fifths, because in the modes 5, 6, 7, 11 and 12, “the fifth is harmonically divided into a major and minor third... the consonances are frequently arranged.” A more thorough explanation of the specific intervals with pleasing and harsh tones is already found in Cotton’s *On Music*.⁶⁶ In chapter 16, “How Different People Are Pleased by Different Modes”, he claims that

Not everyone’s ears are pleased by the sound of the same mode, Some are pleased by the slow and ceremonial peregrinations of the first, some are taken by the hoarse profundity of the second, some are delighted by the austere and almost haughty prancing of the third, some are attracted by the ingratiating sound of the fourth, some are stirred by the well-bred high spirits and the sudden fall of the final in the fifth, some are lamented by the tearful voice of the sixth, some like to hear the spectacular leaps of the seventh and some favor the staid and almost matronly strains of the eighth.⁶⁷

⁶³ Steblin, 25.

⁶⁴ The added modes, 9 through 12 are authentic and hypo of Aeolian and Ionian.

⁶⁵ Gioseffo Zarlino, *On the Modes: Part four of Le Institutioni Harmoniche*, trans. Vered Cohen, and ed. Claude V. Palisca (New Haven: Yale University Press, 1983), 22.

⁶⁷ Palisca, 133.

Similarly, Bardi and Zarlino discuss the intentional use of certain intervals to produce a desired quality to the composition.⁶⁸ The pleasing sound of consonant intervals and harsh tones of dissonant ones in certain modes became one of the more popular arguments by Renaissance theorists to support their theories on the proper interpretation of modes.⁶⁹

Section 3: Keys in Baroque, Classical and Romantic Periods

During the Baroque period, the concept of ascribing characteristics to keys formed a part of doctrine of rhetoric. The basic purpose of this doctrine was to conceptualize and organize languages, and deliver speech effectively and persuasively.⁷⁰ Rhetoric was originally made a discipline of the Greek trivium around the fifth century B.C., and Aristotle is credited with writing the first book on the art of rhetoric.⁷¹ Among the Greek and Latin writers of antiquity, namely the early Christian church and renaissance humanists, rhetoric was known “as the art of persuasion and had as its principal goal the moving of the passions or emotions of the audiences.”⁷²

Naturally, as some aspects of both music and rhetoric strive toward the common objective of moving an audience, there have been a number of analogies made between these two subjects since antiquity. For example, the expressivity of music has been taken

⁶⁸ Strunk (1950) 232, 257, and 299.

⁶⁹ Gioseffo Zarlino, *The Art of Counterpoint: Part Three of Le Institutioni Harmoniche*, trans. Guy A. Marco, and ed. Claude V. Palisca (New York: Norton, 1976) 21, and Strunk (1950), 257.

⁷⁰ Patrick McCreless, “Music and Rhetoric,” in *the Cambridge History of Music Theory*, ed. Thomas Christensen (New York: Cambridge University Press, 2002), 847.

⁷¹ *Ibid.*, 849.

⁷² Gregory Butler, “The Projection of Affect in Baroque Dance Music.” *Early Music*, Vol.12 (May, 1984), 201.

as the model for an orator's success in the delivery of speech, and on the rhetorical side, methods have been formulated specifically for musicians to an even more extensive degree.⁷³ Moreover, a style in the Baroque period *musica reservata* was greatly concerned with the relationship between text and music. From the sixteenth to the eighteenth century, rhetoric, which had long been one of the essential elements of the humanistic education, began to play a central role in providing the model for teaching musical composition. Music theorists imported the system from the discipline of rhetoric directly into teaching of musical composition, and the discipline was called "musico-rhetoric." The Baroque period experienced the height of musico-rhetoric, especially in German speaking regions in Europe.⁷⁴

By the seventeenth century, the music-rhetoric tradition had reached its peak. Rhetorical terminologies can be found in a number of treatises on composition and music theory of the time. Two central figures in these early Baroque disciplines, Joachim Burmeister (1564-1629) and Johannes Lippius (1585-1612), wrote a few treatises on the subject, such as the former's *Musica Practica* (1606) and the latter's *Synopsis Musicae Novae* (1612).⁷⁵ Their approach to the doctrine of musical rhetoric was not theoretical, but intended for composers and musicians as a practical guide.⁷⁶ Studies on musico-rhetoric continues for more than a century and one of the best known texts on the subject, *Der vollkommene Capellmeister* by Johann Mattheson, written in 1739, also presents

⁷³ McCreless, 847.

⁷⁴ Rodney Farnworth, "How the Other Half Sounds: A Historical Survey of Musical Rhetoric during the Baroque and After," *Rhetoric Society Quarterly*, Vol.20 (Summer, 1990), 209.

⁷⁵ McCreless, 854.

⁷⁶ *Ibid.*, 854.

examples of hands-on application of rhetoric for composers and musicians to employ for expression in music and to arouse certain emotions in its listeners.⁷⁷

There are two separate branches in music-rhetoric. One is the *Figurenlehre* tradition (the doctrine of music figures) and the other, which concerns us, is the doctrine of ethos.⁷⁸ In the same way that the Greeks selected certain octave species to correspond to the emotions expressed in texts, the effective use of appropriate modes, the very foundation of harmony, continued to be considered a powerful device for musical expression throughout the Baroque period.⁷⁹

Mattheson was a native of Hamburg, and although best known for his theoretical writings, he was also one of the prominent opera composers in Hamburg at the time (*Cleopatra*, *Boris Goudenow*, etc.). His compositions and theoretical texts show the progressiveness of his ideas about music as an art form.

In the Baroque period, instrumental compositions emerged as a genre and achieved prominence equaling that of vocal music.⁸⁰ While expressions of musical affect could be derived from the texts of vocal melodies, instrumental music had to deliver expressivity solely by music alone. Mattheson, from intervals as well as the directions of

⁷⁷ Johann Mattheson and Hans Lenneberg, "Johann Mattheson on Affect and Rhetoric in Music," *Journal of Music Theory*, Vol. 2 (Apr., 1958), 47.

⁷⁸ According to McCreless (856), the doctrine of ethos in the field of musico-rhetoric was founded by Burmeister, and inherited and developed into a device for musical analysis by theorists such as Johannes Nucius (1556-1620), Athanasius Kircher (1601-1680), and Christoph Bernhard (1628-1692). Musical figures including ornaments and embellishments were thought to be instrumental to producing certain expressions and gestures in music.

⁷⁹ Farnworth, 211.

⁸⁰ McCreless, 873.

melody lines, derived characteristic gestures which he believed to express certain passions explicitly:

Joy is an expansion of our vital spirit... this affect is best expressed by large and expanded intervals. Sadness is a contraction of those same subtle parts of our bodies... The narrowest intervals are the most suitable... pride or arrogance: never be too quick or failing, but always ascending... Calmness, free of all extraordinary emotions and is quietly contented within itself. It can be represented nicely and naturally by means of gentle unison passages...⁸¹

According to Mattheson, keys are one of the musical elements along with meter, intervals, tempo and rhythm to which composers should pay attention in order to write music affectingly.⁸² Making the appropriate choice of keys enabled composers to provoke the desired emotions in the souls of audiences. In his first treatises, *Das Neu-Eröffnete Orchestre* (1713), Mattheson provided the earliest and most extensive discussion of the characterization of keys as written by a German theorist.⁸³

To an anonymous article in *Journal de Trevoux* (1718), Mattheson claimed that the affective properties of keys were caused by two elements: 1) the pitch level (higher or lower pitch) and 2) a slight difference in the size of intervals due to unequal temperament systems. The latter theory had been supported by many scholars until equal temperament ended it in the eighteenth century. Mattheson, however, insisted that the former was the primary cause of key characteristics because the latter argument could easily be defeated by a number of different circumstances: the slight difference in the sizes of intervals

⁸¹ Mattheson (1958), 54-56.

⁸² Ibid., 47.

⁸³ Steblin, 40.

could easily be disturbed by mistuning, or by the natural variation between instruments. Experienced ears were also required to perceive the minute diversities.⁸⁴

Mattheson not only expressed his personal and interpretation of key characteristics, but also compared them with the interpretations of modes by a number of scholars of the past in an effort to support his own conception of keys. Writings by scholars such as Plato, Kircher, Zarlino and Johannes Corvinus (1610-1663) were mentioned by Mattheson.⁸⁵ In concordance with previous scholars, he believed the ethical affect found in ancient Greek octave species were caused by certain pitch collections. Moreover, the many conflicting interpretations among resources from several different periods convinced him that interpretations of keys were purely subjective, and thus there should not be any dogma on the subject and each individual should be free to give his own interpretation.⁸⁶

As can be seen in several periods of music history, changes in musical styles were often accompanied by a change in the theoretical, aesthetic and practical approaches to music. By the time of Mattheson's death, instrumental music was becoming a more and more central component in music making, and the music-rhetoric approach came to be replaced by topics more typically associated with instrumental music. Many scholars in the early Baroque period wrote on the musico-rhetorical approach and quite specifically on key characteristics. However, by the mid eighteenth century theorists turned away from the tradition of *Figurenlehre*, and began to focus on theory of counterpoint (Fux,

⁸⁴ Ibid., 49.

⁸⁵ Ibid., 40-42.

⁸⁶ Ibid., 41.

Zarlino and Kirnberger), thorough-bass tradition (Lippius), harmony (Rameau, Marpurg), and melody and forms (Mattheson, Riepel and Koch).⁸⁷

Classical and Romantic Periods

By the classical period, the prestige of instrumental music was raised to a height equal to that of vocal music. Increasing numbers of compositions required no texts and the *Figurelehre* part of the music-rhetoric was no longer a vital means for successful composition. However, the other half of the discipline, *Affektenlehre*, was still very much alive in the middle of the eighteenth century, since composers believed instrumental music to have its own affective aspects.⁸⁸ They continued to believe that modes, keys and chords had innate affective properties which could enrich their musical creations.⁸⁹ This debate over the characterization of keys was carried on by various theorists and composers through the late eighteenth and nineteenth centuries.

One significant event that influenced advocates of key characteristics theory occurred in the late Baroque period. While unequal temperament was the norm for centuries, equal temperament soon arose and was increasingly promoted in the time of Rameau.⁹⁰ Some theorists and philosophers such as Jean-Le Rond d'Alembert (1717-1783) and Friedrich Wilhelm Marpurg (1718-1795) supported the application of equal temperament because it provided a larger palette of employable harmonies in a given composition. However, some scholars had grave misgivings with the promotion of equal temperament. This resistance arose from the belief that banning the unequal

⁸⁷ McCreless, 873-874.

⁸⁸ Mattheson (1981), 424.

⁸⁹ Farnworth, 213.

⁹⁰ Steblin, 54-56.

temperaments would cause composers to lose a crucial device for enriching the expressivity of their compositions: the affective properties found in keys.⁹¹

Unequal temperaments, which created various sizes of semitones, have commonly been considered the cause behind the different affects found in keys. This argument was supported by number of theorists and composers such as Rameau, Jean-Jacques Rousseau, Francesco Antonio Vallotti, Johann Philip Kirnberger and Heinrich Christoph Koch.⁹² However, with the abandonment of unequal temperament, the central explanation for the affective key properties became irrelevant. Furthermore, the entire concept of key characteristics themselves was beginning to fall apart.

Once unequal temperaments were abandoned as a valid cause, various suggestions were raised by theorists and composers as alternative possible causes for the phenomenon of key characteristics. The failure to find a satisfactory physical explanation led to increase support in psychological explanation for these associations. Sharp keys were associated with brilliant quality, and the flat keys were associated with sober quality.⁹³ Jean Rousseau's use of terms "# quarre" as major and "b mol" as minor were found in *Méthode Claire* (1691) and it may be the root of this association:

when one says "b mol" it is as if one said "b doux" because b mol is a mode suited to soft, tender and languid songs; and when one says "# quarre" it is as if one said "b gay" because "# quarre" is a mode suited to gay songs.⁹⁴

Another outcome resulted from the use of such terms is discussed by Jean-Jacques Rousseau. Since the sharp symbol has a square and angular shape that would bounce

⁹¹ Steblin, 54.

⁹² Ibid., 55-72.

⁹³ Ibid., 189.

⁹⁴ Ibid., 31.

around when rolled on a surface, sharp keys were associated with disharmony. On the other hand flat keys with their rounded symbols would merely sit still on a surface, retaining a calm and sober quality.⁹⁵

This association of certain qualities with sharp and flat keys developed into what Rita Steblin calls “the sharp-flat principle.” Under any name, it was widely discussed in the descriptions of keys by numerous scholars of music: when keys have a greater number of sharps and flats, the intensity of the corresponding characteristics increases. For example, starting from C major with no sharps or flats, the key, once removed to G major with one sharp, takes on a brilliant quality, and when twice removed to D major with two sharps, this brilliance becomes even more intense. On the flat side, if F major with one flat is characterized as calm, then B flat major with two flats might be characterized as somber or sad. Georg Joseph Vogler stated in his *Deutsche Encyclopedie* (1779) that going through keys by fifths would always increase the intensity of their inherent qualities.⁹⁶

The sharp-flat principle was not actually new to the nineteenth century, having been discussed as early as the Baroque period. Several arguments have attempted to explain the principle, and the one most widely agreed with can be found in Marc-Antoine Charpentier’s writing. Charpentier (1645-1704) argued that with unequal temperament, which was still very much in use during his lifetime, the further one went from the key of

⁹⁵ Ibid., 97.

⁹⁶ Ibid., 120-121.

C major, the more out of tune the scales became.⁹⁷ Those keys with a greater number of accidentals were more out of tune and produced harsher-sounding harmonies.

Kirnberger (1721-1783) was one of many advocates of this view. Kirnberger categorized all keys into three classes based on the purity given by the unequal temperaments.⁹⁸ The keys closest to C major in the circle of fifths were grouped in the purest class, and the furthest were assigned to the harshest. These groups signified the three levels of purity in tuning and the degree of intensity of the general characteristics found in the major and minor keys.⁹⁹ Instead of giving specific interpretations for each key, Kirnberger provided a broader view on the affects of keys. This classification was widely accepted in the mid-eighteenth century and continued to be cited in the nineteenth century by August Gathy's *Characteristik der Tonarten* (1835), J.A.C. Burkhard's *Neustes vollständiges musikalisches Wörterbuch* (1832) and Johann Georg Sulzer's *Allgemeine Theorie der schönen Künste* (1771-1774).¹⁰⁰

During the Enlightenment, many more descriptions of the characteristics of keys were produced by theorists and composers alike. While some of these writers discussed the causes and effects of the sharp-flat principle, some did not include any discussion, and simply presented the principle in their descriptions. Among these are André Grétry, a composer of *opera comique*, who gave his key description in *Mémoires Ou Essais sur la musique* (1779) in addition to a discussion of its principles.¹⁰¹ Descriptions of key

⁹⁷ Marc-Antoine Charpentier, "Regles de Composition," trans. Lillian M. Ruff, *The Consort 24* (1967): 250-251.

⁹⁸ Steblin, 78-79.

⁹⁹ *Ibid.*, 78-79.

¹⁰⁰ *Ibid.*, 90-93.

¹⁰¹ Steblin, 101.

characteristics are also found in Francesco Galeazzi's *Elementi teorico-pratici di musica* (1797) and Charles Masson's *Nouveau Traité* (2nd ed., 1697).¹⁰²

In the nineteenth century, the second most common explanation for the affective properties of keys was based on the acoustic properties of orchestral instruments.

Connections between various timbres of instruments and key affects were supported by a number of leading nineteenth century theorists and writers, such as E.T.A. Hoffmann (1776-1822), Gottfried Weber (1779- 1839), F. G. Drewis, Wilhelm Christian Mueller (1752-1831), Georg Joseph Vogler (1749-1814), Joseph Riepel (1709-1782), Henrich Christoph Koch (1749-1816), and Hector Berlioz.

Their analysis of instruments and the effects they have on the affective properties of keys can be divided into three basic components: 1) the characteristic timbres of wind instruments, 2) the open and stopped strings on string instruments, and 3) the physical mechanism of keyboard instruments. Drewis stated that bassoons was most suited for flat keys because of their somber and full sounds, while flutes and oboes were appropriate for sharp keys for their brilliant quality.¹⁰³ Transposable instruments are frequently associated with more than one specific key. As a result, certain qualities associated with the timbres of certain wind instruments are limited to a few keys.

The difference in tone quality found in open and stopped strings was one of the most popular explanations for the affective qualities of keys and struck many theorists as the satisfactory explanation for the phenomenon. As early as the middle of eighteenth century, Joseph Riepel had remarked that the number of open strings on the violin was

¹⁰² Ibid., 35 and 105.

¹⁰³ Ibid., 133.

the reason for the more merry quality found in certain keys.¹⁰⁴ Koch in his 1787 *Versuch einer Anleitung zur Composition* agreed with Riepel, stating that keys like A major, which employ a number of open strings, had sharp and brilliant qualities, while keys with many stopped strings, such as f minor, had a lamenting quality.¹⁰⁵ Vogler similarly wrote in the *Deutsche Encyclopädie* (1779) that a piece composed in a key which employs open strings for important notes in scales such as tonic, dominant, subdominant and dominant of the dominant, was naturally endowed with a brilliant quality.¹⁰⁶ This open-stopped string theory also provided the foundation of the characterization for keys on the violin found in Berlioz's *Grand Traité d' Instrumentation* published in 1843.

Marpurg's disciple, F.G. Drewis was an advocate for the theory which the mechanics of the piano explains the origin of key affects-- an argument gained popularity in the late nineteenth and early twentieth centuries. Pianos, which contain black keys with a shorter leverage and white keys with a longer one, are asymmetrical in their construction. Drewis argued that the difference in the length of leverages creates a variety of striking forces, which in turn brings about a difference in the tone quality of pitches.¹⁰⁷ Additionally, Drewis maintained that because every fifth string on pianos was thinner and produced a softer tone the harmonic balance in each key was not uniform.¹⁰⁸

These arguments relating to the timbre of instruments, although once widely shared, did not end the search for a satisfactory physical explanation for the affective properties of keys. Rather, it was the sharp- flat principle, which was established as a

¹⁰⁴ Ibid., 129.

¹⁰⁵ Ibid., 130.

¹⁰⁶ Ibid., 132.

¹⁰⁷ Ibid., 131.

¹⁰⁸ Ibid., 131.

main supporting argument in the nineteenth century.¹⁰⁹ Because this principle had its foundation in psychology, as more knowledge about human psychology was gained in the nineteenth century, theorists' attitudes and approaches to the study of the affective properties of keys changed. Furthermore, a notion of the affective properties of keys as innate and inherent phenomenon began to be accepted.¹¹⁰

This notion brought with it a new trend among writings on the subject. Now believing affective key properties to be a product of personal interpretation rather than as universal, scholars such as Gustav Schilling and Ferdinand Hand began to re-work and clarify the lists of key descriptions from past sources, instead of creating new subjective descriptions of their own.¹¹¹ Of several existing descriptions, C. F. D. Schubart's description of keys from *Ideen zu einer Ästhetik der Tonkunst* (1784/ 1806) was the most widely copied and cited. Schubart's list was cited in Johann Ernst Hauser's *Musikalisches Lexikon* (1812), Heinrich Weiker's *Kunstwörterbuch* (1827), Anton Graffer's *Ueber Tonkunst, Sprache, Schrift und Bild* (1830), and Ignaz Franz Mosel's *Versuch einer Aesthetik des dramatischen Tonsatzes* (1813).¹¹² The inclusion of the sharp-flat principles in Schubart's contributed tremendously in making sharp-flat principle even more widely shared and accepted in the nineteenth century.

Several other trends can be seen in the descriptions of keys found in these nineteenth century sources. As the general public became acquainted in the 1800's with a repertoire of masterpieces, writers of key descriptions began to match actual compositions of classical masters to certain keys in order better to describe their qualities.

¹⁰⁹ *ibid.*, 96.

¹¹⁰ *ibid.*, 145.

¹¹¹ *ibid.*, 184.

¹¹² *ibid.*, 156, 157, 159, 160, and 162.

¹¹³ J. A. Schrader's interpretation of key characteristics in *Kleine Taschenwörterbuch der Musik* (1827) includes names of composers as well as their pieces:

G major sounds simple, satisfied, childlike, innocent, and depicts joy and gratitude. (Mozart, *Don Giovanni*: 'Liebe Schwestern,' and from the opera *Die Entführung aus Dem Serail*: 'Welche Wonne, welche Lust,' and the chorale: 'Allein Gott in der Hoh'.)¹¹⁴

Schrader's list continues to present in full all twenty-four keys along with their qualities as well as masterpieces associated with them, which he believed best represented the characteristics of keys.

Another trend visible in the list assembled by Schubart followed the stylistic tastes of the Romantic period. Schubart's description was filled with metaphor, fantastic images, and poetic expression that were appealing to Romantic audiences. He described G major as follow "Everything rustic, idyllic and lyrical, every tender gratitude for true friendship and faithful love, in a word, every gentle and peaceful emotion of the heart is correctly expressed by this key..."¹¹⁵ Schubart's poetic style in describing the characteristics of keys became widely adopted in the early nineteenth century. Vogler, E. T. A. Hoffmann, J. J. Wagner, August Gathy, J. A Schrader and William Gardiner followed Schubart in their subsequent key descriptions.

Comparisons of the key with different colors began to appear more frequently in the late eighteenth and early nineteenth century. Colors have been an oft-employed metaphorical device for describing the characteristics of a variety of things in addition to keys (i.e. keys can be "brighter" or "darker" depending on the number of sharps and

¹¹³ Ibid., 175

¹¹⁴ Ibid., 177.

¹¹⁵ Ibid., 118-119.

flats,¹¹⁶ and A-flat major can become “black like the night, dark and gloomy”¹¹⁷).

However, the way in which Anton Graffer and Johann Justus Heinrich Ribock employed colors to describe the quality of keys was not metaphoric (analogy between two objects or ideas), but rather synaesthetic (direct and involuntary relation between two objects or ideas), and entirely original in the tradition of key characterization. Ribock in Cramer’s *Magazin der Musik* (1783), described his subjective impressions of key affect in terms of colors and smell, while Graffer in *Ueber Tonkunst Sprache, Schrift und Bild* (1830) matched colors and instruments to the qualities of keys. Synaesthesia was not a new idea to the nineteenth century as attempts to build instruments that employ a cross-sensory experience of sight and sound have been made since the seventeenth century.

A series of letters penned by musical amateurs on the subject of key characteristics have been found in the *Harmonicon* as well as in a few German periodicals from the mid 1800’s. This indicates a broad knowledge of the subject in a wide audience.¹¹⁸ While there are numerous proponents of the theory of the affective concept of keys among theorists, composers and even amateur musicians, there have always been skeptics about the validity of the topic. The most widely cited reasons for their disbelief is the lack of physical proof and the subjectivity of the phenomenon of key characteristics.¹¹⁹

Opponents of this theory became more visible at the turn of the eighteenth century when equal temperament came to be accepted and employed more frequently. Unequal temperaments, no longer providing support to the argument for the keys as the origin of

¹¹⁶ Ibid., 132.

¹¹⁷ Ibid., 125.

¹¹⁸ Ibid., 142.

¹¹⁹ Ibid., 145.

the power of music, led a number of advocates of the concept of key characteristics, such as Rameau and Mattheson to change their stance. As they believed that unequal temperaments were the sole basis for the affective properties of keys, there could no longer be any discussion of it with the adoption of equal temperament.¹²⁰

A few scholars in the early century gave definitive counter arguments against validity of key characteristics. Johann Kuhnau (1660-1722) showed his surprise in the sheer number of knowledgeable musicians who blindly continued to consider the notion of key characteristics without adequate physical proof.¹²¹ Others, such as F.G. Drewis and G. C. Kellner, who were originally advocates of key characteristics, were challenged by the characters of compositions that were uninfluenced by transpositions, slight differences in tuning between instruments and the multitude of standard pitch employed in different regions of Europe.¹²²

While they were widely recognized as a phenomenon and many scholars continued to give their own hypothesis, it appears that the search for the cause of the affective properties of keys never met a satisfactory conclusion. Francesco Galeazzi (1738-1819) was convinced that equal temperament would destroy key characteristics due to the equal sized semitone intervals in the all scales. He was one of many who still provided his interpretations of keys in great detail despite adopting equal temperament.¹²³

While many took a clear stance on the matter of the affective properties of keys, there were some who opted for the middle ground. Jean-Jaqucs Rousseau and Johann Heinrichen both agreed with the idea that there was more than one key which could

¹²⁰ Ibid., 95.

¹²¹ Ibid., 52.

¹²² Ibid., 92-93.

¹²³ Ibid., 106.

express certain affects, and that certain keys were simply more suitable than others for producing certain qualities.¹²⁴ Heinrichen went further by stating that it was unwise to specify a certain key for a specific affect, simply because it would bring about obvious contradictions due to the subjective nature of key characteristics.¹²⁵

In the late eighteenth century, the affective properties of keys were discussed continuously in the theoretical writings of well-established scholars such as Forkel (*Über die Theorie der Musik*, 1777), Sulzer (*Allgemeine Theorie der schönen Künsten*, 1774), Carl Ludwig Junker (*Tonkunst*, 1777) and Johann Engel (*Über die musikalische Malerey*, 1780). The pedagogical writings of Johann Joachim Quantz (*Flute Method*, 1752) and Leopold Mozart (*Versuch einer gründlichen Violinschule* 1756) had also touched on this topic for the practical benefit of musicians.

The popularity of the study of key characteristics was also evident in teaching material, used at the time, which had a great impact on the education of aspiring musicians. For example, the descriptions of Schubart and Knecht can both be found in Friedrich Starke's instruction books for young musicians. *Die Wiener Pianoforte-Schule* by Starke, Beethoven's nephew's music teacher, also contained Schubart's list of key descriptions and was repeatedly reprinted in five different editions up until the middle of the nineteenth century.¹²⁶ In it, scales were matched with Schubart's descriptions and were written to be used as an exercise for students, who were encouraged to keep the

¹²⁴ Ibid., 32 and 52.

¹²⁵ Ibid., 52.

¹²⁶ Ibid., 163.

various qualities of keys in mind while they practiced scales and played a piece in a certain key.¹²⁷

These key characteristics were passed down as a tradition from teachers to their students. In his memoirs, Antonio Salieri, who consciously employed keys as a device for enriching expression, remarked that he had learned to set the most suitable keys to his compositions from his teacher, Florian Leopold Gassmann:¹²⁸

When I had undertaken a work with real joy and delight--- I read the poem through again, found it certainly well adapted to music, and, having read the vocal pieces for the third time, my first step was -- as I had seen my master do—to determine which key would suit the character of each separate piece.¹²⁹

As an advocate of the affective properties of keys, Salieri no doubt made attempts to pass this tradition down to his students such as Schubert, Hummel, Liszt and Moscheles. Unfortunately, not many first-hand sources can be found that show composers' conscious selection of keys as an expressive device, except for Beethoven and Berlioz: Beethoven left a sketch in which he describes his interpretation of G minor as a black key, and Berlioz wrote extensively on instrumentation and its affective properties in his *Grand traité d'instrumentation* (1843).¹³⁰ However, it is reasonable to claim that the tradition of using key characteristics was a thriving, well-known, practiced, and disputed matter not only among music theorists, but also among young students and amateurs in the early nineteenth century.

¹²⁷ Ibid., 163.

¹²⁸ Alexander Wheelock Thayer, *Salieri: Rival of Mozart*, ed. Theodore Albrecht (Kansas City: The Philharmonia of Greater Kansas City, 1989), 45.

¹²⁹ Ibid., 45.

¹³⁰ Steblin, 136-138.

CHAPTER III

AFFECTIVE PROPERTIES OF KEYS FROM THE LATE NINETEENTH TO THE MID-TWENTIETH CENTURIES

Rita Steblin's *A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries* was first published in 1983 and its second edition in 2002. It has been cited in many of the recent writings relating to key characteristics. It is the primary guide to the subject because her study is thorough and covers most of the periods in which the concept of key characteristics was active in the musical experience. Her study ends with Hector Berlioz's *Grand Traité d' Instrumentation* of 1843, in which Berlioz introduces his thoughts on key characteristics based on the timbre of the violin. In the conclusion of her last chapter, Steblin names a few music scholars as well as scientists who weighed in on the subject of key characteristics after 1843. Including these, I have found twenty-six articles, mostly by music scholars but also by some renowned scientists, composers and psychologists in the last half of the nineteenth and early twentieth centuries. This chapter will discuss these articles which vary in style and shape.

Section 1: Music Scholars

Adolf Bernhard Marx, *Theory and Practice of Musical Composition*, 1853

Adolf Bernhard Marx (1795-1866) was a German scholar and a friend of Beethoven and Mendelssohn. He published a series of writings on musical aesthetics and

acoustics, and treatises on composition.¹³¹ Marx's *Theory and Practice of Musical Composition* was written for music students to learn how music was constructed and how to compose. The book begins with the elementary lessons of theory. Presenting musical notation and giving the definition of musical terms such as "harmony" and "melody," it then proceeds to lessons on counterpoint and analysis. By the conclusion of the book, students are expected to have learned how to compose a piece of music in a conventional style. The book covers roughly the equivalent of one year of a college-level harmony course.

In this textbook A. B. Marx also presents Greek modes and their qualities, and states his opinion on the concept of key characteristics. While discussing the composing of melodies for national songs, he states that there are two factors that students must consider when deciding on the key of a song: the vocal range and the characteristics of the piece. Speaking of the latter, Marx says:

Every musician knows, or ought to know, that every key, apart from height or depth, and apart from the peculiar character of different instruments, has a character of its own, now warm, now cool, now sad and gentle, now clear and firm, which character is transmitted to the listener. If we have now at all perceived this difference of character, it is but natural that we should select, if possible, that key which corresponds best with the character of the song.¹³²

Marx also presents his interpretation of affective properties of three modal keys, Dorian, Aeolian and Mixolydian:

¹³¹ Percy Scholes ed., *the Oxford Companion to Music* (Oxford University Press, 1955), 608.

¹³² Adolf Bernhard Marx, *Theory and Practice of Musical Composition*, translated from the 3d. German ed., and edited by Herrman S. Saroni (New York: Mason Brothers, 1853), 360.

The Dorian: The major element is predominant and the minor of the tonic cannot impress us sadly, but merely with a deep earnestness. This is the character of this key. Severe and strict, but not sad, it was the key to which the ancients entrusted their most solemn music, for instance the Credo, and in short most of their ecclesiastical songs.¹³³

The Aeolian: The Aeolian melodies are invariably plagal [sic], we see that everything combines to give this key a quiet, gentle, suffering, passive character, the sadness of which is only relieved by the frequent half-cadence upon the dominant.¹³⁴

The Mixolydian: “To exhibit the peculiar characteristics of this key we give here a Bohemian choral”¹³⁵

Unlike the other two modes, no description of characteristics was provided for Mixolydian. However, the author does give a few measures of a “Bohemian choral” of a Mixolydian (with G as a tonal center) which, according to Marx, expresses the characteristics of the Mixolydian mode.¹³⁶

Since the book is written as a pedagogical manual for students, it would be fair to expect the author to expand on the list of key descriptions for students to consult and to aid in key selections. However, no further discussion on the topic is given. Nonetheless, it is clear from what he does include that knowledge of the appropriate use of keys was common and often passed down to the students of his time.

Edward Hanslick, *The Beautiful in Music*, 1854

While most scholars who wrote on the subject of key characteristics were advocates of the idea, Hanslick was an important exception. In *the Beautiful in Music*

¹³³ Ibid., 350.

¹³⁴ Ibid., 352.

¹³⁵ Ibid., 349.

¹³⁶ Ibid., 349.

(*Vom Musikalisch-Schönen*, 1854), the musicologist and critic Edward Hanslick rejected the notion of affective properties of keys. His statement derives from his larger view on the topic of music esthetics.

In Vienna in 1854, Edward Hanslick (1825-1904) had a doctorate in law from the University of Vienna, a post in the Ministry of Culture and a growing reputation as a music critic.¹³⁷ *The Beautiful in Music* where he presented his opinions mainly on musical esthetics became one of the most widely read books on music in the middle of the nineteenth century. It also had a significant influence on the field of musical esthetics.¹³⁸

Hanslick thought of music simply as collections of sounds, and became known for his bias against Wagner's music and philosophy.¹³⁹ A number of composers at the time such as Wagner believed that the function of music was to denote ideas, emotions and stories similarly to the way that language could in ordinary life.¹⁴⁰ However, Hanslick thought differently: music was a self-sufficient realm of organized sounds. He denied music as the reflection and expression of emotions, and the portrait of a person or events, and further criticizes musicians and composers who spoke of music as illustration of certain emotions.¹⁴¹

...if the connection between certain feelings and certain modes of musical expression were so well established as some seem inclined to think, and as

¹³⁷ Thomas Grey, "Hanslick, Eduard," http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/12341?q=hanslick&search=quick&pos=1&_start=1#firsthit, accessed 10 February, 2010.

¹³⁸ Ibid.

¹³⁹ Ibid.

¹⁴⁰ Eduard Hanslick, *The Beautiful in Music*, tr. Gustav Cohen (New York: The Liberal Arts Press, 1957), vii-ix.

¹⁴¹ Ibid., 18-21 and 86-87.

it ought to be if the importance claimed for it were justified...[however], an interpretation of music based on the feelings cannot be acceptable either to art or science... Those inherently fallacious precepts for the excitation of definite emotion by musical means have so much the less to do with aesthetics, as the effect aimed at is not a purely aesthetic one, an inseparable portion of it being of a distinctly physical character.¹⁴²

As a scholar of musical esthetics, he had a broad knowledge of doctrine of ethos from the antiquity as well as treatises on key characteristics from previous centuries as he discussed on the list of Greek modes associated with certain characteristics as well as a short passage from Johannes Mattheson's *Vollkommener Capellmeister*.¹⁴³ Hanslick recognizes the Greek traditions of affective properties of octave species' and the power of music to communicate human emotions and behavior. He does not deny the doctrine of ethos as it existed in Greek culture. However, more importantly, he insists that the same impact of music on human emotions and action could not act on modern audiences, because of different life styles from two very disparate time periods.¹⁴⁴

The action of music was far more direct in the case of ancient races than it is with us, because mankind is much more easily impressed by elemental forces in a primitive state of culture...This natural sensitivity was greatly assisted by the peculiar conditions of music during the Grecian era...The music of the present day knows just as little of the prodigious elaboration of the musical material...as of the specific character of each individual key and its close adaptation to the words both spoken and sung. These subtle relations within their narrow sphere, moreover, were destined for the appreciation of a much more sensitive audience.¹⁴⁵

In the "simpler lives" of the ancient Greeks, they were destined to have more appreciation and sensitivity to the music they heard. Therefore, the Greeks would have

¹⁴² Ibid., 87.

¹⁴³ Ibid., 86 and 89.

¹⁴⁴ Ibid., 95-97.

¹⁴⁵ Ibid., 95-96.

been naturally influenced more by the motion of sounds, rhythm and symbolism of their music. When reciting poems, it was only appropriate to consider modes which fit the sentiment of the poem. The moods and expressions found in such poems, Hanslick claimed, created the associations between octave species and certain affective qualities.¹⁴⁶ Thus, affective properties found in octave species were not pure manifestations of scales themselves, but a result of combinations of other forms of arts.

Hanslick was not alone in his views on the origin of the association between characteristic qualities and octave species in ancient Greece. Several scholars from the seventeenth, eighteenth and nineteenth centuries also presented similar statements in their writings. Hanslick's autonomous views of music and the concept of key characteristics were both frequently employed by other writers who were skeptical about the affective properties of keys.

John W. Moore, *Complete Encyclopedia of Music*, 1854

The first music dictionary published after 1843 that contained an entry on key characteristics was *the Complete Encyclopedia of Music* by John W. Moore. Under the entry of "Key" or "Key-Note," Moore provides descriptions of individual keys. This list of key descriptions first appeared in Stendhal's *Life of Haydn*,¹⁴⁷ a book that was edited and translated by William Gardiner. The same list of key descriptions also appeared in

¹⁴⁶ Ibid., 96-97.

¹⁴⁷ It is known that Stendahl plagiarized Giuseppe Carpani's biographical work on Haydn; the list of key descriptions might have been taken from Carpani's book.

Gardiner's book, *the Music of Nature* (1832).¹⁴⁸ This doubly plagiarized list of key characteristics appears in Moore's encyclopedia with a few modifications. Gardiner begins his list with F major and d minor, while Moore rearranges the order and begins the list in his book with C, proceeding with each key in the order of the circle of fifths.

The major of C is bold, vigorous, and commanding, suited to the expression of war and enterprise; and its relative, A minor is plaintive, but not feeble.

The major of G is gay and sprightly. Being the medium key, it is adapted to the greatest range of subjects; and its relative, E minor, is persuasive, soft, and tender.

The major of D is [Gardiner adds: Ample] grand and noble: Having [Gardiner adds: more fire than C], life and animation, it is suited to the loftiest purposes; and its relative, B minor, is bewailing, but in too high a tone to excite compassion [Gardiner adds: commiseration].

The major of A is golden, warm, and sunny; and its relative, F sharp minor, is mournfully grand.

The major of E natural is bright and pellucid, adapted to the most brilliant subjects; though it stretches the voice beyond its natural power and its relative, C sharp minor, is seldom used. In this key Haydn had written some of his most elegant thoughts. [Gardiner adds: Handel mistook its properties when he used it in the chorus "The many rend the skies with loud applause." Though higher than D, it is less loud, as it stretches the voice beyond its natural power.]

The major of F is rich, mild, [Gardiner adds: sober] contemplative; and its relative, D minor, possesses similar qualities, [Gardiner adds: but of a heavier and darker cast, more doleful] more solemn and grand.

The major of B flat is the least interesting of the major keys; it has not sufficient fire to render it majestic or grand; and its relative, G minor, is [Gardiner adds: meek and pensive] replete with melancholy.

The major of E flat is full, [Gardiner adds: mellow] soft, and beautiful: it is a key in which all musicians delight: though less decided in its character

¹⁴⁸ Steblin, 174.

than some others, the regularity of its beauty renders it a universal favorite; and its relative, C minor, is complaining, and seldom used.

The major of A flat is [Gardiner adds: the most lovely of the tribe] unassuming, [Gardiner adds: gentle, soft] delicate, and tender [Gardiner adds: having none of the pertness of A in sharps. Every author has been sensible of the charm of this key, and has reserved it for the expression of his most refined sentiments]; and its relative, F minor, is [Gardiner adds: religious] penitential and gloomy.

The major of D flat is awfully dark. In this remote key Beethoven [Gardiner adds: and Haydn] has written his sublimest thoughts. He never enters it but for tragic purposes.¹⁴⁹

At the end of the entry on key characteristics, Moore explains how on the piano-forte, sharp keys gained their brilliance from the major third of each key, which was tuned sharper than major thirds in the flat keys. Accordingly, flat keys gained melancholy qualities for their major thirds. On string instruments, Moore remarks that the characteristic qualities of the keys G, D, A, E were more brilliant because of their open strings, which played the important notes of scales in these keys.¹⁵⁰

The Moore-Gardiner list inherited a few aspects from previous generations' studies of key descriptions. First, the sharp-flat principle and second, the list is organized in the order of the circle of fifths. On the other hand, the Moore-Gardiner list does not follow certain other aspects found frequently in the tradition of the study of key characteristics. While many key descriptions by music scholars and composers from previous generations contained masterpieces from previous periods when describing the character of each key, Moore-Gardiner's list does not have any pieces to present characteristics of each key.

¹⁴⁹ John Moore, "Key or Key Note," in *Complete Encyclopedia of Music* (Boston: John P. Jewett and Co., 1854), 479.

¹⁵⁰ *Ibid.*, 479.

Henry Edward Krehbiel, *How to Listen to Music; Hints and Suggestions to Untaught Lovers of the Art*, 1869

Unity within a large-scale work was one of the ultimate bases of esthetics, especially in the Romantic period, as the theory of evolution theory and the idea of organisms became well known.¹⁵¹ In 1869, Henry Edward Krehbiel, an American music critic, published a guide to understanding music for non-musicians. In the course of discussing orchestral music and expected etiquette at orchestral concerts, he introduced the idea and importance of key characteristics in symphonies and their structure:

The symphony... is a composition for orchestra made up of four parts, or movements, which are not only related to each other by a bond of sympathy established by the keys chosen but also by their emotional contents. Without this higher bond the unity of the work would be merely mechanical, like the unity accomplished by sameness of key in the old-fashioned suite....the spiritual bond is more elusive, and presents itself for recognition to the imagination and feelings of the listener.¹⁵²

Keys in four movements of a symphony are selected carefully by a composer to achieve two different levels of unity within a large work. Closely related keys employed in four movements deliver a unity in harmonic relation as well as a unity in their “sympathy.” While the unity in harmonic relations brought by “the sameness of keys” is “merely mechanical [and found] in old fashioned suite,” it is “the bond of sympathy” -- emotional content-- that brings the work to a higher level. This “bond of sympathy” is caused by none but the affective properties that keys are equipped with.

¹⁵¹ Jim Samson, "Romanticism,"

http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/search_results?q=romanticism&button_search.x=43&button_search.y=9&button_search=search&search=quick, accessed 10 Feb. 2010.

¹⁵² Henry Edward Krehbiel, *How to Listen to Music: Hints and Suggestions to Untaught Lovers of the Art* (New York: Charles Scribner's Sons, 1869), 128-129.

While most of the discussions on key characteristics from the late nineteenth and twentieth century are found in treatises, scientific reports, and academic journals, the fact that the topic appeared in a guide book such as this strongly indicates how much it pervaded musical consciousness at the time. The knowledge of key characteristics was not necessarily kept only in the realm of academia. Amateur musicians and music lovers were also encouraged to develop it to understand and enrich their musical experience.

Ernst Pauer, *the Elements of the Beautiful in Music*, 1876

An Austrian pianist, composer, and professor at the Royal College of Music, London, Ernst Pauer (1826-1905) published five books on pedagogy, theory, and esthetics between 1877 and 1895. *The Elements of the Beautiful in Music*, written both for students of music and amateurs, aimed to illustrate principles and elements found in the perfection of beauty in the musical arts.

The discussion of affective properties of keys opens the second chapter of the book, called “Characteristic Beauty.” Pauer begins his discussion with more generally understood musical gestures that reflect certain emotions: bright and happy feelings were delivered by high notes, anxiety and despair by higher notes and calmness and dignity by low notes. These characters develop into intense grief when they drop to lower notes.¹⁵³

Pauer was in absolute opposition to the common practice of transposing music for the convenience of singer’s vocal range. Considering a key as an element that “furnishes the tone to the piece,”¹⁵⁴ transposition would destroy the emotional effect that the

¹⁵³ Ernst Pauer, *The Elements of the Beautiful in Music* (London: Novello, 1876), 19.

¹⁵⁴ *ibid.*, 19.

composer intended. According to Pauer, the selection of an appropriate key was an absolute necessity and the secret to the writing of a successful composition.

Pauer was well aware of the attempts from previous centuries to organize the description of key characteristics into universal list. He stated that such an act was almost impossible, and the only way that it could be done was to “name the characteristics and qualities of the keys as we deduce their characteristic expression from universally admired and accepted masterpieces.”¹⁵⁵ Following this statement, Pauer presented a large list of classical repertoire in keys of C major, C minor, G major and G minor. However, for other keys, he only gave the affective qualities without presenting any piece, since “[the] process of enumeration would result in a somewhat lengthy and confusing catalogue.”¹⁵⁶ Here is the list comprised from Pauer’s text.

Table 1: Ernst Pauer’s Analysis of Keys in Certain Compositions.

Keys	Works	Characteristics
C major	Mozart: arias, “Dove sono” and “Vedrai carino.” Weber: “Chorus of the Maidens” from <i>Der Freischütz</i> Beethoven: <i>Quintet op. 29</i> Finale of <i>Symphony no.5</i> . Mendelssohn: air “Oh rest in the Lord” and “Lauda Sion.” Haydn: “The Heavens Are Telling”	A pure, certain and decisive manner, full of innocence, earnestness, deepest religious feeling.
C minor	Weber: Incantation scene in <i>Der Freischütz</i> Schubert’: The Maiden’s Lament”	Expressive of softness, longing, sadness. Also of earnestness and a passionate intensity. C minor lends itself most effectively to the portraiture of the

¹⁵⁵ Ibid., 21.

¹⁵⁶ Ibid., 22-23.

Keys	Works	Characteristics
	Beethoven: first movement of <i>Symphony in c</i> , and the Funeral March of <i>Symphony no. 5</i> .	supernatural. Soft longing, solemnity and dignified earnestness.
G major	Mendessohn: “But the Lord” from <i>St. Paul</i> . Mozart: Ottavio’s second air from <i>Don Giovanni</i> and <i>Symphony in D major K.[504]</i> , 2 nd movement. Rossini: “Ranz des Vaches” from <i>Guillaume Tell</i> Haydn: the first chorus in the “Spring” from <i>the Seasons</i> . Beethoven: <i>Piano Concerto no.4</i> finale	Favourite key of youth, expresses sincerity of faith, quiet love, calm meditation, simple grace, pastoral life and a certain humour and brightness.
G minor	Mozart’: <i>Symphony [no. 40]</i> . Mendelssohn: “Barcarole” in the first book of <i>Songs Without Words</i> Spohr: air “Onori militari” in <i>Jessonda</i>	Sometimes sadness, sometimes quiet and sedate joy, a gentle grace with a slight touch of dreamy melancholy. Occasionally it rises to a romantic elevation. It effectively portrays the sentimental; and when used for expressing passionate feelings, the sweetness of its character will deprive the passion of all harshness.
D major		Majesty, grandeur, and pomp, and adapts itself well to triumphal processions, festival marches and pieces in which stateliness is the prevailing feature.
D minor		Expresses a subdued feeling of melancholy, grief, anxiety, and solemnity.
A major		Full of confidence and hope, radiant with love and redolent of simple genuine cheerfulness, excels all the other keys in portraying sincerity of feeling. Almost every composer of note has breathed his sincerest and sweetest thoughts in that favourite key.
A minor		Expressive of tender, womanly feeling. Most effective for exhibiting the quiet melancholy sentiment of Northern nations. A minor also expresses sentiments of devotion mingled with pious resignation.
E major		The brightest and most powerful key, expresses joy, magnificence, splendour and the highest brilliancy.
E minor		Grief, mournfulness and restlessness of spirit.

Keys	Works	Characteristics
B major		Seldom used. Expresses in fortissimo boldness and pride, pianissimo purity and the most perfect clearness.
B minor		Very melancholy, tells of a quiet expectation and patient hope. It has been observed that nervous persons will sooner be affected by that key than by any other
F sharp major		Brilliant and exceedingly clear.
G flat major		Expresses softness and coupled with richness
F sharp minor		Dark, mysterious and spectral key. Full of passion.
C sharp major		Scarcely ever used.
D flat major		Remarkable for its fullness of tone, and its sonorousness and euphony. It is the favorite key for Nottornos.
A flat major		Full of feeling, and replete with a dreamy expression.
A flat minor		Funeral marches. Full of a sad and almost heart rending expression. Wailing of an oppressed and sorrowing heart.
E flat major		Boasts the greatest variety of expression. At once serious and solemn, it is the exponent of courage and determination and gives the piece a brilliant, firm and dignified character. It may be designated as eminently a masculine key.
E flat minor		The darkest, most sombre key of all. Rarely used.
B flat major		The favourite key of our classical composers. Open, frank, clear and bright. Also the expression of quiet contemplation.
B flat minor		Full of gloomy and sombre feeling, but seldom used.
F major		Full of peace and joy, but also expresses effectively a light, passing regret—a mournful, but not a deeply sorrowful feeling. Available for the expression of religious sentiment.
F minor		A harrowing key, full of melancholy. At times rising into passion. ¹⁵⁷

¹⁵⁷ Ibid., 23-25.

Pauer did not mention his thoughts on the popular sharp-flat principles found in many writings from previous generations. However, analyzing his list, his descriptions of keys do follow this principle. Looking at the major keys on the sharp side, as the number of sharps increases, the character of brilliance increases: C major— pure, G major— bright and youthful, D major— majestic, grandeur, triumphal, A major— radiant with love and cheerfulness, E major— brightest and most powerful, B major— fortissimo in boldness and pride, and F-sharp major—brilliant and exceedingly clear. The flat side minor gains darkness as the number of flats increases: d minor— subdued feeling of melancholy, grief, anxiety and solemnity, g minor— sometimes sadness, quiet sedate joy, gentle grace, sentimental but nothing harsh or fierce, f minor— harrowing and full of melancholy, and b-flat minor— full of gloomy and somber feelings.¹⁵⁸

Pauer closes his discussion on the affective properties of keys with his statement that the interpretation of keys is only subjective.¹⁵⁹ Therefore, even with centuries of research and tradition, the attempt to compose a universal list is a reckless idea.

George Grove, *A Dictionary of Music and Musicians*, 1880

A discussion of the affective properties of keys received an attention in the first edition of *Dictionary of Music and Musicians* under the entry for “Keys.” Grove discusses the fundamental differences in two different scale systems: while the modern scale system has only two different basic scales (major and minor)¹⁶⁰, the older musical

¹⁵⁸ Ibid., 23-25,

¹⁵⁹ Ibid., 26.

¹⁶⁰ Grove categorizes natural, harmonic and melodic minor scales into one account.

scales (octave species and modes) had eight. It was these various structures found in modes and octave species that afforded various affective qualities to each scale.¹⁶¹

Three anecdotes of Beethoven are presented to prove that composers paid attention to affective properties of keys and selection of appropriate keys. Quoting from Nottebohm, Grove introduced Beethoven's sketch for the Cello Sonata op. 102 no. 2, in which Beethoven himself left a scribble that said "H moll schwarze Tonart (B minor a black key)."¹⁶² Grove presented another anecdote from Beethoven's conversation with Rochlitz: describing the personality of the poet Klopstock, a friend, the composer said Klopstock was "always Maestoso! D-flat Major!"¹⁶³ Lastly, taking from Thayer's *Beethoven*, Grove presented a passage of Beethoven's letter to Thomson of Edinburgh who had sent a manuscript of arranged national songs to the composer. Beethoven transposed A-flat major key to "a correct key" for the piece, titled "barbaresco," since for him the key of A-flat major had nothing to do with "barbarous" qualities that the song was meant to have.¹⁶⁴

Grove considered unequal temperaments as the source of the affective properties of keys for fixed instruments such as keyboards:

If the system of equal temperament were perfectly carried out, the difference would be less apparent than it is: but with unequal temperament, or when the tuner does not distribute the tempering of the fifths with absolute equality in instruments of fixed intonation, there is necessarily a considerable difference between one key and another.¹⁶⁵

¹⁶¹ George Grove, "Key," *A Dictionary of Music and Musicians* Vol. II (London: MacMillan, 1880), 53.

¹⁶² *Ibid.*, 52.

¹⁶³ *Ibid.*, 52.

¹⁶⁴ *Ibid.*, 53-54.

¹⁶⁵ *Ibid.*, 54.

Grove also considers the construction of various instruments to have contributed to the affective properties of keys: Berlioz's *Traité d'Instrumentation* is mentioned, as the author claimed the great influence that stopped and open strings gave to the sonority of violins. The unique order and combinations of these open and stopped strings were considered as one of features that provided characteristic qualities to each key.¹⁶⁶

Edmund Whomes, "Key Colour," *Proceedings of the Musical Association*, 13th Sess. 1886-1887

Edmund Whomes's article is divided into two main parts: the first came from a lecture he had given in 1886, and the second was a discussion of an experiment he had carried out in the same year. In the first part of the article, Whomes presented several anecdotes and informal interviews he held with people who claimed to be able to recognize certain qualities in keys. Starting with two "professional men," who argued that the waltz should be written in the flat keys to make use of ornaments and embellishments that were attainable only in the flat keys, Whomes further presents a few cases of people who were equipped with perfect pitch, and others who claimed to see specific colors when they heard pieces in certain keys.¹⁶⁷

Whomes believed the central cause of the affective properties of keys was equal temperament.¹⁶⁸ This argument is entirely different from the majority of opinions on the subject, which used unequal temperament as the basis of key characteristics. Especially among eighteenth-century scholars, equal temperament was considered to have destroyed

¹⁶⁶ Ibid., 54.

¹⁶⁷ Edmund Whomes, "Key Colour," *Proceedings of the Musical Association*, 13 Sess. (1886-1887), 84.

¹⁶⁸ Ibid., 58.

the affective properties of keys, and a few participants in the debate, such as Mattheson and Marpurg, even reserved their opinions as equal temperament became a more popular tuning system for keyboard instruments.¹⁶⁹ Whomes argued that because every key was out of tune in equal temperament, the inequalities of sharpness and flatness of each note assisted in giving “color-quality” to each key.¹⁷⁰

Whomes suggests reasons for the fact that there are no two descriptions of key characteristics that mirror each other exactly.¹⁷¹ First, in both equal or unequal temperament, it is nearly impossible for any tuner to tune two pianos exactly the same. Second, qualities of the pianos on which people learned to play in general were not those of superior models such as concert pianos. Most of them were considered to be “old worn-out box[es] of rattles.”¹⁷² With pianos such as these, Whomes considers it impossible for the delicate matter of key characteristics to be experienced by everyone in a uniform manner.

In his discussion, Whomes includes an experiment designed both to demonstrate the different effects that certain keys may provide the individual listeners, and if possible, to establish a reproductive pattern for the phenomenon. The experiment involved listening to seven well-known pieces played on the piano and identifying their keys.¹⁷³

¹⁷⁰ Ibid., 84.

¹⁷¹ Ibid., 89.

¹⁷² Ibid., 88.

¹⁷³ Ibid., 91-98. The total number of subjects and their identities were not stated; however, we later discover the names of four of them, who were also active members of the discussion: Mr. Charles Stephens, Mr. Southgates, Mr. Gilbert, and Dr. Vincent. Only Mr. Stephens claimed to possess perfect pitch, while the other three all appeared to have been somewhat familiar with the affective properties of keys.

Whomes expected his subjects without absolute pitch to identify the keys by observing the impressions and characteristics they received from each piece of music. Because Whomes had chosen pieces well-known to the general public (Ballade and Polonaise, Mazurka, a Mozart piano concerto, a Beethoven sonata and concerto,¹⁷⁴ a piece by Mendelssohn and a piece from Rossini's *William Tell*), it is possible that some subjects may have known the keys to those pieces in advance. What the subject did not know, however, was that the piano was tuned a half-step higher.¹⁷⁵ From this, Whomes wanted to obtain impressions from his subjects based on their opinions from the act of listening to the music, and not from whatever impressions the subject may have carried from past experience.

The results of the experiment were, unfortunately, not clearly described in Whomes's article. However, something interesting that resulted from this experiment was a discussion that resulted among some of his subjects. Mr. Stephens, with his perfect pitch, indeed recognized that the piano was tuned a half-step higher.¹⁷⁶ Mr. Gilbert claimed that he did not have absolute pitch, but rather, had his own system that involved key qualities. His system engaged "an inherent property of each particular scale that causes it to lend itself to the expression of certain characteristics and feelings of the human mind."¹⁷⁷ Utilizing this system, Mr. Gilbert was able to identify all keys correctly, as had Mr. Stephens.

Mr. Stephens disagreed with Whomes, who saw the tuning system as the source of key characteristics, claiming that such grand characteristics as "majestic" and

¹⁷⁴ compositions not specified.

¹⁷⁵ Whomes, 93.

¹⁷⁶ Ibid., 93.

¹⁷⁷ Ibid., 92.

“pensive” should not be born from the mismanagement of tuners.¹⁷⁸ Mr. Stephens continued and stated that “the character of a work rests on the genius of the composer and not on the particular key in which he writes.”¹⁷⁹ He believed that the affective qualities arise from music due to creativity and sensitivity of composers, but they do not exist inherently in keys themselves.¹⁸⁰ His idea parallels that of the author, as he believes that it is a piece with a strong impression that provides characteristics to a key to the audience.¹⁸¹

Whomes presents a few arguments for the phenomenon of key characteristics that we have already encountered in previous texts: no one fails to experience the sharp-flat key principle and vocal music is uninfluenced by key characteristics.¹⁸² Whomes stated that while he could not concretely say anything about the reasons behind the affective properties of keys, he would continue to believe in their existence until they are definitely proven to be incorrect.¹⁸³

Franz Gronings, “Key Colour,” *The Musical Times and Singing Class Circular*, Nov. and Dec. 1886, Nov. 1887 and Apr., 1888

A series of articles by Franz Gronings on the affective properties of keys can be found in four different issues of *The Musical Times and Singing Class Circular* between the years 1886 and 1888. From the first article to his conclusion in the fourth, Gronings’s opinion on the matter remains unchanged as he claims that the phenomenon of key

¹⁷⁸ Ibid., 95.

¹⁷⁹ Ibid., 96.

¹⁸⁰ Ibid., 94.

¹⁸¹ Ibid., 85.

¹⁸² Ibid., 87.

¹⁸³ Ibid., 85.

characteristics exists only in a relative, rather than in an absolute sense. He also considers the timbres, constructions, and manipulations of instruments to be central factors in contributing to the affective properties of keys.¹⁸⁴

To prove his argument, Gronings presents his investigation of several instrumental families, beginning with the strings. The author focuses on open versus stopped strings producing different sonorities to support this idea, as seen in Berlioz's treatises from 1843. The keys in which dominant, subdominant and tonic are played on open strings have different sonorities from keys in which these three pitches are produced on stopped strings. It is the violin's peculiarly uneven construction, which produces various combinations of open and stopped strings, that causes one key to sound different from another.¹⁸⁵

Gronings also describes the uneven construction found in the piano, which comes from the black keys and white keys being built of two different lengths. The author hypothesizes that, depending on the length at which the leverage was struck, the loudness and tone of a given note would vary.¹⁸⁶ This unevenness of sound is furthermore increased by the physiological construction of the human hand. Thumbs are independent of the other four fingers, which are restricted in mobility and hampered by their neighbors. Thumbs are also heavier than other fingers and although good pianists attempt to make the action of the thumb and fingers uniform, this can only be achieved to a

¹⁸⁴ Franz Gronings, "Key Colour," *the Musical Times and Singing Class Circular* Vol. 27 (Musical Times Publication: Dec, 1886), 721.

¹⁸⁵ Franz Gronings, "Key Colour," *the Musical Times and Singing Class Circular* Vol. 28 (Musical Times Publication: Nov. 1886), 652.

¹⁸⁶ Gronings (Dec., 1886), 771.

certain degree.¹⁸⁷ The physical differences between thumbs and fingers create an unequal touch on the keyboard and contribute even more to the uneven sonorities and to various characteristics found in keys.¹⁸⁸

Gronings introduced another factor that he believed contributed to this difference in sonorities: the age of the instruments themselves. As a piano becomes older, the difference in the sonorities between the white and black keys becomes more apparent. The more the keys are hit, the thinner the felt becomes, resulting in harder, brighter and more metallic tones.¹⁸⁹ Generally, pianists begin learning pieces in keys that contain fewer sharps and flats. This meant that pieces in keys close to a white key (C major and A minor) were more often played, thus wearing down the felt on notes in keys with fewer sharps and flats.

In Gronings's discussion of brass and wind instruments, another possible cause for the varied characteristics in keys is presented: the varieties in timbre created by fundamental notes and notes made from their harmonics and upper partials.¹⁹⁰ With brass instruments, the shape and length of their tubes affect timbre. The rounder the tubes, the more noble the sound becomes. The fewer turns there are (thus, the fewer bends created by the combination of pressed valves), the more forcefully air is sent through the tube, and the more brilliant the tone becomes.¹⁹¹

In the next section, Gronings touches on the affective properties of keys played on the guitar, banjo and harp, remarking that these instruments do not possess any great

¹⁸⁷ *Ibid.*, 771.

¹⁸⁸ *Ibid.*, 711.

¹⁸⁹ *Ibid.*, 711.

¹⁹⁰ Gronings (Nov., 1887), 655.

¹⁹¹ *Ibid.*, 654-656.

difference in key characteristic because of the manner of their constructions. Provided that equal temperament is applied, the nut and cross metal bars cancel out any possible variation of sonority, as these instruments make no distinctions between open and closed strings.¹⁹²

A month after this first article, Gronings published a second article on the matter, opening with his experiments on the keyboard. Gronings chose a few bars from two pieces, the “Old Men’s Chorus” and the “Soldier’s Chorus” from *Faust* and played them on keyboards in two different settings: In the first, Gronings shifted the entire keyboard, resulting in the ability to play the pieces in two different keys without changing fingerings. In the second, he simply transposed pieces to other keys, which required different fingerings to play these pieces.¹⁹³

Gronings found that when the keyboard itself was manipulated to transpose the piece a semitone higher, both pieces sounded brighter. However, when transposed manually (which changed the motion of the finger), “the Old Men’s Chorus” “stood out” in the lower key, while “the Soldier’s Chorus” “stood out” in the higher key, according to Gronings. From two of his experiments, he concluded that key characteristics on keyboard instruments were indeed influenced by motion of the fingers.¹⁹⁴

Gronings draws his final conclusions from general investigations on the timbre of multiple instruments, their construction, and the manner in which they produce various tones. The first experiment, where two pieces were played in transposed keys in two different manners on the keyboard, lent support to his theory that the increase of

¹⁹² Ibid., 652.

¹⁹³ Gronings (Dec., 1886), 710.

¹⁹⁴ Ibid., 711.

characteristics such as brilliance and somberness came from the comparison and contrast of these keys. In the second experiment, the change in the motion of the fingers as well as pitches created a difference in characteristic qualities in the pieces. Finally, the unevenness in the physical construction of an instrument and hands was also variables for the various timbre of pitches.

Gronings upheld his belief, however, that the key characteristics exist only in a relative sense and that keys themselves do not carry characteristic qualities found in music:

[Key colors are] artificially produced, and vary according to the characteristics and manipulation of the respective instruments and combinations. How much manipulation can alter the character and effect may be judged from the solitary village bell, which gives notice of church services, and which serves as wedding and funeral bell as well. It is the manner of ringing it, not a certain pitch, which informs the neighborhood unmistakably of its meaning on each occasion. Where a peal of bells is at disposal, it matters not to the bridal pair whether they ring in D or in D flat, and the strongest believer in key color in the abstract would hardly go to be married in another parish because the bells in his own are pitched in a scale which some authority or he himself credits with a doleful meaning.¹⁹⁵

The author also comments on how to apply the concept of key characteristics in practice:

Any organist would on a festive day, transpose a hymn which, on ordinary days, he played in A, instinctively and without hesitation a semitone or a tone higher, and not a fourth lower to E said to be the most brilliant key. On a mournful occasion, (he) would just as naturally transpose the same hymn down to A flat or G; in fact were the organist guided in the choice of key by the erratic characteristics laid down in some books instead of by his natural instinct, he might run the risk of a proposal being made by the congregation to have his cranium examined.¹⁹⁶

¹⁹⁵ Gronings (Nov. 1886), 652.

¹⁹⁶ Franz Gronings, "Key Colour," *The Musical Times and Singing Class Circular*, Vol. 29 (Apr. 1888), 210.

Hugo Riemann, *On the Imagination of Tone and Analysis of Bach's Wohltemperirtes Clavier*, 1893

Hugo Riemann (1849-1919) examined the affective qualities of keys in depth and dedicated two entire volumes to the subject in the early twentieth century. Riemann, a gifted pianist, studied history, philology and philosophy at the universities of Berlin and Tübingen. His study in music theory started in 1871 at University of Leipzig, where he published articles on tonality and musical logic.¹⁹⁷ As an active music theorist, editor, performer and lexicographer, he was a pioneer in developing the field of musicology and in explaining the nature of musical experience.¹⁹⁸

The active experience of an audience in listening to music was at the heart of Riemann's article "On Imagination of Tones." He proposed that the act of listening to music was not simply an ear passively receiving sounds, but rather "a highly developed manifestation of the logical function of the human intellect."¹⁹⁹ He posited that sounds perceived by the ear were processed by the brain into an image of the tones, "the mental image of musical relationships."²⁰⁰ To Riemann, every auditory detail, such as pitch level, tone color, loudness and motion found in music, was imagined in the composer's

¹⁹⁷ Brian Hyer and Alexander Rehding, "Hugo Riemann," http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/23435?q=riemann+hugo&search=quick&pos=1&_start=1#firsthit, accessed 10 Feb. 2010 .

¹⁹⁸ Robert W. Wason, " *Musica Practica: Music Theory as Pedagogy*," in *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (New York: Cambridge University Press, 2007), 65.

¹⁹⁹ Hugo Riemann, "Ideas for a Study 'On the Imagination of Tone,'" *Journal of Music Theory*, Vol. 36 (Spring 1992), 81.

²⁰⁰ *Ibid.*, 82.

mind during composition before being transmitted to the imagination of the listener at the moment of performance.²⁰¹

Riemann describes music as a psychic experience: “the high ethical worth of music lies therein, that it enables the receiving hearer to experience again what the heaven-inspired artist experienced before.”²⁰² Additionally, Riemann introduces the concept held by the ancient Greek philosophers on the moral and behavioral effects of certain modes. Unsurprisingly, Riemann touches on the subject of key characteristics:

Each key, through its type of derivation from the fundamental scale (that is, through the fifth and third chains in ascent and descent), has a particular character. To define it briefly, all steps upward make the character brighter and more radiant (while) all steps downward make it darker and cloudier. Since the major-- as opposed to minor-- already has a bright and radiant effect, the brightest keys are the major keys with many sharps and the darkest are the minor keys with many flats.²⁰³

Here, Riemann follows the sharp-flat principle. Another Riemann’s arguments in the discussion of brilliant keys versus dark keys involved the metaphoric interpretation of the behavior of the mass of a vibrating body:

The heavy mass of the vibrating body’s lower tones is drawn to the ground, (while) the diminutive dimensions of the vibrating body’s higher tones appear light as a feather, floating weightlessly above... tonal motion is valued as an alteration in strength of light. Higher is at once brighter, lower at once darker. In this fashion, the hearing of changes in pitch level is transformed into a vision of changes in location.²⁰⁴

For Riemann, keys themselves were not the medium of affective musical properties. His approach here shows that there were non-musical elements, such as associations between words and certain physical behaviors and emotions, that also play a certain role in

²⁰¹ Ibid., 81-82.

²⁰² Ibid., 92.

²⁰³ Ibid., 104-106.

²⁰⁴ Ibid., 93.

contributing to the qualities found in keys. Riemann also argues that details and characteristics of sounds, such as loudness, pizzicato, staccato and legato, were integrated into the mental images of tones and influenced his interpretation of the characteristic qualities of a composition in a particular key.²⁰⁵

Riemann published two volumes of analysis on each prelude and fugue from both volumes of Bach’s *Well-Tempered Clavier*. In these he gave separate entries for each prelude and fugue; in the first volume, Riemann typically opens his analysis of each piece by presenting his interpretation of its character before moving on to analyses of the motives and form of the piece. Riemann also noted a parallel between sensations of color and tone.²⁰⁶ The following figure summarizes his interpretations of the characteristics of keys and the affective qualities found in these pieces. It is organized in three sections: overall characteristics of the composition, characteristics of keys, and qualities evoked by melodic and rhythmic motives.

Table 2: Hugo Riemann’s Interpretations of Keys in J.S.Bach’s Well Tempered Clavier Vol.1.

Keys	Overall Character of pieces	Characteristics of keys	Motives
C major	A prelude of truly Olympian-like repose and serenity, from the portal to Bach’s majestic wonder-work of polyphonic art: The harmonics are translucent, the argument is the simplest, the rhythm normal, while		

²⁰⁵ Ibid., 94.

²⁰⁶ Hugo Riemann, *Analysis of J.S. Bach’s Wohltemperirtes Clavier Vol.I*, trans. J.S. Schedlock (New York; G. Schirmer, 1893), 60.

Keys	Overall Character of pieces	Characteristics of keys	Motives
	complications of any kind are almost non-existent. ²⁰⁷		
C minor		<p>Prelude: Possessed with the spirit of the C minor key, so full of restrained power, of passionate throbbing, that the C minor symphony of Beethoven and likewise his Sonata Pathétique recur spontaneously to one's mind.²⁰⁸</p> <p>Fugue: This powerful piece shows the key from quite another side. The minor character, intensified by 3 flats, naturally infuses an earnest tone. The key has characteristics of sober-mindedness rather than energetic will.²⁰⁹</p>	<p>Fugue: Presents an alternation between the legato of the melodic intervals and the staccato of the harmonic breaks and increases the impression of perseverance, of quiet diligence.²¹⁰</p>
C-sharp Major		<p>Powers of feeling and of invention are definitely influenced by the key: this ardent midsummer mood, this flashing, glimmering and glistening are evoked from the spirit of the C-sharp major; the veiled, soft key of D flat would have suggested treatment of a</p>	<p>Prelude: Beginning with the accented measure and having a long feminine ending. It has a quiet almost languishing character and seems to suggest a siesta under the shade of leafy trees, on grass fragrant with</p>

²⁰⁷ Ibid., 1.

²⁰⁸ Ibid., 8.

²⁰⁹ Ibid., 11.

²¹⁰ Ibid., 11.

Keys	Overall Character of pieces	Characteristics of keys	Motives
		totally different kind. Evokes the moods of Nature painting. ²¹¹	blooming flowers, and all alive with the hum of insects. ²¹²
C-sharp minor	Prelude and Fugue: the Holy of Holies, so full of dignity and of inspiration. ²¹³	Prelude: The serious, sad key of C-sharp minor expresses noble feeling, full of depth and energy. ²¹⁴	
D major	Prelude: resembling a spring mood and light-hearted beings that seem to be merrily throwing flowers. ²¹⁵		Prelude: ingenious sport with a light movement. Graceful and pleasing, rather than strong and expressive. ²¹⁶
D minor	Prelude: Prelude: a pensive piece full of nobility and refined feeling, and of a certain bustling activity. ²¹⁷		
E-flat major (No entry)			
E-flat minor	Prelude: clear eyes full of love seem to be gazing at us. Deep sighs are heard, sighs of pain at the limited power of human beings who are able to realize only a small portion of unlimited will. ²¹⁸	Serious and dignified key. ²¹⁹	Prelude: with deep, dignified solemnity, and advanced in 3/2 measure, the long drawn lines of the melody display great noble feeling. ²²⁰
E major		Key of deep green, of	Prelude: The light

²¹¹ Ibid., 15.

²¹² Ibid., 15.

²¹³ Ibid., 23.

²¹⁴ Ibid., 23.

²¹⁵ Ibid., 32.

²¹⁶ Ibid., 32.

²¹⁷ Ibid., 39.

²¹⁸ Ibid., 54.

²¹⁹ Ibid., 54.

²²⁰ Ibid., 54.

Keys	Overall Character of pieces	Characteristics of keys	Motives
		<p>fully developed spring. Nature painting moods.²²¹</p> <p>Fugue: the joy of a wondering life which... befits the spring mood of the key.²²²</p>	<p>arpeggio triplets with their delicately moving summits (as though ruffled by a soft breath of air), and the cosy little shake of the feathered singers concealed beneath them wave like branches adorned with fresh leaves: below all is peaceful (stationary bass, slow, onward-gliding middle voice).²²³</p>
E minor	<p>Prelude: full of passion, of painful palpitation, of impetuousness.²²⁴</p> <p>Fugue: mournful mood, yet there are no painful convulsions. It is rather of a contemplative character, like the beholding of nature clad in its autumn garb, when even the falling leaf and the bare-becoming branches afford aesthetic enjoyment.²²⁵</p>	Pale colored key. ²²⁶	
F major	Clear, bright and simple. ²²⁷	Bright key of F major sparkles like morning appears, and remains free from all bitterness and melancholy. ²²⁸	Vital power revealed in the movement of the melody, rhythm and harmony. ²²⁹

²²¹ Ibid., 60.

²²² Ibid., 61.

²²³ Ibid., 60.

²²⁴ Ibid., 63.

²²⁵ Ibid., 66.

²²⁶ Ibid., 63.

²²⁷ Ibid., 69.

²²⁸ Ibid., 69.

Keys	Overall Character of pieces	Characteristics of keys	Motives
F minor		Somber both by its minor character, and by its position on the undertone side of the fundamental scale, yet standing in close relationship to the Fundamental major scale. Commanding the C major chord as dominant, it receives a consoling ray of light... [F minor] is one of the most melancholy of keys. It does not express sorrow as deep as that of E-flat minor, nor passion as morbid as that of C-sharp minor, but it is impregnated with deeper feeling, greater solemnity, pensiveness and introspection than almost any other key. ²³⁰	
F-sharp major	Full of life, entrancing up to the very last note, moving onward in so natural a manner that one always lingers over it with renewed rapture. ²³¹	As the key... stands between E major and C-major, brighter than the former, but less glowing than the latter. It forms a natural middle member between the one in E, fresh as spring, and the other in C-sharp, rich with summer glow. ²³²	The gently swinging opening motive. The upper voice carries out a syncopated motive of enchanting grace: While listening...one can only think of wood, of flowers, and of the song of birds. ²³³ Fugue; the second counter-subject: it

²²⁹ Ibid., 69.

²³⁰ Ibid., 76.

²³¹ Ibid., 82.

²³² Ibid., 82

²³³ Ibid., 83.

Keys	Overall Character of pieces	Characteristics of keys	Motives
			has a light upward motion, almost as if it were a body without weight capable of being raised by the gentlest breath of air and incapable of a real fall. ²³⁴
F-sharp minor	Prelude relating to the parallel key. Clear and joyous. Prelude as the landscape. ²³⁵ Fugue as soul-painting. Both in the season of autumn, but while the autumn mood of nature casts only a light shadow over the landscape. Through the fugue runs a solemn awe. ²³⁶	Feeling of a deep pain.	Prelude: over a stationary bass, the middle voice gives short notes descending in parallel movement. Are they drops of rain or tears? ²³⁷
G major	Prelude and Fugue: brisk as bees. Troubled joy, of lively enjoyment. Not midsummer, but spring, young fresh spring. ²³⁸		Prelude has throughout gay semiquaver-triplet-figuration. Kindred features (the octave leaps of the lower voice, and especially the whole jugglery of the light winged figuration) everything more precipitated, more impulsive, spring-forth, fluttering and bounding; it is, in fact, youthful spring! ²³⁹

²³⁴ Ibid., 85.

²³⁵ Ibid., 87.

²³⁶ Ibid., 87.

²³⁷ Ibid., 87.

²³⁸ Ibid., 94.

²³⁹ Ibid., 96.

Keys	Overall Character of pieces	Characteristics of keys	Motives
G minor	Prelude: contemplative and earnest mood. ²⁴⁰		
A-flat major	Prelude and Fugue: a certain thoughtfulness and tenderness of expression. ²⁴¹ Fugue: neither as somber as the fugues in C-sharp and E-flat minor, nor as energetic as the fugues in D major and E major. ²⁴²		
G-sharp minor	Prelude: Impulsive power. ²⁴³	The sober views of everyday life and moving in a sphere of super-sensual presentation of ideal feelings. ²⁴⁴	
A major	Prelude and Fugue: a fresh healthy life pulsates. ²⁴⁵ Prelude: full of heartfelt feeling, and of almost touching naivete. ²⁴⁶		
A minor	Prelude and Fugue: somewhat colourless. A light trifling, a pleasant see-saw movement, rather than a passionate struggle, or trembling terror. ²⁴⁷		Lack of rhythmical energy or harmonic depth or melodic polish. The theme...with an up and down chord movements had no stability—a prey to the lightest breathe of air. ²⁴⁸
B-flat	Prelude and Fugue: fresh	When compared to C,	Fugue: garland of

²⁴⁰ Ibid., 101.

²⁴¹ Ibid., 106.

²⁴² Ibid., 111.

²⁴³ Ibid., 111.

²⁴⁴ Ibid., 111.

²⁴⁵ Ibid., 120.

²⁴⁶ Ibid., 123.

²⁴⁷ Ibid., 128.

²⁴⁸ Ibid., 128.

Keys	Overall Character of pieces	Characteristics of keys	Motives
major	<p>healthy pieces without subtleties or mystification of any kind.²⁴⁹</p> <p>Prelude: something of organ dignity.²⁵⁰</p>	the key of B-flat is more satisfying, and fuller than that of F. ²⁵¹	flower. ²⁵²
B-flat minor	<p>Most sublime number. Idea of holy earnestness evokes church.²⁵³</p> <p>Prelude: a fervent prayer, a tormented and dejected heart beseeching for the loving mercy of the Almighty.²⁵⁴</p>	Deep darkness. ²⁵⁵	
B major		<p>Transcendental, more removed from plain everyday life, and enter an ideal sphere of existence and feeling. An intelligent man renounces egoism in the fullest sense of the word and acquires the feeling of universal existence. Minor keys with many flats are the most reserved and so to speak, the most philosophical. Major keys with many sharps overflow with all-embracing love; they reveal the happiness of soul gazing with rapture on the harmony of the world.²⁵⁶</p>	

²⁴⁹ Ibid., 133.

²⁵⁰ Ibid., 133.

²⁵¹ Ibid., 133.

²⁵² Ibid., 135.

²⁵³ Ibid., 138.

²⁵⁴ Ibid., 138.

²⁵⁵ Ibid., 138.

²⁵⁶ Ibid., 147-148.

Keys	Overall Character of pieces	Characteristics of keys	Motives
B minor	Earnest character. ²⁵⁷ Fugue: no ordinary grief, no feeble groaning or sighing, but a Faust-like search for truth, a true soul-struggle which reveals itself. ²⁵⁸	Yearning key. ²⁵⁹	

Riemann occasionally presents the characteristics of keys simply and directly. For instance, in the entry for the key of C-sharp minor he notes: “the serious, sad key of C-sharp minor expresses noble feeling, full of depth and energy.”²⁶⁰ However, some descriptions are infused with qualities derived from other suggestive musical gestures found in voice leading, figures and motives. All of the elements found in these pieces contributed to Riemann’s highly metaphoric interpretation, like these seen in the E-flat minor Prelude: the key has characteristics of “seriousness and dignity” which is infused with “the long drawn lines of the melody...in 3/2 (meter).”²⁶¹ Such long melodic lines, Riemann finds, are similar to chants from church masses.²⁶² This leads the author to interpret the character of E flat minor Prelude “clear eyes full of love seem to be gazing at us, now deep sighs are heard, sighs of pain at the limited power of human beings...”²⁶³

It is clear that Riemann’s interpretations of the characteristics of each piece are shaped by various musical elements, and not only by the inherent affective properties of keys. Riemann considers voice leading to be one of the main components that contribute

²⁵⁷ Ibid., 154.

²⁵⁸ Ibid., 161.

²⁵⁹ Ibid., 156.

²⁶⁰ Ibid., 23.

²⁶¹ Ibid., 54.

²⁶² Ibid., 54.

²⁶³ Ibid., 54

to the characteristic qualities of a piece, because the motions of melodies in music are related to the speaking voice, which, in turn, reflects human emotions: “in the speaking voice, rising pitch motion is connected to more lively excitement, and descending pitch motion is a sign of calming... A value of pleasant or unpleasant sensation, of joy or suffering... is determined by its distance from the limits of rising and falling tension.”²⁶⁴

Judging from the list above, the sharp-flat principle is readily apparent in Riemann’s interpretations of keys. In order to present a closer and clearer observation, I have extracted a few relevant passages from his analysis of *Well Tempered Clavier* and re-arranged the order of the entries for each piece according to the circle of fifths:

Table 3: Analysis of Hugo Riemann’s Interpretations of Keys (Using the Sharp-Flat Principle).

Keys	Characters
Sharp side Majors	
C major	Translucent harmonies, simple argument and rhythm, complications of any kind are almost non-existent.
G major	Lively enjoyment, not midsummer, but spring, young fresh spring.
D major	Resembling a spring mood. Light-hearted beings merrily throwing flowers, graceful and pleasing rather than strong and expressive.
A major	A fresh and healthy life.
E major	Deep green, fully developed spring. Wave-like branches adorned with fresh leaves.
B major	Transcendental, more removed from plain everyday life, ideal sphere of existence and feeling. Happiness of a soul gazing with rapture on the harmony of the world.

²⁶⁴ Hugo Riemann (1992), 93.

Keys	Characters
F-sharp major	Stands between E major and C-sharp major, brighter than the former, but less glowing than the latter. Between key of E, fresh as spring and C-sharp, rich with summer.
C-sharp major	Ardent midsummer mood. Siesta under the shade of leafy trees, on grass fragrant with blooming flowers and all alive with the hum.
Flat side majors	
F major	Clear and simple. Free from all bitterness and melancholy.
B-flat major	Fresh, healthy without subtleties or mystification.
E-flat major	No entry
A-flat major	A certain thoughtfulness and tenderness of expression.
D-flat major	No entry
G-flat major	No entry
Sharp side Minors	
a minor	Somewhat colourless. A pleasant seesaw movement rather than a passionate struggle or trembling terror.
e minor	Full of passion, painful palpitation and impetuosity. Contemplative character, autumn. Falling leaf and the bare-coming braches.
b minor	Earnest character. No ordinary grief, no feeble groaning and sighing, but a Faust-like search after truth, a true soul struggle.
f-sharp minor	Season of autumn, but while the autumn mood of nature casts only a light shadow over the landscape, solemn awe, a deep pain.
c-sharp minor	So full of dignity and of inspiration. Serious and sad. Noble feeling, full of depth and energy.
g-sharp minor	Impulsive power, sober views of everyday life, super-sensual presentation of ideal feelings.
Flat side minor	
D minor	A pensive piece full of nobility and refined feeling.

Keys	Characters
G minor	Contemplative, earnest mood.
C minor	So full of restrained power, of passionate throbbing. Sober-mindedness rather than energetic will.
F minor	Somber, one of the most melancholic keys, impregnated with deeper feeling, greater solemnity, pensiveness, introspection than almost any other keys.
B-flat minor	Most sublime number. Idea of holy earnestness. A tormented and dejected heart beseeching the loving mercy of the Almighty. Seriousness and dignity.
E-flat minor	Clear eyes full of love, deep sighs of pain at the limited power of human beings who are able to realize only a small portion of unlimited will. Deep solemnity, great nobility of feelings in melody.

In the sharp-side major keys, starting from C major with its quality of “simplest... without complications of any kind,”²⁶⁵ Riemann’s interpretations of key qualities noticeably gain liveliness and brilliance as the number of sharps increases. Using his metaphor of the early spring found in G major, this youthful feeling and joy gains more and more energy in D major and A major²⁶⁶ and finally becomes fully developed spring in E major,²⁶⁷ followed by mid-summer in C-sharp major.²⁶⁸

Riemann found similar trends in minor keys on both the sharp and flat sides. A minor, with no flat or sharp, was assigned a plain character which contained no evidence of sadness or joyousness.²⁶⁹ Once the minor gained a sharp or flat, its characteristic qualities emerged and began to develop further. Riemann gives the season of autumn as

²⁶⁵ Ibid., 1.

²⁶⁶ Ibid., 33, 94 and 120.

²⁶⁷ Ibid., 60.

²⁶⁸ Ibid., 15.

²⁶⁹ Ibid., 128.

an expression for both the sharp and flat sides of minor keys. Additionally, Riemann's sharp-side minor keys appear to have associations with struggle, grief and pain (E minor, B minor and F-sharp minor), while the flat-side minors keys are paired with sobriety, melancholy, solemnity and pensiveness (D minor, C minor, F minor). Once the signatures have more than four sharps or flats, interestingly, his interpretations appear to take on something of a religious bent: ideal of holy earnestness (B-flat minor), dignity and sighs at the limited power of human beings, deep solemnity (E-flat minor), super-sensual presentation of ideal feelings (G-sharp minor), full of dignity and inspiration, and noble feelings (C-sharp minor). It is also worth noting that even though C-sharp and D-flat major technically have the same pitch collections, Riemann assigned a contrasting character to them.

Riemann's remarks on enharmonic keys makes clear the distinction he made between keys with flats and keys with sharps. For the C-sharp major prelude and fugue in Book I, he comments, "This flashing, glimmering and glistening were evolved from the spirit of the C-sharp major key; the veiled, soft key of D flat would have suggested treatment of a totally different kind."²⁷⁰

Bach originally wrote the eighth prelude and fugue in Book II in the key of D-sharp minor. However, Riemann's analysis of these two pieces is in the key of E-flat minor; he had transposed them in that key for his edition because they "do not appear to contain any special characteristics of keys with sharps."²⁷¹ He claimed that the only

²⁷⁰ Riemann (WTC., Vol.I), 15.

²⁷¹ Hugo Riemann, *Analysis of J.S. Bach's Wohltemperirtes Clavier* Vol. II, trans. J.S. Schedlock (New York: G. Schirmer, 1893), 53.

motivation for Bach to have written this pair in D-sharp minor was pedagogy.²⁷² Judging from Riemann's description of sharp side minor keys, D-sharp minor should provoke characteristics of struggle, pain, sadness and seriousness-- typical characteristics found in all other minor keys on the sharp side. E flat minor, as opposed to D sharp minor, should inspire such characteristics as dignity, deep solemnity and great noble feelings, all typical characteristics of other minor keys with flats.

It is clear that certain trends arise in Riemann's interpretation of major keys with sharps and minor keys with flats in accordance with the sharp-flat principle. However, for minors with sharps and majors with flats, Riemann seemed to have trouble ascertaining their qualities. Taking the list from Book I into consideration, one finds relatively fewer remarks by Riemann on these six sharp minor keys. With such paucity of description, Riemann's general interpretation of flat-side majors and sharp-side minors are indeterminable.

Riemann, responsible for shaping the modern field of musicology, is inarguably one of the most important musical scholars from the twentieth century. His two large works on the analysis of J.S. Bach's *Well-tempered Clavier* shows that for Riemann, key characteristics were no trifling matter, but a topic that deserved the utmost attention and consideration

Albert Lavignac, *Music and Musicians*, 1907

The third encyclopedic work on music where key characteristics made an entry was by Albert Lavignac. A Professor of Harmony at the Paris Conservatory at the time of

²⁷² Ibid., 53.

the publication, Lavignac aimed to present a music guide to a wide audience. Lavignac touches on various topics relating to the idea of key characteristics: acoustics, musical perception, tonality, instruments, counterpoint, harmony, esthetics and the history of music. Lavignac introduced his ideas on key characteristics in a chapter called “Esthetics” and shared his list of key characteristics.

Scholars and musicians who organize their list of key characteristics according to the circle of fifths usually follow the sharp-flat principle. So does Lavignac: for the sharp-side majors, the general mood of this group was joyous and brilliant, and as the number of sharps increased, the degree of such moods became more intense. A similar trend was found in the sharp side as well as the flat-side minor keys. The general moods of this group are sad and somber, and as the number of sharps increases such characteristics gain in intensity.

Table 4: Albert Lavignac’s Analysis of Characteristics of Keys.

Keys	characteristics	Keys	Characteristics
C# major	No entry	F major	Pastoral, rustic
F# major	Rugged	B-flat major	Noble and elegant, graceful
B major	Energetic	E-flat major	Sonorous, vigorous, chivalrous
E major	Radiant, warm, joyous	A-flat major	Gentle, caressing or pompous
A major	Frank, sonorous	D-flat major	Charming, suave, placid
D major	Gay, brilliant, alert	G-flat major	Gentle and calm
G major	Rural, merry	C-flat major	No entry
C major	Simple, naïve, frank or flat and common place		
A# minor	No entry	D minor	serious, concentrated
D# minor	No entry	G minor	melancholy, shy
G# minor	very sombre	C minor	gloomy, dramatic, violent
C# minor	brutal, sinister, or very sombre	F minor	morose, surly, or energetic
F# minor	rough or light, aerial	B-flat minor	funereal or mysterious

B minor E minor A minor	savage or somber, but vigorous sad, agitated simple, naïve, sad rustic	E-flat minor A-flat minor	profoundly sad doleful, anxious ²⁷³
-------------------------------	--	------------------------------	---

While the increase in intensity of certain moods was evident in sharp-side majors and flat-side minors, that was not the case for flat major keys. The general mood of the flat-side major keys was good natured. However, this group did not seem to gain more of such a quality even as the number of flat increased.

The causes for the phenomenon of key characteristics in orchestral music, Lavnac claims without hesitation, are the structures of different instruments and fingerings employed to play. However, the author excludes piano, choral and organ music from this part of discussion. He recognizes that music of these three instruments in all keys are simply transpositions of two scales, so that the tonalities should resemble each other exactly, only leaving them in two different groups, a major key and minor key. Additionally, as equal temperament was the norm by the early twentieth century, unequal temperaments were not considered as a part of the cause.²⁷⁴

Between two chapters included in this publication, the author contradicts himself about the validity of affective properties of keys: in the chapter called “The Art of Orchestration,” he expresses that the lists of characteristics of keys are completely subjective. In the chapter “Esthetics,” on the other hand, he closes the discussion on key

²⁷³ Ibid., 365-366.

²⁷⁴ Ibid., 366

characteristics by stating that “[the phenomenon of key characteristics] is in obedience to that mysterious law which assigns to each key a peculiar aspect.”²⁷⁵

Ralph Dunstan, *A Cyclopedic Dictionary of Music*, 1925

In Ralph Dunstan’s *A Cyclopedic Dictionary of Music*, his discussion on the idea of key characteristics gets its own entry (in the dictionary of Grove and Moore, it is presented as a part of the entry for “key.”) Under “Key Colour,” Dunstan is deeply concerned with presenting systematic charts as well as the validity and possible causes of key characteristics discussed among writers such as Lavignac, Gardiner and Berlioz. Dunstan himself assures us that “every composer has an intuitive perception that keys have different complexions... they conjure up different mental atmospheres, suggest different planes of thought-- different melodies, harmonies and modulations.”²⁷⁶

The visual images of shapes of music notation (sharps and flats) were considered as one of the possible causes of the phenomenon of key characteristics. This is an argument that was presented in the early eighteenth century by scholars such as Rameau,²⁷⁷ and it became popular in the early nineteenth century when unequal temperament was considered to have been disproved widely as a cause for the matter. Consequently, the psychological responses from visual images became one of the main streams of argument by many scholars and musicians.²⁷⁸

Dunstan drew his conclusion on the interpretations of keys as a subjective matter and concluded this entry:

²⁷⁵ Ibid., 365.

²⁷⁶ Ralph Dunstan, “Key Colour,” in *A Cyclopedic Dictionary of Music* (Philadelphia: Curwen Inc., 1925), 278.

²⁷⁷ Steblin, 97.

²⁷⁸ Dunstan, 278.

Though this above description is occasionally contradictory, there is, on the whole, a very striking unanimity of feeling. There seems to be abundant evidence that composers and performers recognize and appreciate key-colour; how far it is discerned by listeners is another question!²⁷⁹

Chart on key descriptions given in Ralph Dunstan's *A Cyclopedic Dictionary of Music*, p.279.

Table 5: Ralph Dunstan's Analysis of Characteristics of Keys (from A Cyclopedic Dictionary of Music, 1925).

Major	Lavignac	Gardiner	Berlioz (for Violin)
C	Simple, naïve, frank; or flat and common place.	Bold, vigorous, commanding.	Grave, but dull and vague.
C#	No Entry	No Entry	Less vague, and more elegant Majestic.
D-flat	Charming, suave, placid.	Awfully dark.	Gay, Noisy, and rather common place.
D	Gay, brilliant, alert.	Grand and noble.	Dull.
D#	No Entry	No Entry	
E-flat	Sonorous, Vigorous, Chivalrous.	Full, soft, beautiful.	Majestic, tolerably sonorous, soft, grave.
E	Radiant, warm, joyous.	Bright, pellucid, brilliant.	Brilliant, pompous, noble.
F	Pastoral, rustic.	Rich, mild, contemplative.	Energetic, vigorous.
F#	Rugged.	No Entry	Brilliant, incisive.
Gflat	Gentle, calm.	No Entry	Less brilliant; more tender.
G	Rural, merry.	Gay, springy.	Rather gay, and slightly

²⁷⁹ Ibid., 278.

Major	Lavignac	Gardiner	Berlioz (for Violin)
G#	No Entry	No Entry	common place. Dull, but noble.
Aflat	Gentle, caressing; or pompous.	Unassuming, delicate, tender.	Soft, veiled; very noble.
A	Frank, sonorous.	Golden, warm, sunny.	Brilliant, elegant, joyous.
Bflat	Noble and elegant; graceful.	Deficient in fire.	Noble; but without distinction.
B	Energetic.	No Entry	Noble, sonorous, radiant.
Cflat	No Entry	No Entry	Noble, but not very sonorous. ²⁸⁰

Minor	Lavignac	Gardiner	Berlioz (for Violin)
C	Gloomy, dramatic, violent.	Complaining.	Gloomy; not very sonorous.
C#	Brutal, sinister; or very somber.	No Entry	Tragic, sonorous, elegant.
Dflat	No Entry	No Entry	Serious; not very sonorous.
D	Serious, concentrated.	Solemn, grant.	Lugubrious; sonorous; somewhat common place.
D#	No Entry	No Entry	Dull.
Eflat	Profoundly sad.	No Entry	Very vague, and very mournful.
E	Sad, agitated.	Persuasive, soft, tender.	Screamy, and slightly common place.
F	Morose, surly; or energetic.	Penitential, gloomy.	Not very sonorous, gloomy, violent.
F#	Rough or light, aerial.	Mournfully grand.	Tragic, sonorous, incisive.
G	Melancholy, shy.	Replete with melancholy.	Melancholy, tolerably sonorous, soft.
G#	Very somber.	No Entry	Not very sonorous; mournful,

²⁸⁰ Ibid., 279.

Minor	Lavignac	Gardiner	Berlioz (for Violin)
Aflat	Doleful, anxious.	No Entry.	elegant. Very dull and mournful, but noble.
A	Simple, naïve, sad, rustic.	Plaintive, but not feeble.	Tolerably sonorous, soft; mournful rather noble.
Bflat	Funeral or mysterious.	No Entry	Gloomy, dull, hoarse; but noble.
B	Savage or somber, but vigorous.	Bewailing.	Very sonorous; wild, rough, ominous, violent. ²⁸¹

Sir Donald Francis Tovey, *Beethoven* and “Tonality” (1928)

A renowned British concert pianist and composer, Tovey was one of the most important music critics who gave a significant influence to the field of musicology and created musicology as a field of study at the University of Edinburgh. Tovey lectured on music, and his articles on musical forms and composers represented important contributions to the eleventh edition of the *Encyclopedia Britannica* (1910-1911).

On the two occasions in which Tovey discusses his thoughts on the ideas of key characteristics, his stance on the matter is unclear. While giving a clear denial of the legitimacy and validity of the idea, he explains his own positive experiences of the phenomenon.

To me, the character of A flat is the character of most of the movements Beethoven wrote in that key. B minor I feel to be a not very dark brown, partly because of its relation to D minor, which I happen to think of as bright red...But I also happen to feel that Friday is remarkably like the colour of A minor. This may happen because I think of A minor as a fish-like white; but I have not the slightest idea why both Tuesday and E major should seem to me grass-green. E flat minor seems to me to be the colour

²⁸¹ Ibid., 279.

of Bach's prelude in that key in Book I of the Forty-Eight; a very dark colour, because that is a very tragic colour.²⁸²

Tovey "feels" colors from certain musical keys as well as from certain instruments. Only a handful of scholars from previous centuries used colors to express key characteristics. In many of these previous cases, colors were used as the adjective in a part of a metaphor (such as "black of the nights"²⁸³ and "the color of a pale rose...the most tender of all, the most womanly exalted."²⁸⁴). However, Tovey, like composers Alexander Scriabin and Nikolai Rimsky-Korsakov, gave a definite color (such as blue or red) for each key. This is an approach suggesting the experience of synaesthesia which became a popular field of psychology in the late nineteenth and early twentieth centuries.

Tovey's interpretation of keys are represented only by Beethoven's works. Including classical repertoire in a key description to describe affective properties of keys was not new. Schubart's list of works and key characteristics, of course, was well known and had circulated for a century among musicians and music amateurs. However, employing various works of a single composer, as seen in Tovey's writing, is unique. Tovey identifies Beethoven's use of A-flat to express remarkably suave quality, while he recalls the key of D major "a cry de profundis," as found in works such as *Agnus Dei* of *Missa Solemnis*. Nevertheless, Tovey still denied the phenomenon to be an important factor for the aesthetics of music, claiming that the concept of key characteristics and key- colors were completely a psychological factor and subjective.

²⁸² Sir Donald Francis Tovey, *Beethoven*, ed. Hubert J. Foss (New York: Oxford Univ. Press, 1965), 8.

²⁸³ Steblin, 125.

²⁸⁴ *Ibid.*, 109.

Notions about the characters of keys in themselves are entirely subjective, and no agreement about them might be expected, though doubtless their psychological statistics might be as interesting as those of ‘number-forms.’²⁸⁵

For Tovey, it was the contrast between various keys, employed in a piece though modulations, that provided color effects in music as he claims that “what is not subjective at all is the effect of one key as approached from another.”²⁸⁶ Also certain relationship keys have influenced the interpretation of key character for him: While B minor is interpreted as “black” key by Beethoven,²⁸⁷ Tovey finds it not so dark, because of its close relationship to a “bright red” key of D minor. The contrast of keys and a series of modulations played an important role for Tovey’s interpretation of key characteristics and supported his denial of the existence of affective properties of keys in an abstract sense. Tovey closed his discussion on the subject by writing that the notion of key characteristics was a “kind of fantasy which many learned musicians still fail to confine to its proper place among psychological obscurities.”²⁸⁸

Otto Rudolph Ortmann, “What is Tone-Quality?” *The Musical Quarterly*, 1935

A music theorist at Peabody Conservatory of Music, Otto Rudolph Ortmann published articles on a theory of musical experience, the physics of sounds as well as practical treatises on score reading and ear training, synaesthesia, jazz, and piano

²⁸⁵ Sir Donald Francis Tovey, “Tonality,” *Music & Letters*, Vol.9 (Oct., 1928), 343.

²⁸⁶ *Ibid.*, 343.

²⁸⁷ Tovey (1965), 7.

²⁸⁸ *Ibid.*, 9.

performance. His life-long aim was to increase understanding of music and to provide a firmer basis for improving music education.²⁸⁹

In his article on tone quality in *The Musical Quarterly* in October 1935, he discussed on timbre and tone-color of instruments as being a fourth attribute of sound in addition to pitch, intensity and duration. Ortmann suggested that this fourth attribute was a result of the other three, and a slight change in one of them would cause a change in the quality of sounds. To prove this point, Ortmann used the oscillograph²⁹⁰ to demonstrate the outcome on the shape of sound waves when one of the three attributes was changed. The quality was dependent on pitch, intensity and duration, while these three attributes were independent of each other.²⁹¹

Ortmann describes qualities of tones not only with terms such as loud and soft, high and low, but also with terms such as bright, dull, sweet, sparkling, piercing and round. These terms are used to describe the quality of tones in relation to sensation processed by other scholars as well.

In touch, a sensation of “sharp” quality is produced when a very small skin area is stimulated to a rather marked degree. In audition, an equivalent condition results from the sounding of tones that are very high (i.e. that affect only a few end-organs) and loud... In vision, sparks are points of light (which stimulate few end-organs) of short duration...the use of descriptive terms results from a similarity in the effect produced upon the end-organ... and therefore, is not arbitrary, but has its basis in our psycho-physiological organs of sensation.²⁹²

²⁸⁹ David Gonzol, “Otto Rudolph Ortmann, Music Philosophy and Music Education,” *Philosophy of Music Education Review*, Vol.12 (Fall, 2004), 160-180.

²⁹⁰ An electrical measuring instrument which indicates the varying electric current in terms of voltage and current. It also interprets electrical current in waveform.

²⁹¹ Otto Rudolph Ortmann, “What Is Tone-Quality?” *The Musical Quarterly*, Vol.21 (1935), 442-446.

²⁹² *Ibid.*, 448-449.

Many nineteenth-century composers, in their treatises on orchestration, speak of the tone-colors of various instruments and of different shades of tones created by the piano in various combinations of dynamics. Ortmann's view of tone-quality made possible largely by the invention of oscillograph, which added a new perspective of analysis to the phenomenon of key characteristics. Ortmann represents a key advance in twentieth century thinking: having treated the tone quality as the result of sensations on our psycho-physiological organs, the author considered it acceptable for individuals to have subjective descriptions on characteristics of keys.

Harry Farjeon, "The Colour of Keys, and The Color of Notes," *The Musical Times*, May and July 1938

Harry Farjeon (1878-1948) was a British composer and professor at the Royal Academy of Music, who wrote several articles and books on compositional techniques, harmony, tuning and tonality. Two of his articles are especially concerned with colors and characteristics of keys: "The Colour of Keys" and "The Colour of Notes" are found in the May and July 1938 issues of *The Musical Times*. In "The Colour of Notes", he compares the spectrum of colors and octaves, discussing the compatibilities between the two phenomena, and their influence on how we listen to music. He presented some characteristics found between color waves and sound waves. The frequency range of colors matches that of the octave, while the octave repeats itself once at its highest or lowest note and the color spectrum does not. Therefore, even though colors and notes

share their fundamental phenomenon, the wave, their nature is not identical.²⁹³ Farjeon, although having admitted that there was without any doubt some affinity between colors and notes, came to the conclusion that the relationship between these two phenomena was more the result of “an imaginative process than even faint rays of a scientific truth.”²⁹⁴

The other article, “The Colour of Keys,” is more provocative as well as revealing, and it generated many responses from the readership. For students in his lecture classes, he conducted an experiment: a few keys were chosen, both major and minor, both flat and sharp, and students were asked to record the colors that came naturally to their minds as they thought of these keys. Farjeon compared his interpretation of key characteristics with collected data from his students:

Table 6: Harry Farjeon’s Analysis of Keys.

keys	Works: Farjeon	Interpretation of keys: Farjeon	Colors: Farjeon	Colors: Students
C major	Wagner: <i>Meistersinger</i> . Haydn: “and there was light” from the <i>Creation</i> .	Surely the universe is in C major.	White (not because of the white key colors on the piano), whiteness of lights.	Majority is white. A few answers with cream and grey.
G major		Hedge buds a popping to the accompaniment of tiny running waters.	Spring green.	Over 2/3 considers green. Two considers red, yellow and brown.
E major	Chopin: <i>Etude op.10-3</i> .	Kind and soothing.	Warm orange.	No agreed consensus of opinion, several yellows and blues, but many other colors as

²⁹³ Harry Farjeon, “The Colour of Notes,” *The Musical Times*, Vol.79 (July 1938), 500-501.

²⁹⁴*Ibid.*, 501.

keys	Works: Farjeon	Interpretation of keys: Farjeon	Colors: Farjeon	Colors: Students
				well.
F# major		Eager, aspiring quality.	Red.	Yellow and deep rose-pink.
G-flat major		Hard, yet soft. Blunted and composed.	Electric blue.	
F major	Beethoven: <i>Pastoral Symphony</i> .	Vague. Picture of autumn than of spring.	Somewhere among the browns, somewhere among the blues. Brown in the friendliness, but more interesting than brown.	Varied. Two votes for oyster, one for white.
E-flat major	Any young lady's songs.		Sky-blue pink, light mauve.	Browns and oranges preferred, but a few blues and pink and a pinky-mauve.
A-flat major	Lekeu: the second movement of <i>the violin sonata</i> .		Real mauve.	Lost records.
D-flat major	Early compositions of the author.		Deepens into purple.	Overwhelmingly purple and allied shades.
C minor	Beethoven: <i>Symphony no. 5</i> .	Sheen of actual silver rather than steel.	Silver, steel and iron.	Mostly grey. Two votes for stone colour.
g minor			Green or blue with the sparkle of silver threaded through it.	Only a few opinions recorded: one deep red.
d minor		Dreary affair and dead. One of his own student songs comes to mind.	Sand color.	Varied. Inclination towards tempered greys.
f-sharp minor	Anything Mendelssohn wrote when he		Light red.	Nearly all agree with scarlet or frame colour.

keys	Works: Farjeon	Interpretation of keys: Farjeon	Colors: Farjeon	Colors: Students
	meant to be passionate.			
b-flat minor	Chopin: <i>Funeral March.</i>		Black	Mostly black and other dark or deep effects. One pink. ²⁹⁵

Comparing the list of colors interpreted by Farjeon and his students, seven entries out of eleven agree with each other. The keys that they did not agree about their interpretations were E-flat major, E major, F major and F-sharp major. Curiously, these four keys exist in the close approximation to each other and are all in a major mode. Additionally, for these four keys, it appears that opinions of students among themselves varied more.

The popular approach to the sharp-flat principle is found in Farjeon's interpretations of E-flat, A-flat and D-flat: "(E-flat) Light mauve... (A-flat) real mauve... (D-flat) deepening into purple."²⁹⁶

Farjeon discussed his experience of associating two unrelated concepts together: "Saturday is silver and Friday chocolate brown...the month is vertical (beginning at the bottom) and the week is horizontal."²⁹⁷ He called such experience an "association of ideas,"²⁹⁸ which meant that a concept was associated to another by some idea which bonded them together.

This view was also evident in his interpretation of keys and colors. For example, C major, which Farjeon associates with the color of white, is a key of a chord that Haydn

²⁹⁵ Harry Farjeon, "The Colour of Keys," *The Musical Times*, Vol. 79 (May, 1938), 335-336.

²⁹⁶ *Ibid.*, 335-336.

²⁹⁷ *Ibid.*, 335.

²⁹⁸ *Ibid.*, 335.

uses in *Creation* at the presentation of the creation of light. Therefore, it is not the C major itself abstractly gives the color of white to Farjeon's mind, but the composition he has in his mind, which glues the color and the key together. In *Creation*, at the arrival of C major from a preceding chaotic passage, Farjeon imagined bright white lights filling up space, clearing out all the chaos.²⁹⁹ Similarly with F-sharp minor, which Farjeon associated with the color red, he coupled works of Mendelssohn, filled with passionate sentiments, to the key.

The idea the author presents to support his argument on "association of ideas" as the cause of key characteristics is the impressions listeners receive from certain works.³⁰⁰ Farjeon is convinced that this plays a significant part in one's interpretation of key color: "a composer, choosing that key [D-flat major] for the first time in history, would be less likely to produce a rich, melodious work than he is now, after the examples of that Chopin Nocturne and the 'Raindrop' Prelude."³⁰¹ In other words, Farjeon proposes that keys are associated with certain impressions and characteristics only because of great works from the Romantic period from which audiences received certain affects. In previous centuries, characteristics of keys were less strongly felt by audiences simply because of the absence of works that left strong impressions on them.

Percy A. Scholes, *The Oxford Companion to Music*, 1955

Percy Scholes's *Oxford Companion to Music* is one of the last encyclopedias that included a discussion of the concept of key characteristics. It also shows the change in the

²⁹⁹ Ibid., 335.

³⁰⁰ Ibid., 335.

³⁰¹ Ibid., 335.

approach to the phenomenon. One will not find anything on the topic under an entry of “key.” Instead, there are a few pages dedicated to a topic called “colour and music.”

Scholes’s discussion covers a wide range on color-music association. His use of the term “color” signifies the definite colors, such as blue and green, as well as metaphoric expressions about moods and qualities. He presents the association of colors with keys, timbre of instruments, letters of the alphabets and specific musical repertoire. He further discusses history of production of color music, educational use of color on music, and the list of color-key description.

Scholes remarked on the continuous attention and growing popularity in interpretations of colors and keys: “[the association between colors and notes is] a subject upon which considerable misunderstanding exists...[and] it is a subject that may at any time, by the activity of some inventor or composer, come into a position of greatly enhanced public interests.”³⁰² The affinity between color and music has a long history since the argument made by Ptolemy, an Alexandrian scientist and music theorist of the second century A.D. The subject has been widely explored by artists, musicians and philosophers since the Baroque period. Scholes argued that there were firm connections between color and music because of the common physical cause, wave and vibrations, which resulted in providing similar phenomena to our senses.³⁰³

Scholes turns his attention to dividing composers into two groups: those who were sensitive to key characteristics and those who weren’t. The author gives special remarks

³⁰² Percy A. Scholes, “Colour and Music,” *The Oxford Companion to Music* (New York: Oxford Univ. Press, 1955), 200.

³⁰³ *Ibid.*, 201.

to two Russian composers, Alexander Scriabin and Nicolai Rimsky-Korsakov and presents the list of key-color descriptions by the two composers.³⁰⁴

Table 7: Key-color description by Rimsky-Korsakov and Scriabin (from Scholes’s *Oxford Companion to Music*, 1955).

Keys	Rimsky-Korsakov	Scriabin
C major	White	Red
G major	Brownish-Gold, Bright	Orange-rose
D major	Yellow, sunny	Yellow, brilliant
A major	Rosy, clear	Green
E major	Blue, sapphire, sparking	Bluish-white
B major	Somber, dark blue shot with steel	Same as above
F # major	Greyish-green	Bright blue
Dflat maj	Dusky, warm	Violet
Aflat maj	Greyish-violet	Purple-violet
Eflat maj	Dark, gloomy, bluish-grey	Steel-color with a metallic luster
Bflat maj	---	Same as above
F major	Green	Red ³⁰⁵

One section is devoted to discussions of composers’ attempts to invent instruments to produce “color-music,” a topic that had rarely appeared in any dictionary or articles until then. The invention of instruments that produce pitches while projecting colors in some form has been explored since Louis Bertrand Castel, a French Jesuit and scientist in the late seventeenth century. This trend continued into the two centuries. Scholes introduced a nineteenth century composer, D.D. Jameson, whose composition of color-music involved an instrument to produce sounds and colors simultaneously. Furthermore, Bainbridge Bishop, an American, invented an organ with color-light projection attached to each pitch, and Alexander Laszlo was an inventor of a color piano

³⁰⁴ Ibid., 202.

³⁰⁵ Ibid., 202.

that projected colors onto a screen.³⁰⁶ Such attempts were presented in Walt Disney's *Fantasia* and at the Paris Exhibition in 1937, and the 1939 Earl's Court Exhibition.³⁰⁷

Scholes gave a special attention to British composer Arthur Bliss (1891-1975). In *A Colour Symphony* (1922), Bliss labeled each movement with names of colors and gave subtitles each movement. For example, the fourth movement has the color "Green" which is "the color of Emeralds, Hope, Joy, Youth, Spring and Victory."³⁰⁸ Scriabin and Schoenberg were also mentioned by Scholes as composers who further advanced the color-music associations. In the scores of Scriabin's *Prometheus* and Schoenberg's *Die glückliche Hand*, both composers notated the detail of colored lights which were to be projected on the screen or to fill the performance space.³⁰⁹

While the author proceeded further on the topic of associations between music and colors in the synaesthetic sense and its use in education and occultism, he stated his clear view on the ideas of key characteristics:

On the whole, it would seem that 'key colour' is an entirely subjective experience, dependent partially on the emotional suggestions of the words 'flat' and 'sharp'... and, probably, also, on the unconscious recollection of particular pieces met with in early life...[and]the fact that the lowering or raising of the pitch of a particular piece does tend to give it more solemnity or more brilliance...The conclusion is that key-colour associations are in part conventional and partly arbitrary and personal—for probably no two musicians have yet agreed on the same series of associations.³¹⁰

³⁰⁶ Ibid., 207.

³⁰⁷ Ibid., 207.

³⁰⁸ Ibid., 207.

³⁰⁹ Ibid., 207-208.

³¹⁰ Ibid., 203.

Scholes further remarks that a number of features in music as well as metaphoric terminology and extra-musical associations all contributed to the phenomenon of key characteristics.

Hans Keller, “Key Characteristics,” *Tempo New Series*, No.40, 1956

Hans Keller (1919-1985) was a British music critic and writer of Austrian birth. While Austria was under the Nazi regime, Keller fled to London where he settled for the rest of his life. An amateur string player, Keller wrote extensively on film music in his early career as a music critic, joined the BBC in the mid-twentieth century and took charge of music talks, chamber music, orchestral music and new music. One of his strong interests was to connect music and psychoanalysis.³¹¹

Keller’s purpose in the article “Key Characteristics” was to discuss what he considered misunderstanding and incorrect information found in an article by Gene Revesz. The main problem Keller had with many of Revesz’s arguments was that Revesz approached the examination of key characteristics with only a scientific view without giving any consideration to the musical practice.

The first issue which Keller attacked was Revesz’s approach to the change in the standard pitch in the Western music that resulted in the transposition of the entire repertoire. Revesz stated in his *Introduction to the Psychology of Music* (1953) that “one consequence of the theory of key characteristics would be that the character of the key

³¹¹ Christopher Wintle, “Hans Keller,” http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/14843?q=hans+keller&search=quick&pos=1&_start=1#firsthit, accessed, 2 Feb, 2010.

would change with a change in standard pitch.”³¹² Keller disagreed and made an argument that the key characteristics were transposable because they were not attached to specific pitches, but with structure of scales, and the location of pitches in relation to other pitches.³¹³ Speaking of the Jupiter Symphony by Mozart, Keller stated:

The strings have been tuned up three quarters of a tone since Mozart’s day, and most of the characteristic sound of C major has been tuned up with them, because the relation of the strings to what happens with and upon them has largely remained the same...owing to the interaction of the stringed instruments’ fingered notes with their characteristic partials and the vibration of the open strings, let alone the different sets of fingerings and placings of open strings in different keys, there are objective colour differences between keys.³¹⁴

Therefore, if one wished to listen to music in an authentic style regarding keys, it was incorrect to transpose the work according to the change in the standard pitch. For example, C major works played in the standard pitch of Mozart’s time would have a tonic of C which is equivalent or close to our B-flat since our standard pitch is about half of a tone to three-quarter of a tone higher. Playing Mozart’s C major works in the key of our b-flat, according to Keller, would destroy the character of the piece significantly.³¹⁵ B-flat major is a dark key on string instruments while C is simple and plain. Keeping the work in the key of C major, individual pitches in the work would not match the pitches Mozart heard, however, since the combination of the characteristic partials and vibrations of

³¹² Hans Keller, “Key Characteristics,” *Tempo New Series*, No.40 (Summer, 1956), 6.

³¹³ *Ibid.*, 6.

³¹⁴ *Ibid.*, 6.

³¹⁵ *Ibid.*, 6-7.

pitches which come from open and stopped strings would be the same as the one Mozart had composed his piece in; the characteristics would remain the same.³¹⁶

Like many others, Revesz considered that open strings on bowed string instruments produced richer overtone and sounded brighter, resulting in key using more open strings having a brighter character. This was another argument that made sense only in terms of acoustics, according to Keller.³¹⁷ Looking from a performer's prospective, pitches on open strings were not necessarily more brilliant in character than corresponding pitches from fingered strings. Pitches from stopped strings were played with vibrato and they sounded more alive; while playing on open strings, one could not use any vibrato, resulting in a less brilliant sound.³¹⁸ Therefore, it was the stopped strings that gave more brilliance, not the open strings. Moreover, open strings were called "empty strings" in German.³¹⁹

Another point that Keller made was related to the actual practice of playing string instruments. Due to the distinctive tone quality that pitches on open strings have, "[pitches from the open strings] tend to fall out of their colouristic context... In solo violin literature, the note G is almost wholly avoided [for the same reason]... and also in ensemble playing, adjustment of intonation [on open strings] is impossible."³²⁰ Keller presented a few examples in actual violin pieces by Berg, Bartók, Vivaldi and Mozart and remarked that composers purposely avoided the open G pitch for its distinctive color. Keller finds that the number of open strings was relatively unimportant in determining

³¹⁶ Ibid., 7.

³¹⁷ Ibid., 7.

³¹⁸ Ibid., 7-9.

³¹⁹ Ibid., 9.

³²⁰ Ibid., 7.

the key characteristics because there was no key in which more or fewer open strings were used in the actual playing of music.³²¹

Scordatura, an intentional mistuning of string instruments, is generally known to have been used in previous centuries in order to make playing in certain keys technically easier.³²² It is generally understood as a trick for technical and practical purpose.

However, Keller stated that it was intentionally done by some composers in order to achieve certain qualities which they had in mind, and which certain keys could provide.³²³

In *Sinfonia Concertante* in E-flat major for violin, viola and orchestra, Mozart used *scordatura* on the viola. The solo viola part was originally written in D, and while the key of the whole work is E-flat, the viola was to be tuned half-step up and played exactly what was written on the score, sounding in the key of E flat. The author suggested that Mozart had done so because of the characteristic color of key on viola: “ For E-flat sounds very characteristic on the violin and D major sounds very characteristic on the violin.”³²⁴ By re-tuning the instrument and having viola play in its D major, Mozart could obtain the characteristic sound of viola, which he loved. Also, it is only the viola soloist who employed *scordatura*. So that while the orchestral viola players were in key of E flat, the color of the solo viola stood out. By this means, Mozart successfully achieved the contrast of key colors between violin and viola as well as soloists and the orchestra.³²⁵

³²¹ Ibid., 9.

³²² Ibid., 13.

³²³ Ibid., 13-15.

³²⁴ Ibid., 13.

³²⁵ Ibid., 13.

Approaching the topic in question from an aural sense, Keller argued from the viewpoint of musicians.

Donald N. Ferguson, *Music as Metaphor: the Elements of Expression*, 1960

In Ferguson's *Music as Metaphor*, there is a short passage where he discusses the color, images and characteristics existing in certain musical events. First, Ferguson treats musical symbols, such as sharps, flats and dynamic markings, as one of the factors which provides the images of tones and the motion of sounds.³²⁶ Such images were the means of "musical communications [which] have a much larger emotional component that is usual in verbal utterances."³²⁷

Ferguson also considers colors to have inherent factors in the esthetics of music. Colors have been approached as the fourth ingredient of musical structure, especially among impressionist composers as well as modernists such as Webern in his early works and his idea of *Klangfarbenmelodie*.³²⁸

Ferguson presented interesting analogies for certain ranges of sounds and the human voice:

The peculiar sonority of a passage played high on the G-string of the violin, for example, is suggestive of a voice speaking in an unusual range, and thus imparting a quality of tension rather than of color...Low tones, being like low voices, have immediate suggestion of masculinity. To transfer their characteristic sonority to a high register is to impart a peculiarity to the utterance which is only in part of the value of color.³²⁹

³²⁶ Donald Ferguson, *Music as Metaphor: The Elements of Expression* (Minneapolis: University of Minnesota Press, 1960), 80.

³²⁷ *Ibid.*, 80.

³²⁸ *Ibid.*, 82.

³²⁹ *Ibid.*, 83.

This voice-register analogy is somewhat similar to James O. Young's idea of the characteristic tones of voices in which an unpleasant tension created by a dissonant interval inspires bitterness and pain. Additionally, pitches in lower registers deliver the imagery of the source of the sounds, voices of men and masculinity.

After Ferguson's book, the next writing on the idea of key characteristics is not found until in 1991. Between 1853 and 1960 writings on the topic have been constant. After more than three decades of break, the discussion of the topic by James O. Young has a retrospective tone as if retreating to the ideas of the past.

James O. Young, "Key, Temperament and Musical Expression," *The Journal of Aesthetics and Art Criticism*, 1991

James O. Young is Professor of Philosophy at the University of Victoria, Canada, where his focus and interests are in the philosophy of arts and language. In this article, Young gives a thorough overview of a number of aspects and opinions on the subject, touching on various central ideas and arguments historically made by scholars and composers: characteristics found in Greek octave species versus modern keys, use of unequal temperaments versus equal temperament, various tone qualities created by open and stopped strings, transposability of key characters, and memory associations between specific keys and characteristics from classical repertoire. Young explores writings of Johann Ernst Hauser, Johann Mattheson, Johann Philipp Kirnberger, Peter Kivy, Deryck Cooke, Rameau, and Marc Antoine Charpentier.

While Young suggests unequal temperaments as one of the most important features contribute to the phenomenon of key characteristics, he also touches on the human voice and expression as another factor. Speaking of Greek octave species, Young

says that Greek music had almost been always performed by voice, and so the location of each octave species in vocal range was the answer to the affective properties in each octave species:

The Lydian modes were associated with high pitch and best sung by women. The Dorian was low and suitable for the voices of men. These differences of each gave modes the capacity to resemble aspects of human expressiveness...[therefore] the higher modes, such as the Lydian, were suited to the imitation of the expressive activities associated, in Greek society, with women.³³⁰

Furthermore, Young makes an analogy between sounds on string instruments and voice. The stopped strings produced “a slightly subdued sound compared to the firm and bright sound” on the open strings.³³¹ Such qualities have some similarity with human expressions of soberness reflected in the voice. The solemn and grave emotions are generally expressed in the voice with “subdued or wavering tones.”³³² Such tones in the voice are similar to sound produced by stopped strings without much firmness and brightness. Therefore, the author claims that the tone qualities of stopped strings resemble “the tender and somber emotions.”³³³

Unequal temperament was one of the most supported arguments as the cause for keys and their characteristics in the eighteenth century. Various combinations of sizes of semitones and degrees of dissonance and consonance in unequally tempered keys were considered to produce difference in qualities of each key. Young, once again, applies his

³³⁰ James O. Young, “Key, Temperament and Musical Expression,” *The Journal of Aesthetics and Art Criticism*, Vol.49 (Summer, 1991), 236-237.

³³¹ *Ibid.*, 237.

³³² *Ibid.*, 238.

³³³ *Ibid.*, 238.

idea of human voice and expression to the microtonal differences in various intervals in different keys created by unequal temperament:

An impurely tuned perfect fifth or third results in dissonance. Such dissonance has a piercing, whining, and shrill quality. Insofar as an interval has this quality it resembles the timbre of a human voice cracked by pain or grief. The throats of grieving persons frequently become constricted, giving their voices an unaccustomed broken quality. The voice under such circumstances resembles moderately dissonant intervals. More extreme dissonance resembles the crying and cries of someone suffering a more extreme anguish, despair or pain... There is a slight unevenness in an excited, energetic voice. A key with a soupcon of impurity in its thirds (in conjunction with a brisk tempo can be suited to the expression of joy and excitement. A key with a soupcon of impurity in its thirds (in conjunction with a brisk tempo) can be suited to the expression of joy and excitement. Pure intervals, on the other hand, resemble a firm, calm voice. Dissonant intervals are marked by beats... that give the sound of wavering character. The voices of calm, relaxed and confident speakers are, typically, like consonant intervals, unwavering.³³⁴

As unequal temperaments gradually disappeared by the middle of the nineteenth century for composers' preference for having a larger harmonic palette available on fixed instruments. His argument about the relationship between unequal temperaments, dissonant intervals and human emotions portrayed in voice maybe outdated in the present time. However, there is one exception to this:

Blues musicians... have introduced "blue notes" into their music. Blue notes are produced by the microtonal lowering of the third, seventh and... fifth degrees of a scale. The blues employs an unequal temperament that introduces dissonance in the same manner as an eighteenth century temperament. Blues musicians believe that this dissonance is suitable in music that expresses the blues. The resemblance between the dissonance and the sound of the tortured voice of someone suffering from the blues is the best explanation of this suitability.³³⁵

³³⁴ Ibid., 240.

³³⁵ Ibid., 240.

Young was aware that even though the topic of key characteristics had been discussed and explored for many centuries, the phenomenon still gave “room for skepticism.”³³⁶ One of the reasons for this skepticism toward validity of the phenomenon came from the fact that we had not found any universal principle that explained and assigned the characteristics to keys. According to Young, this problem arises from the fact that a number of key descriptions have been much too specific in describing certain expression found in keys. In order to find such a clear-cut principle that would be a strong support to the phenomenon, it was necessary to make more broad generalizations.³³⁷

My findings in the various writings on the concept of key characteristics from the late nineteenth and twentieth centuries end here with Young (1996). Yet, there are a few more scholarly works written on the topic of key characteristics which may be helpful for the study of the topic. These brief articles were written by W.R. Andersons and Summer (1934), J. Swinburne (1938), E. Markham Lee, H.V. Spanner and W.S. Russell (1940). They have given responses and confirmations as well as shared personal experiences with key characteristics.

Section 2: Scientists’ Views and Approach

In the next section, we will look at some on the ideas relating to key characteristics by renowned scientists from the late nineteenth and early twentieth centuries: Hermann von Helmholtz, Carl Stumpf, Gene Revesz, Carl Seashore, and P.E. Vernon.

³³⁶ Ibid., 235.

³³⁷ Ibid., 241.

Hermann von Helmholtz, *On the Sensations of Tones*, 1863

In the middle of the nineteenth century, science attracted scholars from various fields to take part in scientific thinking and apply scientific methodology. This, in part, meant reshaping their approach or examining their subjects from different angles.

Meanwhile, scientists also diversified their interests and integrated their studies with topics from other fields. As part of these interdisciplinary studies, music was frequently paired up with the fields of physics, psychology and acoustics.

The study of acoustics was established as a subfield of physics in the early nineteenth century and from the very beginning some aspects of it had strong connections with music. The study of consonance and dissonance, timbre and sound waves were some of the central concerns of the field of acoustics, which were then applied to the study of music. Although some of the elementary acoustical discoveries were concentrated in the seventeenth and eighteenth centuries, such as relationships between resonance and musical consonance, tone partials, and the study of overtones, it was not until the second half of the nineteenth century that acousticians began to succeed in finding connections between the musical mind, sensation and the physical phenomenon of sound,³³⁸ such as the nature of vibration and the response of the nervous system and brain.³³⁹ With the invention of a new acoustical instrument, the siren, in the 1840's, and the improved the

³³⁸ Robert Gjerdingen "The Psychology of Music," in *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (New York: Cambridge University Press, 2002), 958.

³³⁹ Burdette Green and David Butler, "From Acoustics to Tonpsychologie," in *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (New York: Cambridge University Press, 2002), 247-9.

knowledge of the anatomy of the ear brought about by the invention of the compound microscope in the 1830's, acoustical research gained great momentum.³⁴⁰

Hermann von Helmholtz, a German physician and professor at the universities of Bonn and Heidelberg, was a pioneer of the interdisciplinary study of acoustics, physiology and the psychology of musical perception in mid-nineteenth century. In many of his essays, he discussed the nature of the scientific method as well as the influence of science on art and society.³⁴¹ An amateur musician interested in music theory, Helmholtz took on the questions about the relationship between harmony and musical perception raised by Mersenne in the sixteenth century.³⁴² His goal was to explain music and physical sensation using the language of science, namely physics.³⁴³ Staying faithful to his commitment to empirical methodology, he applied the laws of physics to demonstrate the physiology of musical perception. His research resulted in a field called *Tonpsychologie*, which became popular in the last three decades of the century. Upon the publication of *Die Lehre von den Tonmpfindungen (On the Sensations of Tones)* in 1863, Helmholtz extended his research to aesthetics, music theory, and the history of musical styles.

Helmholtz's goal with this work was to explain the physical and physiological sensation of hearing and to demonstrate a better understanding of the tonal system that served as the foundation of the western music. In one of the nineteen chapters, Helmholtz discusses the system of keys and their qualities. Helmholtz acknowledged that

³⁴⁰ David Cahan, *Hermann von Helmholtz and the Foundation of Nineteenth- Century Science* (Los Angeles: University of California Press, 1993), 263.

³⁴¹ Cahan, xiv.

³⁴² Green, 246.

³⁴³ *Ibid.*, 258.

modulations certainly produced changing effects in musical works.³⁴⁴ He also went further questioning whether or not the effects came from the relative or absolute characters that keys could possess.

He begins his discussion by stating that C major and D-flat major have different effects. C major is found to have “brighter and stronger character” and D-flat its “soft and veiled harmonious effect.”³⁴⁵ In examination of qualities found in keys, many scholars have considered the sharp-flat principle as well as raising and falling motions of pitches as the cause of different effect and characteristics in keys. Helmholtz agreed with neither. The explanation that he found the most adequate for the varying qualities of keys was the difference of length of the white keys and black keys of a piano.³⁴⁶ For bowed instruments, he suspected that the disparity in the quality of tone created by stopped strings in various lengths provided and altered the character of keys.³⁴⁷ The inequality in intonation found on the fifths due to stopped and open strings was another argument the author suggested as a contributing factor.³⁴⁸

One particularly interesting argument that Helmholtz presented in this chapter involved solely the absolute pitch of the tonic of a scale, and no effects from instrumentation or any other musical elements. Returning to the key of C major: Helmholtz claimed that g''' had peculiarly shrill sounds and that this shrill quality provided brightness to the key of C major, whose tonic and dominant, c''' and g'',

³⁴⁴ Hermann L.F. Helmholtz, *On the Sensation of Tone* (New York: Longman, Green and Co., 1875), 330.

³⁴⁵ *Ibid.*, 311.

³⁴⁶ *Ibid.*, 310-311.

³⁴⁷ *Ibid.*, 311.

³⁴⁸ *Ibid.*, 311.

contained g'''' as their upper partial.³⁴⁹ In the previous chapter, the author had described the “peculiarly shrilling sounds of g'''' on the piano.”³⁵⁰ Frequencies between 2640 and 3168 vibration per hour, which produce pitches between e'''' and g'''', were found favorable by our ears, and other pitches that contained these upper partials inherited a similar flavor:

If a very small glass tube or sphere is applied to the ear, the cutting effect ceases, and these notes become as soft and weak as the rest, but another and deeper series of notes now becomes stronger and more cutting. Hence it follows that the human ear by its own resonance favours the tones between e'''' and g''''...These notes produce a feeling of pain in sensitive ears. Hence the upper partial tones which have nearly this pitch...are extremely prominent and affect the ear powerfully.³⁵¹

The existence of the overtone series has been known since the eighteenth century, and theorists such as Rameau, Riepel and many others have employed it to support their ideas on the fundamentals of harmony and scales in Western music. Helmholtz’s approach to the overtone series of certain pitches and our reaction to them is nothing new. However, what had not been known before Helmholtz was how the sounds were received by our ears. Helmholtz continued the dialogue about consonant and dissonant intervals by using cents and ratios as well as by presenting a highly mathematical study of the vibration of the basilar membrane, one of the organs that perceive vibrations in the air as a source of sound.³⁵² By not only investigating the source of sound, but also by examining the mechanics and physiology of the receiving body, Helmholtz went further in the

³⁴⁹ Ibid., 311.

³⁵⁰ Ibid., 311.

³⁵¹ Ibid., 116.

³⁵² Ibid., 312-330 and 128-151.

exploration of the nature of sound and provided various arguments for sensations we receive from music.

There have been a few other influential works on *Tonpsychologie* by Carl Stumpf in the late 1800's as well. While *Tonpsychologie* in Helmholtz's circle focused on the physiological and physical phenomenon of sounds, the *Tonpsychologie* of Carl Stumpf focused on the mental aspects of perception, human reactions to music, and psychology.³⁵³ Giving much weight to the empirical method in his experiments with sounds and music, Stumpf is known for his advances through research on consonance, dissonance and tonal fusion theory (a study of the human perception to hear two simultaneous pitches as one infused pitch). He argued that not only physics and mathematics were accountable for the sensation of sound, but that they were also significantly influenced by physiology and psychology.³⁵⁴

The study of psychology had begun in the sixteenth century with Descartes, who explored the dualism of humankind: soul and body as two separate components of human beings.³⁵⁵ With John Locke in the 1690's, the British school of psychology, with a strong focus on empiricism, became the root of modern psychology.³⁵⁶ Psychology grew into a science at the end of the nineteenth century as Wilhelm Wundt founded his first modern psychological research laboratory in Leipzig in 1879.³⁵⁷ Strongly influenced by the tradition of British experimental psychology and the progress of experimental methods of

³⁵³ Green, 246, 260, 263, 264 and 266.

³⁵⁴ Green, 266.

³⁵⁵ Edwin G. Boring and Hebert Sidney Langfeld ed., *Foundation of Psychology* (New York; John Wiley and Sons, 1948), 7.

³⁵⁶ Gjerdingen, 957.

³⁵⁷ Boring, 7.

other scientific fields, the field of modern psychology in the nineteenth century continued to concentrate its efforts on experiments and observation.³⁵⁸

In the sixteenth century, Sir Francis Bacon (1561-1626) interpreted music as means of conveying ideas and feelings.³⁵⁹ Using his work as a basis, Carl Stumpf and his circle of acousticians advanced their research on musical experience within the psychological frame of reference of the 1840's.³⁶⁰ Several music scholars and psychologists such as Edward Hanslick, Carl Seashore and Gene Revesz, approached the examination of the nature of sounds from the field of aesthetics.

Gene Revesz, *Introduction to the Psychology of Music*, 1953

A twentieth-century Hungarian psychologist, Gene Revesz (1878-1955) was a student of Stumpf in Berlin. His research covered diverse topics such as the senses of touch, sight and hearing, and he was an influential exponent of experimental psychology.³⁶¹ Revesz's *Introduction to the Psychology of Music* is in three parts. The first section focuses on acoustics and physiological reactions to sounds. The third section is on the musicality, talent, musical capacities of musicians and the esthetics, and psychology of music. It is in the second section that his discussion of key characteristics appears. Revesz integrated analysis of consonance and dissonance, tonal fusion theory, complex tone structures, the sensation of pitch, and tone-color associations to discuss key

³⁵⁸ David Cahan, *From Natural Philosophy to the Science: Writing the History of Nineteenth-Century Science* (Chicago: University of Chicago, 2003), 67.

³⁵⁹ Gjerdingen, 957.

³⁶⁰ Green, 246-263.

³⁶¹ Helga de la Motte- Haber, "Gene Revesz,"

http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/23284?q=revesz&search=quick&pos=1&_start=1#firsthit, accessed 2, Feb., 2010.

characteristics. While the first section is purely on the physiology of ears and how we perceive sounds, the second section focuses on how we understand, judge and digest musical elements.

Revesz opens his discussion of key characteristics in relation to the Greek doctrine of ethos. It was commonly accepted that the reason the Greeks found vivid contrast among their octave species was because of the different structures in each octave species. However, Revesz points out that modal qualities of each Greek octave species were incorrectly matched up and organized when they were adopted by the church modes. He further remarks that while the names and the actual scales no longer matched, the qualities attributed remained with the names of modes, so that the qualities of modes were paired with wrong modes. From this Revesz drew the conclusion that it was the tradition that determined the qualities of the modes, not the sounds of modes themselves.³⁶²

Revesz revisits various arguments presented by scholars from previous centuries as the possible causes of the phenomenon of key characteristics. The subjects Revesz presents included the effects of transposing, composers' preferences for certain keys, the influence of great works from the past on the individual interpretation of key characteristics, the sharp-flat principle, phonetic associations with words "sharp" and "flat," the various timbres of instruments, and the issues of hammer mechanisms and the difference in lengths of levers of piano keys.³⁶³ The author disproves the validity of some

³⁶² Gene Revesz, *Introduction to the Psychology of Music* (Norman: University of Oklahoma Press, 1954), 113.

³⁶³ *Ibid.*, 119-121.

of these arguments and leaves some others as possible factors that contributed to key characteristics.

Finally, Revesz provides two new theses of his own to answer the initial questions he had about key characteristics, that is: what, why and how. Many musicians, according to the author, claimed that when a piece was transposed by a large interval it was easier to recognize its transposition. Revesz argued that this recognition of transposition was due to “the regional pitch ear, which permits an approximate mnemonic fixation of the locus of the note in the pitch scale.”³⁶⁴ In other words, by knowing approximately where one note lies in the spectrum of a certain octave (“the general pitch level”³⁶⁵), one is able to realize whether the composition is in the original key or whether it has been transposed. Recognition of transposition, therefore, does not come from realizing the particular qualities that certain keys have.

Revesz came to his own conclusion that the concept of key characteristics was a manifestation of musical memory and that “the theory of key characteristics has very little foundation in fact.”³⁶⁶ Revesz finalizes his argument on the topic: Characteristics in musical keys were retrieved from our memory acquired from previous musical experience.

Phillip Ewart Vernon, “The Individuality of Keys,” *The Musical Times*, 1942

P.E. Vernon (1905-1987) was a professor of psychology at Glasgow University from 1938 to 1943, specializing in the psychology of musical appreciation as well as

³⁶⁴ Ibid., 121.

³⁶⁵ Ibid., 121.

³⁶⁶ Ibid., 121.

educational psychology.³⁶⁷ In April and May of 1942, two of his articles on the characteristics of keys were published and he discusses the recognition of affective properties of keys in two different realms, one associated with emotions (thus, called “emotionists”) and the other with colors and synaesthesia (called “colorists”). Although he admitted that more disagreements than agreements were found between the various interpretations of the topic of key characteristics,³⁶⁸ he was able to identify a few broad generalizations about key qualities: keys with fewer sharps and flats were interpreted by both realms as simple, and according to the “colorists,” keys such as C, G and F major were interpreted to be associated with primary colors. Keys with a greater number of sharps and flats were considered more complex and interpreted by the “emotionists” as being more harmonious, mysterious and luscious than the simpler ones.³⁶⁹

The interpretation of qualities of “simpler keys” and more “complex keys,” according to Vernon, was due to the frequent use of certain keys in particular periods: many works from the sixteenth, seventeenth, and eighteenth centuries (Baroque period, specifically) were written in keys with fewer sharps and flats, tended to be suggestive of greater strength and purity and expressed a single emotion.³⁷⁰ In turn, the Romantic composers used more accidentals and more complex keys and expressed intricate and multifaceted emotions.³⁷¹ Keys with more sharps and flats became associated with emotional complexity, thanks to the general impressions of works from different periods.

³⁶⁷ Jonathan Plucker, “Phillip E. Vernon,” www.indiana.edu/~intell/vernon.shtml, accessed Feb. 28, 2010.

³⁶⁸ P.E Vernon, “The Individuality of Keys,” *The Musical Times*, Vol. 83 (Apr., 1942), 105.

³⁶⁹ *Ibid.*, 105.

³⁷⁰ *Ibid.*, 106.

³⁷¹ *Ibid.*, 106.

Therefore, interpretation of keys with fewer sharps and flats as simple and keys with more sharps and flats as complex came from impressions listeners gained from specific works.

Ideas from several writers whom we saw earlier are mentioned in Vernon's article. Ideas found in arguments by Tovey, Farjeon, Helmholtz, and the majority of Vernon's explanations of the phenomenon run parallel. For wind and brass instruments, various timbres and sonorities found among different pitches were suggested to be the foundation for distinguishing pieces in sharp and flat keys. For piano music, he presented the mechanical difference between black keys and white keys as the contributor to the different qualities found in tonalities.³⁷²

Last, Vernon stated that while for centuries there had been inconsistency and skepticism about the concept of key characteristics due to the lack of physical evidence, the subject remained important in the twentieth century for musical esthetics.³⁷³ When music was transposed, strong emotional reactions from the audience are nearly always perceptible. The great works appear always to have been written in certain keys that were particularly appropriate to the composer's emotional expression.³⁷⁴ Therefore, whether or not the phenomenon is explainable or is given satisfactory proof, the experience of affective qualities in keys that audience received has always been observed.

Twentieth century scientists--especially from the fields of psychology, computer sciences and physics --continue to consider the subject of key characteristics and related topics. Douglas Keisler, Harry Conviser, Henry Kaufman, Jan Mycielsko and Carol

³⁷² P.E. Vernon, "The Individuality of Keys," *The Musical Times*, Vol.83 (May, 1942), 139.

³⁷³ P.E. Vernon (Apr., 1942), 106.

³⁷⁴ *Ibid.*, 106.

Krumhansl continue their exploration of musical keys. However, the focus of studies in the twentieth century was more often dedicated to “related topics,” such as tuning systems, invention of instruments able to integrate sound and visual images, and psychological processing of sound instead of discussion of affective properties of keys.

Section 3: Composers’ Views

In this section, we will explore the thoughts on the topic given by composers: Vincent d’Indy, Alexander Scriabin, Nicolai Rimsky-Korsakov, Arthur Bliss, Arnold Schoenberg and Olivier Messiaen.

As the late nineteenth and early twentieth centuries were a period of special diversity in compositional styles, techniques, and ideas of aesthetics, composers found an array of approaches to the idea of key characterization in this period. While d’Indy’s approach the concept of key characteristics remained similar to the way composers and music scholars explored it in previous centuries, other composers surveyed the idea, choosing tactics which characterized the period of modernity appropriately. In *Prometheus*, Scriabin employed a colored keyboard along with a large orchestra; and in *Die glücklichen Hand* Schoenberg utilized the symbolism of colors and brightness of lights on the stage to express the unspoken emotional states of characters. English composer Arthur Bliss, with help from Percy Scholes, also interpreted individual qualities of colors from symbolisms and commonly felt emotions, and applied them to each movement of one of his symphonies. Messiaen utilized harmonies and complex chords derived from his Modes of Limited Transposition in his compositions of bird songs and several orchestral pieces in order to integrate color aspect in his music, rather than for their harmonic functionality.

Vincent d'Indy

Vincent d'Indy was an extraordinary force on the nineteenth-century French music scene. Until his death at the age of eighty, d'Indy remained active as a composer, teacher, organizer of concerts and the administrator of the *Schola Cantorum*. His lectures on the historical development of music and *the Cours de Composition Musicale*, his book on the historical development of music, show his wide-ranging knowledge of the long tradition of Western music.

D'Indy's foundation in musical education came from Louis Diemer and Antoine François Marmontel, in piano, and Albert Lavignac in harmony. In 1869 he sought lessons from the composer César Franck.³⁷⁵ Franck, who shared d'Indy's traditional views on key characteristics, remained his friend and teacher throughout his life.

The French music scene in the late nineteenth century had two equally French, but very different poles, d'Indy and Debussy. While Debussy's music was aimed toward listeners' pleasure, d'Indy's was directed towards duty.³⁷⁶ D'Indy's admiration for and knowledge of traditions were at the core of his compositions and writings on music. He disapproved of any composer or critic who did not make an effort to respect traditions, and he approached anything resulting from revolution as an error and evil.³⁷⁷

Many of his dramatic works employed Gregorian chants and were strengthened by medieval religious symbolism, which the composer derived from reading Dante and John Ruskin. Placing art on the same level with religious faith, d'Indy stated that the

³⁷⁵ Paul Landormy, "Vincent d'Indy," *The Musical Quarterly*, Vol. 18 (Oct., 1932), 508.

³⁷⁶ *Ibid.*, 516.

³⁷⁷ M.D. Calvocoressi, "The Dramatic Works of Vincent d'Indy," *The Musical Times*, Vol. 62 (May 1, 1921), 322.

principal of all art was religion, and demanded the virtues of faith, hope and charity from musicians.³⁷⁸ D'Indy wrote four dramatic works in which religious faith played a principle role: *Le Chant de la Cloche* (1885), *Fervaal* (1895), *L'étranger* (1902) and *Le Légende de Saint Christophe* (1915). Of these four, *Fervaal* is a work in which I have found multiple remarks by d'Indy on use of key characteristics as a part of musical expression.

Fervaal is a drama of conflict between love and duty, with a hint of religious ideology.³⁷⁹ It is often compared with Wagner's *Parsifal* for the similarity in the setting of the drama, the undercurrent theme of Christianity, and the construction of the work. Not only did both composers write their own libretti, but also principal characters, mysticism and religious symbolism are features often found in the two works.³⁸⁰

Along with the progressive use of mysticism in his dramatic work, d'Indy employed keys to express unspoken feelings in the drama. Combined with a number of reappearances of a plainchant *Pange Lingua* in a choral piece, the key of D major represents the triumphant return of Christian charity in *Fervaal* at the end of his inner conflicts. The composer not only used keys and modulations for their harmonic functionality, but also for symbolism found in the drama.

His writings on the subject further clarify the composer's acknowledgement of the tradition and phenomenon of characterization of keys and its history. In part II of his *Cours de Composition Musicale*, a series of publications on the theoretical and historical

³⁷⁸Camile Saint- Saëns and Fred Rothwell, "The Ideas of M. Vincent D'Indy," *The Musical Times* (March, 1920), 176-177.

³⁷⁹ Ibid., 321.

³⁸⁰ M.D. Calvocoressi, "The Dramatic Works of Vincent d'Indy. 'Fervaal,'" *The Musical Times*, Vol. 62 (Jun, 1921), 401.

study of Western music, d'Indy's awareness of the topic is documented. He believed that with a carefully planned series of modulations, light and shade were delivered to music like a color spectrum. The brightness emerged from the modulation towards the sharp-side keys and the darkness from the flat-side keys.³⁸¹ In other words, d'Indy followed the ever-popular principle of the nineteenth century, the sharp-flat principle.

His first teacher in harmony was Lavignac, who included an extensive article on the subject of characterization of keys in his music dictionary, *Music and Musicians* (1904). D'Indy's friend and teacher, César Franck, is also mentioned in various writings to have taken a serious interest in the utilization of keys characteristics in his compositions. It is unmistakable that d'Indy inherited the idea of key characteristics from his teachers.

There have been many cases in which the concept and application of key characterization was passed down from a teacher to his pupil, for instance, from Salieri to a number of his students such as Beethoven, Schubert and Liszt.³⁸² Certainly d'Indy's teachers, Lavignac and Franck, would have been the over-arching influences on his musical language, but also the composer's admiration for tradition and strong interests in the history of music and early sources of music from the Greek and Renaissance periods would unmistakably be the central force of the establishment of the characterization of keys in his musical language.

Composers and Synaesthesia in the Twentieth Century

³⁸¹ Andrew Thomson, *Vincent d'Indy and His World* (Oxford: Clarendon Press, 1996), 88.

³⁸² Steblin, 163.

The relationship between music and color has been considered and documented since the time of Aristotle. Numerous words (such as “bright” and “warm”) used to metaphorically describe aspects of characteristic sounds and musical terms (such as “chromaticism”) are also used to describe colors. However, it is in the twentieth century that more serious effort was made among composers, musicians and scholars to directly connect music and colors in the process of music making. Starting with Alexander Scriabin’s *Prometheus*, Arnold Schoenberg, Arthur Bliss, and Olivier Messiaen continued explorations in developing ways to integrate colors into their compositions. Each one of them did so differently, as a means to enrich their expressivity and effect on an audience. Coincidentally, it is in the first half of the twentieth century that attempts to combine art and science became popular.

Synaesthesia is an involuntary cross-sensory experience in which stimulation on one sensory pathway results in experience in a second sensory pathway. Although synaesthesia has been documented for three centuries, it was not until 1812 that the first full description was published.³⁸³ While it was known only in the European medical community for the most of the nineteenth century, Western culture became more widely acquainted with synaesthesia because of a French Symbolist poet, Arthur Rimbaud’s sonnet in 1883 in which delivered the phenomenon of synaesthesia with an atmosphere of magic and mystery.³⁸⁴

While some scientists considered synaesthesia as a psychological defect, Post-Romantic thinkers and artists approached it as a privilege, a higher form of human sense.

³⁸³ Kevin T. Dann, *Bright Colors Falsely Seen: Synaesthesia and the Search for Transcendental Knowledge* (Yale University Press: New Haven, 1998), 17.

³⁸⁴ *Ibid.*, 18.

They became excessively enthusiastic about synaesthesia which, they believed, conveyed transcendent meaning, and it became enormously popular to incorporate synaesthetic aspects in the arts at the end of the nineteenth century and through the first few decades of the twentieth. Music was not an exception. According to Kevin Dann, “the synaesthete’s color visions represented music as it would be perceived on the astral plane, where the spiritual, rather than strictly sensual, value of music were apparent.”³⁸⁵

A number of curious inventions came about in the late nineteenth and twentieth century thanks to much energy which was spent toward integration of elements from diverse fields, such as optics and acoustics: the optophone (invented by Fournier d’Albe), which picks up the outline and colors of object optically and sends them as light vibration, the kinetophone (Thomas Edison), described as “a talking machine that works in conjunction with moving picture,”³⁸⁶ the telephone (1861 Phillip Reis, 1876 Alexander Graham Bell) and the photophone (1880, Graham Bell), a device which delivers a sound from one place to another, but requires the sound to convert from sound-vibration to light-vibration.³⁸⁷ However useful or not in the end, the development of these inventions is the evidence that scientists were interested in exploiting the relationships among various senses and perceptions. With so much interest in these studies, it is not surprising that at that time scientists and artists alike sought for ways to translate what they perceived by sight into what they would perceive by hearing, such as music.

An invention of instruments which integrated colors and pitches began with a French Jesuit, Louis Bernard Castle, in the 1740’s and multiple attempts of a similar kind

³⁸⁵ *Ibid.*, 74.

³⁸⁶ *Ibid.*, 220.

³⁸⁷ *Ibid.*, 217-218.

were made for the next two centuries. Castel's Ocular Harpsichord made color signals using a set of candles and stained glass that lit up when different keys were struck. It did not become a popular instrument in households; however, several contemporary musicians shared his view on the direct relationship between color and music.

Castel's innovative idea was answered by a number of composers. Telemann composed a few pieces specifically for Castel's instrument, and Rameau and Grétry among others commented on the shared effect from colors and sounds. Grétry states that "a sensitive musician will find all colours in the harmony of sound."³⁸⁸

Despite two centuries of invention of such musical instruments, it was not until the twentieth century that integration of music and colors came into an international stage. A. Wallace Rimington's *Tastiera per Luce* (Keyboard for Light, 1895), which emitted colored lights to a screen behind the instrument as each key on a keyboard was pressed, was employed in Scriabin's *Prometheus*.

The general interest in combined forms of art and science was also great in the early twentieth century, and in line with the modernist movements, musicians looked for ways to make something new. Many writings on this matter can be found from the period in the late nineteenth century when the subject was developed further: *Colour Music* by D. D. Jameson (1844), *Sound and Color* by John Denis Macdonald (1869), *Harmonics of Tones and Colours* by F. J. Hughes (1883), *Scales in Music and Colours* by G. B. Allen (1911) and finally *the Art of Mobile Colour* by A. Wallace Rimington.

The notion of affective properties of keys and the phenomenon of synaesthesia have general aspects which distinguish one from the other: 1) various colors are assigned

³⁸⁸A. Anglefield Hull, *A Great Russian Tone- Poet, Scriabin* (London: K. Paul, Trench, Trubner & co., 1916), 220.

to pitches in synaesthesia while affective properties in keys exist in a specific pitch collection of a scale, rather than individual pitches in a scale, 2) the cause for synaesthesia has been explained to the point of satisfaction in science while the principle of key characteristic has not, and 3) while in synaesthesia, colors and sounds have a direct correspondence, color-sound association found in the affective properties of keys is indirect as it has a third element, the emotional response, that connect the other two.

Despite these fundamental differences, in the trend of combining expressive forces and composers' search for new ways to produce musical works, the border line between the concept of affective properties in keys and the phenomenon of synaesthesia blurred in the twentieth century. Composers' choice of key was influenced by its affective properties, and it was employed as one of the musical elements to enrich expressivity in their works. Among twentieth century composers, synaesthetic phenomena began also to be used for similar purpose. The idea that colors are directly connected to pitches broadened the compositional methods for some composers of the twentieth century and the direct relations of color and sounds was employed in their works as a part of their expressive components.

A number of twentieth century composers found the synthetic merging of emotion, music, action, light and color as a powerful method to express and investigate their modernistic views further. Especially composers such as Messiaen and Scriabin, whose devotion to religious and theosophical concepts led them to incorporate components from mythology and spiritual teachings, took full advantage of the synthetic media to maximize effects on the audience.

Arthur Bliss

An English composer, Arthur Bliss created a symphonic work in which he utilized the symbolism of color as a central component of expression and inspiration. A *Colour Symphony* (1921-1922) was written for the Gloucester Festival of 1922, and was commissioned by Edward Elgar. It is one of the twentieth century compositions that were inspired by integration of colors and music. Bliss uses the symbolism of colors in order to enrich the expressivity of his work.

Each movement of *A Colour Symphony* is named after colors: the first is Purple, the second is Red, the third Blue, and the finale is Green. Bliss said that one day he picked up a book in which he found the symbolic meanings of the primary colors. The colors are solely rooted in symbolisms, personal interpretations of colors, and their associated emotions.³⁸⁹

A Colour Symphony, the first major orchestral work to bring success and international fame to the composer, was originally named "Symphony in B." However, Bliss changed the title after discussing it with Percy Scholes, one of the twentieth century music lexicographers who expressed serious interests in the historical study of music and color in his *Dictionary of Music*.³⁹⁰ Bliss was convinced by Scholes to rename his symphony since the symbolic meanings and specific emotions that the composer personally associated with colors were the original inspiration for the work, so that it was timid not to name his work after them.³⁹¹ It is also understandable that in the midst of the

³⁸⁹ Arthur Bliss, *As I Remember* (London: Thames Publishing, 1989), 71.

³⁹⁰ *Ibid.*, 71.

³⁹¹ Bliss, 73.

popular vogue for uniting elements in art, music and science, integrating color association in musical works must have helped the composer to gain the attentions of the public.

According to Bliss, the first movement reflected “ the color of amethysts, pageantry, royalty and death.”³⁹² Three themes which lead to the climax in this movement are presented once again in the reverse order after the climax. This palindromic form suggests “a slow processional march approaching then receding from sight.”³⁹³ Combined with trumpet fanfares, the composer’s intention was to express the color of purple as the color of royalty which is presented by a slow processional march.

The second movement, *Red*, is a furious and exciting scherzo movement which reflects his impressions of the color, “revelry, furnaces, courage and magic.”³⁹⁴ The third movement, *Blue*, brings a meditative release with a repeated rhythm under an arabesque of woodwinds. This *ostinato* rhythm was linked by Bliss to “the lapping of water against a moored boat or stone pier.”³⁹⁵ The finale, *Green*, has a double fugue. As the color of green symbolizes “hope, youth, joy, spring and victory,”³⁹⁶ the movement is filled with energy. An enormous climax is delivered after the two fugal themes are combined with powerful pounding of timpani.

In *A Colour Symphonie*, Bliss did not take advantage of the affective properties of keys. In other words, his description of each movement of the symphony did not become the reason for his selection of keys. However, it is fair to state that he used the concept

³⁹² David Lloyd Jones, “Arthur Bliss” in accompanying booklet, Arthur Bliss “A Color Symphonie,” English Northern Philharmonia, conducted by David Lloyd Jones, Naxos, 1996, 3.

³⁹³ Ibid., 3.

³⁹⁴ Ibid., 3.

³⁹⁵ Ibid., 3.

³⁹⁶ Ibid., 3.

and application of affective properties of keys: as keys were traditionally used as a mean for enrichment of expressivity in a composition, Bliss took advantage of emotional associations his audience had for colors, and used them and the audience's response as a means to enhance his music, along with other musical elements.

Arnold Schoenberg

The idea of *Gesamtkunstwerk*, best known from Wagner's Ring Cycle, was shared by many composers of the twentieth century, including Schoenberg. As documented in Schoenberg's autobiographical writings, Wagner's works strongly influenced his compositional development: the use of Leitmotif, quick changes of mood in music, as well as theatrical representation.³⁹⁷

Another component from which Schoenberg drew the idea for realizing his own *Gesamtkunstwerk* was paintings of Kandinsky and Oskar Kokoschka.³⁹⁸ From their first meeting in the summer of 1911, Kandinsky and Schoenberg recognized the similar goals they both strived for and the equal creative and intellectual rank upon which they placed one another.³⁹⁹ Until the outbreak of World War I, the two artists carried on regular correspondence, and some of Schoenberg's scores and writings showed up in the *Blaue*

³⁹⁷ Edward D. Latham, "Physical Motif and Aural Salience: Sounds and Symbols in Die glückliche Hand, op. 18," in *Schoenberg and Words: The Modernist Years*, ed. Charlotte M. Cross and Russell A. Berman (New York: Garland Publishing Inc., 2000), 179-183.

³⁹⁸ *Ibid.*, 181.

³⁹⁹ Jelena Hahl-Koch, "Kandinsky and Schoenberg," in *Schoenberg-Kandinsky*, ed. John C. Crawford (Boston: Faber and Faber, 1984), 138.

Reiter Almanac, a journal edited by Franz Marc and Kandinsky, two modernists in the twentieth-century visual arts.⁴⁰⁰

Having formed a close friendship and equally striving towards the realization of modernist goals, Schoenberg and Kandinsky shared various goals. Kandinsky exemplified sensitivity towards the timbres of musical instruments, which affected much of his style of painting.⁴⁰¹ For Schoenberg, it was Kandinsky's stage work, *Der Gelbe Klang*, that inspired him to use the combined force of colors, lights, timbres from various instruments, actions and music on the stage to achieve his own *Gesamtkunstwerk*.⁴⁰²

Schoenberg demanded the realization of *Gesamtkunstwerk* in his op 18, *Die glückliche Hand* (1910-1913), written during a period which he faced an aesthetic and personal crisis. In order to realize the Wagnerian idea of the *Gesamtkunstwerk*, Schoenberg wished to control every component of the work, from writing the libretto, designing costumes, sets, lights, composing, choosing the casts, and even assigning the movements and facial expressions of the actors.⁴⁰³ He believed that any little alteration would have disturbed his realization of *Gesamtkunstwerk*.

Die glückliche Hand was written for a large orchestra and a small chamber chorus of six female and six male voices. There are three main characters, the Man (an unsuccessful artist), the Lady, and the Gentleman. In the score detailed instructions were given by the composer for almost each bar of the composition for the stage direction, including the lightening instructions.

⁴⁰⁰ Ibid., 137-138.

⁴⁰¹ Ibid., 135.

⁴⁰² Ibid., 188 and 193.

⁴⁰³ Ibid., 183.

The large orchestra and soloistic scoring by Schoenberg enabled the work to provide a delicate assortment of timbres. Furthermore, the colored lights contributed another significant component to the listeners' emotional experience.⁴⁰⁴ In a lecture that Schoenberg gave in Breslau in 1928, the composer stated that "gestures, colors and light are treated here similarly to the way tones are usually treated... Figures and shapes, so to speak, are formed from individual light values and shades of color, which resemble the forms, figures and motives of music."⁴⁰⁵

Lights and colors were used as elements along with timbres and music and acting gestures to express the emotional aspects of the plot.⁴⁰⁶ As "tones can be easily combined with each other when they have a basic relationship to each other... different shades of colors can only be combined by means of their basic relationship to each other."⁴⁰⁷ Schoenberg found ways to combine colors to build tension, and create dissonant relationships between colors in the way conventional musical harmony worked.

Lights and colors represented two separate ideas of Schoenberg in *Die glückliche Hand*. Colors are associated with the personalities of the three characters and relationships between them. The Woman wore a violet dress and red and yellow roses in her hair. Purple represents wealth, royalty and power since historically the color purple required expensive dye and was affordable only by people with power and wealth.⁴⁰⁸ The color of the Woman's dress symbolizes the power which she has over the main character,

⁴⁰⁴ Allen Shawn, *Arnold Schoenberg's Journey* (New York: Farrar, Straus and Giroux, 2002), 162 & 167.

⁴⁰⁵ Latham, 182.

⁴⁰⁶ Hahl-Koch, 107.

⁴⁰⁷ *Ibid.*, 106.

⁴⁰⁸ Victoria Finlay, *Color: A Natural History of the Palette* (New York: Random House, 2002), 363.

the Man.⁴⁰⁹ Yellow and red, colors of the roses, also represent a particular meaning.

While red is commonly associated with blood, fire, anger and desire, yellow is associated with purity and gold. Yellow is also the color of the diadem which the Man creates later in the story and which symbolizes his success in his artistic creation and life.⁴¹⁰

The dark gray of the overcoat the Gentleman wears symbolizes stone and iron, the colors of modernity as opposed to yellow mixed with brown of Man's jacket and black pants, which symbolize the color of earth, humility, despair and ignorance.⁴¹¹ The fourth "character" of the work, the *Fabeltier* (some sort of mythical creature), always glows in a green light, a color associated with the feeling of envy.⁴¹² The colors that Schoenberg employed for each character are loaded with symbolism and provide another dimension of expression to the whole work.

The gradual brightening of light is found throughout the work. The opera opens with minimum light, barely illuminating the stage where the Man and the magical creature sit. As the opera progresses, the lighting is become gradually brighter, thus corresponding with the Man's emotions, the realization of truth and the betrayed dreams.

Die glückliche Hand is an atonal work where key relationship affective properties of keys are irrelevant. However, use of colors in Schoenberg's *Gesamtukswerk* and the application of key characteristics by composers from the previous centuries all strove for a common goal—enhancing of expressivity and affect for an audience. Schoenberg's interpretation of colors comes from symbolism as well as emotional association and responses that the composer could count on from the general audience.

⁴⁰⁹ Latham, 188.

⁴¹⁰ *Ibid.*, 188.

⁴¹¹ *Ibid.*, 189.

⁴¹² *Ibid.*, 189.

In order fully to realize his *Gesamtkunstwerk*, Schoenberg combined color, light, and music into one force of expression: to portray a storm scene where not only the weather is stormy, but also to express the unsettling emotional conditions which the Man goes through a series of colors: dull red, brown, dirty green, dark blue-gray, violet and intense dark red. The chords used in the scene are also characterized as dismal, dark and deeply dissonant and complex sounds.⁴¹³ As the Man increasingly comes into a realization of the truth, the brighter colors, such as orange, bright yellow, and glaring orange-yellow appear on the stage. Then, when the storm breaks, yellow lights from the previous scene turns into a pale blue and the volume and complexity in sounds from the orchestra dramatically decrease.⁴¹⁴ Intensity of light, colors and complexity of sound correspond to each other and the progression of Man's emotion. As a director of all components of the music drama, Schoenberg united all possible forces he could find to enrich the expressivity occupying the stage and all the senses of the audience.

Alexander Scriabin

A Russian modernist, Alexander Scriabin (1872-1915) was surrounded by some of the prominent figures in realizing the integration of colors and music in the early twentieth century: Rimsky-Korsakov (1844-1908) and Leonid Sabaneef (1881-1968). Sabaneef, one of two well-known biographers of Scriabin, had been in Scriabin's circle throughout his life and was especially crucial to Scriabin's formation of music and ideas towards the end of the composer's life.⁴¹⁵ Serving as president of the Science Council of

⁴¹³ Hahl- Koch, 107.

⁴¹⁴ Shawm, 163.

⁴¹⁵ Faubion Bowers, *Scriabin: A Biography of the Russian Composer, 1871-1915* Vol. I (Palo Alto: Kodansha International, 1969), 11.

the State Institute of Musical Science as well as president of the music section of the Russian Academy of the Arts and Sciences in the 1920's, Sabaneef was an important and influential figure in the Russian music scene. However, the change of political climate in Russia forced him to leave for abroad in 1926.⁴¹⁶ Having studied mathematics and physics at Moscow University and music at the Moscow Conservatory, Sabaneef was a respected thinker at the time in Russia. Among many writings on music theory, harmony, and rhythm, his articles on the relationship between color and sound appeared in a variety of publications.⁴¹⁷

In *Music and Letters* of July 1929, Sabaneef published an article that included results from his own survey and examinations on those who claimed to experience certain correspondence between color and sound. His thirty-two subjects included Scriabin, Rimsky-Korsakov and Sabaneef himself and a few other Russian musicians of the time.⁴¹⁸ Sabaneef had given special attention to Scriabin in this article as they were life-long friends and also shared views on the mystical nature of art.⁴¹⁹ Sabaneef analyzed Scriabin's "tone vision (color- sound correspondence)" and stated that it reflected his mystical theories, a central idea for Scriabin's creative force.⁴²⁰

Rimsky-Korsakov and Scriabin shared their experiences of colors through hearing music, which have been documented and mentioned in many articles. In his *Dictionary of Music*, Scholes provided charts for the interpretation of colors and keys by Rimsky-

⁴¹⁶ Larry Sitsky, *Music of the Repressed Russian Avant-Garde, 1900-1929* (Westport, CT: Greenwood Press, 1994), 292.

⁴¹⁷ *Ibid.*, 291.

⁴¹⁸ Leonid Sabaneef and S.W. Pring, "The Relation Between Sound and Color," trans. S. W. Pring, *Music and Letter* Vol. 10 (Jul., 1929), 266.

⁴¹⁹ Leonid Sabaneef, "Scriabin and the Idea of a Religious Art," *The Musical Times*, Vol. 72 (Sept., 1931), 791.
⁴²⁰ Sabaneef (1929), 273.

Korsakov and Scriabin. The two composers' interpretations do not coincide with each other, however; their correspondence on the subject and their discussions are frequently cited in writings on topics relating to synaesthesia. In his biography of Scriabin, Faubion Bowers presents composers' criticisms of Wagner's *Magic Fire Music*, particularly for his use of multiple keys in repeated passages without any consideration of the affective properties of the respective keys, and for his ignorance of the definite relationships between keys and colors.⁴²¹

Prometheus is most often acknowledged by musicologists as the composition with which Scriabin broke the bonds of tonality. The composition is also known for the composer's success in providing a temporary solution to a problem that many composers in the twentieth century faced; composing an extended non-tonal composition.⁴²² We focus on *Prometheus* here for Scriabin's use of a color keyboard and color lights, specifically identified in the score by the composer. *Prometheus* is a work in which the composer finally incorporated his lifelong personal synaesthetic experience of music and colors, and it is one of the first of attempts on the fusion of light and musical effects found among many works of twentieth-century modernists.

Prometheus requires an unusual ensemble of piano, organ, mixed chorus, and color keyboard, in addition to a large orchestra. It is said that the color keyboard, which the composer called for this composition, had not even been invented at the time the work was being composed.⁴²³ At the New York presentation in 1927, after its premieres in cities in Russia, Germany, and England, where no color keyboard was available,

⁴²¹ Bowers, 205.

⁴²² James M. Baker, *The Music of Alexander Scriabin* (New Haven: Yale University Press, 1986), 266.

⁴²³ *Ibid.*, 235.

Prometheus was finally performed with a color keyboard invented by Alexander Mozer.⁴²⁴

Mozer had his own colors set to certain notes on the invented keyboard. However, when Scriabin employed the instrument, he used his own interpretation of colors on each note, based on the sharp-flat principle⁴²⁵ (his interpretation of keys can be found in the article by Percy Scholes in Chapter Two). At the New York premiere, the lights in the auditorium were turned off and colored lights were presented on a screen above the orchestra. According to the *Musical Courier*, “A white sheet at the back of the platform and above the heads of the players was illuminated by streaks and spots of light of various colours” at the actual performance.⁴²⁶

The top line of the orchestral score of *Prometheus* is notated for “*Luce*,” the color organ. *Luce* is employed for the entire work, mostly in long note values, slowly moving from one pitch to another. Although far from contrapuntal, there are two prominent lines for *Luce*, the upper line corresponding to the root of the changing harmonies.⁴²⁷ Colors of both upper and lower lines are emitted from the *Luce* without any pitch.

As the technologies and mechanics improved throughout the twentieth century, the colored lights were projected differently in the performances in the late twentieth century. At the first performance with Serge Koussevitzky (1911), only little electric light bulbs shone in front of the stage.⁴²⁸ As the composer saw the fountain of colors in his mind corresponding to his music and imagined the room filled with colored light,

⁴²⁴ Faubion Bowers, preface to Alexander Scriabin, *Poem of Ecstasy and Prometheus: Poem of Fire* (New York: Dover Publications, 1995), 114.

⁴²⁵ Hull, 226.

⁴²⁶ *Ibid.*, 227.

⁴²⁷ Bowers (1995), 114.

⁴²⁸ Bowers (1969), 204.

Scriabin found such realization of his vision “frightfully vulgar.”⁴²⁹ It was not until the 1967 performance by the Rochester Philharmonic Orchestra under Laszlo Somogyi that a full realization of Scriabin’s vision was achieved. Alex Ushakoff, a film producer and designer of space simulation systems for astronauts, invented a device that emitted colored lights corresponding to the frequency and intensity of the music throughout the performance space.⁴³⁰

Several themes are presented in *Prometheus*, and it appears that the changing of colors corresponds to the changing of these themes and their harmony. The work opens in a chaotic manner (as the world is still in its formless stage) in long, sustained green and blue lights. As the piano, which signifies Men, enters with a rigid march-like passage, the green light disappears and a light the color of flesh is delivered by E flat (8 mm. after T 1) on *Luce*. Then at T2, yellow light (D) takes over from red (C), for a section called “Joy of Life.” This yellow is sustained to represent the sun in the sky, then the blue (E) returns as night falls and the moon emerges at T 42. In a section called “The Final Cosmic Dance of Atoms,” the piano expresses the fire that turned man into mankind (T 54). Violet and Blue, colors of dancing fire, are delivered by F# and C# on *Luce*. The close of the work is filled once again with a return of blue and green lights. The world is formed, man has been touched by the wisdom of Prometheus and has obtained creativity, yet the mystery of gods and evolution are still there, unchanged.

Scriabin was an active participant of mystical symbolist circles, such as the Moscow Religious Philosophical Society, and he frequently attended forums for avant-

⁴²⁹ Ibid., 204.

⁴³⁰ Bowers (1995), 115.

garde poetry and theology in the late 1890's.⁴³¹ Along with his fellow mystic symbolists, he was highly concerned with communicating unmediated divine knowledge to the limited world of human affairs.⁴³² Reconciling his background in Christian religion with transcendentalist religions of South Asia, such as Hinduism and Buddhism, Scriabin found himself occupied with esoteric mystical doctrines in the early 1900's.⁴³³ According to one such doctrine, the *Mystery* was "the concluding act of the life of our race, a final manifestation of its vitality, a colossal mystical cataclysm separating our perishing race from a new-born race."⁴³⁴ In the *Mystery* all different branches of art and creative powers of our races would be united. He applied this to his last complete symphonic work, *Prometheus*, where he explored the fusion of colors and music.⁴³⁵

Unlike Bliss and Schoenberg who employed colors in music for symbolism and emotional responses of the audience, Scriabin's use of colors in *Prometheus* result of experiences in synaesthesia, and of the idea of *Mystery*, which emphasized the ecstatic feeling of oneness. Scriabin, who aimed to unite the senses of man by his composition, found and celebrated synaesthesia as a perfect device for "the unification of all of humanity in a single moment of ecstatic revelation."⁴³⁶ In *Prometheus*, a composition in which spiritual rather than sensual experience from music was highlighted, Scriabin, by

⁴³¹ Richard Taruskin, *The Oxford History of Western Music* Vol.4 (New York: Oxford University Press, 2005), 201.

⁴³² *Ibid.*, 203.

⁴³³ *Ibid.*, 202-203.

⁴³⁴ Alfred J. Swan, *Scriabin* (London: John Lane, 1923), 77.

⁴³⁵ *Ibid.*, 77.

⁴³⁶ *Ibid.*, 76.

employing color-music synaesthetic phenomena, aimed to enrich music to a much higher level so that it would bring humanity to the a form of consciousness.⁴³⁷

Olivier Messiaen

What brings Messiaen into the discussion of characterization of keys is his experience in linking colors to his Modes of Limited Transposition and his complex chords. The concept of Modes of Limited Transposition was not new, but almost a century old since Liszt had experimented with symmetry in deriving scales from the cycle of thirds. Messiaen's modes often contain symmetrical relationships, which would be repeated after transposing a certain number of times. Modes of Limited Transposition were introduced and described for the first time in the preface to Messiaen's 1935 composition, *La Nativité du Seigneur*,⁴³⁸ and have appeared in number of his compositions such as *Sept Haïkai*, *Le Banquet Céleste*, and *Saint Francis* as well as *Couleurs de la Cité Céleste*.

Seven modes were discovered by Messiaen to have limited numbers of possible transpositions. The fewer possible transpositions a mode had, "the charm of impossibility" increased, and that made the mode more special.⁴³⁹ The first mode, which corresponds to the whole-tone scale, has two transpositions; the second mode, which is divided into four symmetrical groups of three notes, has three as does the third mode.

⁴³⁷ Ibid., 75.

⁴³⁸ Taruskin, 231.

⁴³⁹ Olivier Messiaen, *Technique of My Musical Language*, ed. John Satterfield (Paris: Alphonse Leduc, 1956), 58.

Each of modes 4, 5, 6, and 7 are transposable six times.⁴⁴⁰ For Messiaen the first, second and third modes had special meaning due to their fewer of possible transpositions.

According to Messiaen, “The Modes of Limited Transposition realize in the vertical direction, while non-retrogradable rhythms realize in the horizontal direction.”⁴⁴¹ His modes were not simply scales consisting of pitches and various intervals, but a vast source of his harmony. As Allen Forte claims, Messiaen is the twentieth-century composer who put the most creative energy into chords,⁴⁴² The composer derived a number of complex chords from combinations of notes in these modes.

Messiaen had another use for his modes: Colors.

I use modes, not as scales, but as colors. They aren't harmonies in the classical sense... They are colors and their power springs mainly from the impossibility of transposition and also from the color linked to this impossibility. The two phenomena are simultaneous.⁴⁴³

Messiaen's notion of colors in his music was unique for he focused on the coloristic notion of harmony rather than functional conception.⁴⁴⁴ For him, certain harmonies were directly associated with actual colors, while other composers who spoke of employing colors in their music as a result of harmonic progression and orchestration. Messiaen also gave clear descriptions of complex color combinations on his scores.

Mode 2 has three transpositions. In a conversation with Claude Samuel, Messiaen explains the colors of Mode 2: the first transposition of Mode 2 has colors of

⁴⁴⁰ Ibid., 58-62.

⁴⁴¹ Ibid., 62.

⁴⁴² Allen Forte, “Messiaen's Chords,” in *Oliver Messiaen: Music, Art and Literature*, ed. Christopher Dingle and Nigel Simeone (Burlington, VT: Ashgate, 2007), 91.

⁴⁴³ Claude Samuel, *Olivier Messiaen Music and Color*, trans. E. Thomas Glasow (Portland, OR: Amadeus Press, 1994). 49

⁴⁴⁴ Robert Sherlaw Johnson, *Messiaen* (L.A: University of California Press, 1975), 182.

...blue-violet rocks speckled with little gray cubes, cobalt blue, deep Prussian blue, highlighted by a bit of violet purple, gold, red, ruby, and starts of mauve, black, and white. Blue-violet is dominant...Mode 2 in its second transposition is totally different: Gold and silver spirals against background of brown and ruby-red vertical stripes. Gold and brown are dominant...[Mode 2 in its third transposition is] light green and prairie green foliage, with specks of blue, silver and reddish orange. Dominant is Green.⁴⁴⁵

As there are three transpositions for Mode 3, three different cases of complex color combinations are described in a similar manner by the composer.

Much effort was made by music theorists and historians to find out the exact essence in harmonies from which Messiaen interpreted colors. The complexities of color descriptions as well as of his harmony made it difficult for one to find elements for exact correspondence between certain colors and music. However, the composer himself stated that “colors are complex and are linked to equally complex chords and sonorities,”⁴⁴⁶ so that attempting to match certain colors with certain pitches would not be the answer to Messiaen’s curious interpretations of harmony.

Paul Griffiths analyzes Messiaen’s use of harmony and colors based on two elements: one, traditional harmony and Messiaen’s personal interpretations, and two, the scenes and objects which are portrayed in the composer’s music. In many birdsongs from *Catalogue de Oiseaux* and other works, the choice of harmonies came from colors of the scenery and of birds’ feathers. Mode 2 is found in scenes of blue rock thrushes with blue

⁴⁴⁵ Samuel, 64.

⁴⁴⁶ Ibid., 42.

sea in *Le Merle Bleu*, and of the flight of the kingfisher and the river in *La Couscarle* and *Le Tranquet Rieur*, all scenes and objects containing the color of blue.⁴⁴⁷

Mode 2 has a strong association with A major triad, as often it cadences in A major harmony. According to Paul Griffith's analysis, blue-violet color found in Mode 2 is the color which Messiaen reflected onto A major triad.⁴⁴⁸ In a similar way, E-flat is analyzed to have been associated with reddishness. A complex chord, which is strongly associated with E flat major, appears in places where Messiaen marks the color "Sardoine rouge (red sardonyx)"⁴⁴⁹ in *Couleurs de la Cité Céleste*. This "red chord" also appears in *Sept Haïkai* where a passage is marked by the composer's color indication, "red touched with blue."⁴⁵⁰

Messiaen, with his ability to see colors as he hears harmony, creates music which speaks to both his hearing and visual sense. While his personal interpretations of colors of harmonies and modes are auditory effects, his decisions on those interpretations also result from his visual experience. In *Le Merle Bleu* where the composer expresses blueness of rocks and water that he perceived visually, Mode 2 is found to provide the color of blue to the composer's auditory sense.

Various interpretations of colors and sounds found in traditional sources had emotional effect as the third element that connected colors and music. In other words,

⁴⁴⁷ Paul Griffiths, *Olivier Messiaen and the Music of Time* (Boston: Faber and Faber, 1985), 180 and 205.

⁴⁴⁸ Paul Griffiths, "Catalogue de Couleurs: Notes on Messiaen's Tone Colours on His 70th Birthday", *The Musical Times* Vol. 119(Dec., 1978), 1035-1037.

⁴⁴⁹ Olivier Messiaen's *Couleur de la Cité Céleste*: mov.1, marking 24: C, B-flat, A, G F, E-flat, A-flat, D, E, G-flat, D-flat and B.

⁴⁵⁰ Griffith, 205 and Olivier Messiaen's *Sept Haïkai*; Mov 5, m. 3: C, B-flat, A G, F, E-flat, B, A-flat, D, E, G-flat and D-flat.

keys which composers associated as having a somber and calm emotional effect were matched up with colors such as blue and gray. Messiaen's method of choosing harmony is different. Colors of the scenes and objects that he perceived visually are directly expressed by the harmonies in which he finds colors.

Sept Haïkai (1963) and *Couleurs de la Cité Céleste* (1964), premiered at Donaueschingen, the most prestigious festival of new music, are the first two compositions in which Messiaen indicated specific colors on particular chords.⁴⁵¹ *Sept Haïkai* is a result of a trip to Japan with his second wife and was strongly influenced by the style and sonorities of Japanese court music, called *Gagaku*. The seven-movement composition is made up of sketches that reflect his impressions of Japanese landscape, birds and musical tradition.⁴⁵²

The colorful expression in *Sept Haïkai* is achieved by two methods; the first is Messiaen's use of harmony in a way that utilizes the associations with certain modes to render his visual impression of Japan in musical terms, while the second is his methods of orchestration. A few instruments that were used in a *Gagaku* ensemble did not exist, of course, in the Western orchestra, so the composer combined several wind instruments not to achieve only similar timbres, but also to fill the spaces with an assortment of timbres that the audience found "colorful."⁴⁵³

The fifth movement of *Sept Haïkai* is subtitled, "Miyajima et le Torii dans la Mer." The scenery that Messiaen is to express has red and white, which are colors of the temple in Miyajima, and blue and green of the sea from which the *torii* (gate) of Shinto

⁴⁵¹ Griffiths, 200 and 190-191.

⁴⁵² Paul Griffiths, "Poèmes and Haïkai: A note on Messiaen's Development", *The Musical Times* Vol. 112 (Sep., 1971), 851.

⁴⁵³ Johnson, 163.

temple emerges. Sure enough, the movement is filled with the composer's indications of colors-- green, red, orange, and blue. Messiaen translated his experience of Japanese scenery into his music by using chords from which he interpreted colors. According to his biographer, Robert Sherlaw Johnson, performers had to be familiar with these colors, because "each contrast of colour corresponds to [the] contrast of harmony or timbre, which in turn helps to define the form of the work."⁴⁵⁴

With *Couleur de la Cité Céleste*, Messiaen expanded his use of harmonic colors, making them part of the foundation of his composition. The work has a form entirely dependent on color. All musical materials are marked with color values for the entire length of the movement, and any change in melody, rhythm, and the combination of sounds and timbres are results of change in color.⁴⁵⁵

It has never been clear whether or not Messiaen was a synaesthete. While some of his remarks about his experiences appear to fit perfectly with the description of synaesthetics, Messiaen himself denies that he is one of them. On two separate occasions, in interviews with Claude Samuel and Harriett Watts respectively, Messiaen confesses that "[he does] not have this physical disorder [of synaesthesia], but [he does] perceive the colours intellectually."⁴⁵⁶ The composer describes his experience as an inward reality.⁴⁵⁷ According to the composer himself, he "see[s] internally, with the mind's eyes, colours that move with the music,"⁴⁵⁸ "without suffering from physical

⁴⁵⁴ Ibid., 167.

⁴⁵⁵ Ibid., 166.

⁴⁵⁶ Olivier Messiaen and Harriet Watts, "Canyons, Colours and Birds: An Interview with Oliver Messiaen," *Tempo New Series*, No.128 (Mar., 1979), 2-8.

⁴⁵⁷ Samuels, 40.

⁴⁵⁸ Griffiths, 203.

synaesthesia.”⁴⁵⁹ Still, what he describes as his own auditory and visual experience corresponds clearly with the definition of the synaesthetic, cross-sensory phenomenon.

Messiaen’s inspirations and love for complexes of colors comes from his admiration for nature and the stained-glass windows of his childhood, and such colorful representations have been a part of his musical language ever since.⁴⁶⁰ Although some studies have attempted to find the direct correspondence between pitches and his color interpretations, Messiaen denies that the color-harmony correspondence was the result of linking of colors and pitches. Instead, he claims to hear a whole series of overtones of pitches and declares that certain sonorities, melodies, chords, rhythms and durations are all elements that contribute to the correlation between color and music.⁴⁶¹

Messiaen’s remarks about other composers help to illustrate his own interpretation of colors and music. Finding the music of Mussorgsky, Stravinsky, Monteverdi, Chopin and Mozart to be vibrantly colorful, he commented that it was this very aspect, the colors, that made their music different from other composers’.⁴⁶² This vibrancy, according to Messiaen, came from rhythms and accents, thematic and harmonic materials, and orchestration. Interestingly enough, he denied the choice of key as an influence on perception of color and expression.⁴⁶³

What was the reason for Messiaen’s use of color aspects in his compositions? In an interview with Claude Samuel, Messiaen reveals how, whenever he hears music, he

⁴⁵⁹ Samuels, 36-37.

⁴⁶⁰ Ibid., 37-44.

⁴⁶¹ Messiaen and Watts, 5 and Samuels, 40-41.

⁴⁶² Samuels, 62-63.

⁴⁶³ Ibid., 49-50.

experiences “complexes of colors corresponding to complexes of sounds”⁴⁶⁴ so that it was only natural for him to be interested in employing colors in his compositions.⁴⁶⁵ Paul Griffiths considers further possible motivation and suggests that use of colors in music was a result of symbolism and desire to articulate the sense of harmonic qualities.⁴⁶⁶ The interpretation of colors and sounds by the composer was a personal analogy. Thus, although the use of colors enriched aspects of music in the mind of the composer, it may well be meaningless to everyone else.⁴⁶⁷

Messiaen grew up in France and developed his musical language among French modernists, by whom synaesthesia was most enthusiastically welcomed and employed in various artistic forms.⁴⁶⁸ It was not particularly innovative, but rather natural for Messiaen to reveal his experience in colors and music. Synaesthesia, after all, was considered “an ability to perceive unseen worlds [that] might represent the next step in human consciousness,”⁴⁶⁹ and connect human nature to a higher order. For a devout Roman Catholic composer who celebrated a theology of joy, divine love, and faith in God in his compositions, synaesthesia became a device for music to engage the sensual and spiritual world of human nature and transcended man-made music to partake in the cosmic bounty.

⁴⁶⁴ Samuel, 62.

⁴⁶⁵ *Ibid.*, 62.

⁴⁶⁶ Griffiths, 205-6.

⁴⁶⁷ *Ibid.*, 206.

⁴⁶⁸ Dann, 26.

⁴⁶⁹ *Ibid.*, ix.

CHAPTER IV

SUMMARY AND CONCLUSION

The concept of affective properties of scale systems, originated in antiquity, was inherited without any break by generations of musicians and scholars until the mid-twentieth century. While a few ideas of the concept were altered to make sense according to the current events in each period of history, there were also a number of recurring ideas that were continually believed valid. In the texts from the late nineteenth and early twentieth centuries, the anecdotes and sketches of Beethoven were repeatedly mentioned, particularly in encyclopedia and dictionary entries. Scholars continued attempts to discover a cause for the phenomenon of key characteristics, and various explanations included unequal temperaments, equal temperaments, various timbres of instruments,

human emotions reflected in the qualities of voices, open versus stopped strings on the violin, the mechanics of the piano, and even the physiology of our fingers and thumbs.

An inherited aspect of the discussion was dealing with the interpretation of key characteristics. In general, the sharp-flat principle remained the most popular. The organization of a list of key characteristics continued to be done by fifths, and the tradition of presenting works to describe characteristics of keys continued.

The emergence of new as well as altered ideas in the late nineteenth and twentieth centuries on the principle and phenomenon of affective properties in keys is directly correlated to a rise of science as a discipline. Science separated itself from philosophy and rose as a separate discipline in the mid-eighteenth century. Several scientific discoveries came about in the mid-nineteenth century in the fields of acoustics, physics, physiology and psychology. Such discoveries helped to form new ideas and at the same time altered some of the old ones. As experiments, empirical data, and observations became better understood as part of the scientific method to support theories in the nineteenth century, reports on experiments relating to key characteristics increased in the writings from the late nineteenth and early twentieth centuries.

The most striking alterations between the writings from the late-nineteenth and early-twentieth century, and the discussions from previous centuries are not in the content of the lists of characteristics of keys or the arguments about the cause of key characteristics, but can be seen in the attitude and approach to the topic. Lavignac, Dunstan, Tovey, Bedford, Helmholtz, and Revesz considered the interpretations of key characteristics to be highly subjective, existing only in relativity and contrast, but not absolutely. Furthermore, they admitted that the making of a universal dogma was

impossible. Use of repertoires to represent keys and their characteristics was presented as a proof that interpretations of keys came from strong impressions, which the audience received from certain works in the past, rather than affective properties that keys themselves possessed. Once keys were not considered the roots of affect in music, it was the physiology and psychology of human nature that scholars considered the possible determining factors for the phenomenon of key characteristics.

As the physiological study of hearing organs improved, acoustic discoveries about the nature of sounds were revealed. Understanding of senses and our mind improved and the field of psychology progressed, the focus on the study of key characteristics shifted. Since no studies in the fields of acoustics and physiology was yet to provide any reason for keys themselves to possess unique characteristics, more attention was paid to individuals and their experiences of the phenomenon, rather than the general defense of the concept and hypotheses about its possible causes. It began to be understood that the human mind was not merely a passive receiver of information, but rather the interpreter of complex stimuli. From this it came to be concluded that it was no longer relevant to search for a universal reaction that all listeners would have when listening to the same piece.

Romanticism had praised the idea of individuality and personal expressions, instead of generic emotions.⁴⁷⁰ Additionally, thanks to the advanced studies and discoveries in the early twentieth century in psychology, the emotional lives of individuals were truly understood to be unique and subjective, and it became more and more difficult to write about emotions in general. This appears to be the reasons for the

⁴⁷⁰ Mine Dogantan, *Mathis Lussy: A Pioneer in Studies of Expressive Performance* (New York: Peter Lang, 2002), 32.

decrease in the number of lists found in articles, while, in the previous centuries, listing of key descriptions was a popular method of explaining the phenomenon, perhaps for scholars' ambitions in finding a list that convinced all audience.

The late-nineteenth and early-twentieth centuries met a number of discoveries in the physical and psychological worlds. However, a fundamental principle of the phenomenon and application of key characteristics was still uncovered. Composers in the twentieth century no longer spoke of characteristics of keys in a way a number of composers in the previous centuries had. Instead of abandoning the concept of key characteristics altogether, the modernist composers inherited the idea of musical keys as a device for enrichment of expressivity of their musical work. Coinciding with fascination with synaesthesia among artists, they no longer counted on keys, but believed in color not only to enhance musical experience of the audience and but also and furthermore, carry music itself to a higher level.

In the twentieth century, the notion of key characteristics was acknowledged to be an affirmed experience and accepted, even though the reasons for it were never clear. Revesz in 1953 considered the idea of key characteristics as an illusion and a phenomenon without foundation;⁴⁷¹ and Tovey in 1928 confirmed the notion as “entirely subjective,”⁴⁷² and “a favorable example of the kind of fantasy,”⁴⁷³ due to lack of its source, cause and uniformity in the reactions by musicians and listeners. Still, both of them affirmed their experience of the affective properties in keys when they listened to music.

⁴⁷¹ Gene Revesz, *Introduction to the Psychology of Music* (Norman: University of Oklahoma Press, 1954), 121.

⁴⁷² Sir Donald F. Tovey, “Tonality,” *Music and Letters*, Vol. 9, No. 4 (Oct., 1928), 343.

⁴⁷³ Tovey, Beethoven, 9.

Finally by the mid-twentieth century, no acoustical discoveries had been done to support the argument that keys themselves possessed unique characteristics. From studies on human minds and psychology, the phenomena of affective properties of keys are results of personal interpretations. Discussions of the idea of key characteristics no longer searched for the proof of the validity of the phenomenon. Instead, it was up to individuals whether to take the idea as a meaningful and intellectual one or foolish one. As the number of articles on the topic became more scarce after the 1950's, the rare findings speak on the topic as one of the historical aspects of musical art, instead of continuously used musical elements for successful compositions and a living tradition.

BIBLIOGRAPHY

- Baker, James M. *The Music of Alexander Scriabin*. New Haven: Yale University Press, 1986.
- Bedford. "Key Colour and Character." *The Musical Times*, Vol.79 (Jun., 1938): 458-459.
- Blaikley, D.J. "On Quality of Tone in Wind Instruments." *Proceedings of the Musical Association*, 6th Sess. (1876-1880): 79-90.
- Bliss, Arthur. *As I Remember*. London: Thames Publishing, 1989.
- Boring, Edwin G. *A History of Experimental Psychology*. New York: D. Appleton Century Company, 1929.
- _____, and Herbert Sidney Langfeld ed. *Foundation of Psychology*. New York: John Wiley and Sons, 1948.
- Bosanquet, R.H.M. "On Some Points in the Harmony of Perfect Consonances." *Proceedings of the Musical Association*, 3rd Sess. (1876-1877): 143-153.
- _____. "On the Beats of Mistuned Harmonic Consonances." *Proceedings of the Musical Association*, 8th Sess. (1881-1882): 13-27.

- Bower, Calvin M. "The Transmission of Ancient Music Theory into the Middle Ages." In *The Cambridge History of Western Music Theory*, 136-167. Edited by Thomas Christensen. New York: Cambridge University press, 2007.
- Bowers, Faubion. *Scriabin: A Biography of the Russian Composer, 1971-1915*, Vol.I & II. Palo Alto: Kodansha International, 1969.
- _____. Preface to Alexander Scriabin, *Poem of Ecstasy and Prometheus: Poem of Fire*. New York: Dover Publications, 1995.
- Buelow, George J., and Hans Joachim Marx. *New Mattheson Studies*. New York: Cambridge University Press, 1983.
- _____. "Music, Rhetoric and the Concept of the Affections: A Selective Bibliography." *Notes, Second Series*, Vol.30 (Dec., 1973): 250-258.
- Butler, Gregory G. "The Projection of Affect in Baroque Dance Music." *Early Music*, Vol.12 (May, 1984): 201-207.
- Cahan, David. *From Natural Philosophy to the Sciences: Writing the History of Nineteenth-Century Science*. Chicago: University of Chicago, 2003.
- _____. *Hermann von Helmholtz and the Foundation of Nineteenth-Century Science*. Los Angeles: University of California Press, 1993.
- Calvocoressi, M.D. "The Dramatic Works of Vincent D'Indy." *The Musical Times*, Vol. 62 (May, 1921): 320-322.
- Calvocoressi, M.D. "The Dramatic Works of Vincent D'Indy. 'Fervaal.'" *The Musical Times*, Vol. 62 (Jun. 1, 1921): 400-403.
- Charpentier, Marc-Antoine. "Regles de Composition." Translated by Lillian M. Ruff. *The Consort 24* (1967): 250- 251.
- Dann, Kevin T. *Bright Colors Falsely Seen: Synaesthesia and the Search for Transcendental Knowledge*. New Haven: Yale University Press, 1998.
- Dogantan, Mine. *Mathis Lussy: A Pioneer in Studies of Expressive Performance*. New York: Peter Lang, 2002.
- Dunstan, Ralph. "Key Colour" in *A Cyclopedic Dictionary of Music*. Philadelphia: Curwen Inc., 1925.
- Farjeon, Harry. "The Colour of Notes." *The Musical Times*, Vol.79 (Jul., 1938): 500-501.

_____. "The Colour of Keys." *The Musical Times*, Vol.79 (May, 1938): 335-336.

Farnsworth, Rodney. "How the Other Half Sounds: An Historical Survey of Musical Rhetoric during the Baroque and After." *Rhetoric Society Quarterly*, Vol.20 (Summer, 1990): 207-224

Ferguson, Donald N. *Music as Metaphor: The Elements of Expression*. Minneapolis: University of Minnesota Press, 1960.

Finlay, Victoria. *Color: A Natural History of the Palette*. New York: Random House, 2002.

Forte, Allen. "Messiaen's Chords." In *Oliver Messiaen: Music, Art and Literature*, 91-114. Edited by Christopher Dingle and Nigel Simeone. Burlington, VT: Ashgate, 2007.

Gjerdingen, Robert. "The Psychology of Music." In *The Cambridge History of Western Music Theory*, 956-981. Edited by Thomas Christensen. New York: Cambridge University Press, 2002.

Gonzol, David. "Otto Rudolph Ortmann, Music Philosophy and Music Education," *Philosophy of Music Education Review*, Vol.12 (Fall, 2004): 160-180.

Green, Burdette and David Butler. "From Acoustics to Tonpsychologie." In *The Cambridge History of Western Music Theory*, 246-271. Edited by Thomas Christensen. New York: Cambridge University Press, 2002.

Grey, Thomas S. "Eduard Hanslick."
http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/12341?q=hanslick&search=quick&pos=1&_start=1#firsthit;
accessed 10 February 2010.

Griffiths, Paul. "Catalogue de Couleurs: Notes on Messiaen's Tone Colours on His 70th Birthday." *The Musical Times*, Vol. 119 (Dec., 1978): 1035-7.

_____. *Olivier Messiaen and the Music of Time*. Boston: Faber and Faber, 1985.

_____. "Poèmes and Haïkai: A note on Messiaen's Development." *The Musical Times* Vol. 112 (Sep., 1971): 851-852.

Gronings, Franz. "Key Colour." *The Musical Times and Singing Class Circular*, Vol.27 (Nov. 1, 1886): 651-653.

- _____. "Key Colour." *The Musical Times and Singing Class Circular*, Vol.27 (Dec. 1, 1886): 710-712.
- _____. "Key Colour." *The Musical Times and Singing Class Circular*, Vol.28 (Nov. 1, 1887): 654-656.
- _____. "Key Colour." *The Musical Times and Singing Class Circular*, Vol.29 (Apr. 1888): 209-211.
- Grout, Donald Jay and J. Peter Burkholder. *A History of Western Music*. New York: W.W. Norton, 2006.
- Grove, George. *A Dictionary of Music and Musicians* Vol.II. London: MacMillan and Co., 1880.
- Hague, Bernard. "The Tonal Spectra of Wind Instruments." *Proceedings of the Royal Musical Association*, 73rd Sess. (1946-1947): 67-83.
- Hahl-Koch, Jelena. "Kandinsky and Schoenberg." In *Schoenberg-Kandinsky*. Edited by John C. Crawford. Boston: Faber and Faber, 1984.
- Hanslick, Eduard. *The Beautiful in Music*. Translated by Gustav Cohen. New York: The Liberal Arts Press, 1957.
- Hyer, Brian and Alexander Rehding. "Riemann, Hugo"
http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/23435?q=riemann+hugo&search=quick&pos=1&_start=1#firsthit;
 accessed on 10 Feb. 2010.
- Hazel, John and Michael Grant. "Who's Who in Classical Mythology." Oxford University Press: New York, 1993.
- Helmholtz, Hermann L.F. *On the Sensations of Tone*. New York: Longman, Green and co., 1875.
- Hull, A. Anglefield. *A Great Russian Tone-Poet, Scriabin*. London: K. Paul, Trench, Trubner & co., 1916.
- Johnson, Robert Sherlaw. *Messiaen*. Los Angeles: University of California Press, 1975.
- Jones, David Lloyd. "Arthur Bliss" in accompanying booklet, *Arthur Bliss "A Color Symphonie"*. English Northern Philharmonia, conducted by David Lloyd Jones. Naxos, 1996.
- Keller, Hans. "Key Characteristics." *Tempo New Series*, No.40 (Summer, 1956): 5-16.

- _____. "Mattheson as Philosopher of Art." *The Musical Quarterly*, Vol.70 (Spring, 1984): 248-265.
- _____. *Sound Sentiment: An Essay on the Musical Emotions*. Philadelphia: Temple University Press, 1989.
- Krehbiel, Henry Edward. *How to Listen to Music: Hints and Suggestions to Untaught Lovers of the Art*. New York: Charles Scribner's Sons, 1869.
- Krumhansl, Carol L. "Music Psychology and Music Theory: Problems and Prospects." *Music Theory Spectrum*, Vol.17, No.1 (Spring, 1995): 53-80.
- Landormy, Paul. "Vincent d'Indy." *The Musical Quarterly*, Vol.18 (Oct., 1932): 507-518.
- Latham, Edward D. "Physical Motif and Aural Salience: Sounds and Symbols in Die glückliche Hand, op. 18." In *Schoenberg and Words: The Modernist Years*. Edited by Charlotte M. Cross and Russell A. Berman. New York: Garland Publishing Inc., 2000.
- Lavignac, Albert. *Music and Musicians*. New York: Henry Holt and Company, 1899.
- Lee, Markham, and Ll. S. Lloyd. "Key Colour and Character." *The Musical Times*, Vol.79. (Jul., 1938): 532.
- Lester, Joel. *Between Modes and Keys: German Theory 1592- 1802*. Stuyvesant, NY: Pendragon Press, 1989.
- Lloyd, Ll. S. "The Artificial Scale." *The Musical Times*, Vol.82, (Jul., 1941): 252-254.
- MacCreless, Patrick. "Music and Rhetoric." In *Cambridge History of Music Theory*, 847-879. Edited by Thomas Christensen. New York: Cambridge University Press, 2002.
- Marx, Adolf Bernhard. *Theory and Practice of Musical Composition*. Translated from the 3d. German ed. Edited by Herrmann S. Sarroni. New York: Mason Brothers, 1853.
- Mattheson, Johann. *Johann Mattheson's Der Vollkommene Capellmeister: A Revised translation with critical commentary by Ernest Harris*. Ann Arbor: UMI Research Press, 1981.
- Mattheson, Johann and Hans Lenneberg. "Johann Mattheson on Affect and Rhetoric in Music." *Journal of Music Theory*, Vol. 2 (Apr., 1958): 47-84

- McCreless, Patrick. "Music and Rhetoric." In *The Cambridge History of Music Theory*, 847- 879. Edited by Thomas Christensen. New York: Cambridge University Press, 2002.
- Messiaen, Olivier. *Technique of My Musical Language*. Translated by John Satterfield. Paris: Alphonse Leduc, 1956.
- Messiaen, Olivier, and Harriet Watts. "Canyons, Colours and Birds: An Interview with Olivier Messiaen." *Tempo New Series*, No.128 (Mar., 1979): 2-8.
- Moore, John. "Key or Key Note" in *Complete Encyclopedia of Music*. Boston: John P. Jewett and Co., 1854.
- Motte-Haber, Helga de la. "Gene Revesz." http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/23284?q=revesz&search=quick&pos=1&_start=1#firsthit; accessed, 2 February, 2010.
- Ortmann, Otto. "What Is Tone-Quality?" *The Musical Quarterly*, Vol.21 (1935): 442-450.
- Palisca, Claude V. *Hucbald, Guido and John on Music: Three Medieval Treatises*. Translated by Warren Babb. Edited by Claude V. Palisca. New Haven: Yale University Press, 1978.
- Pauer, Ernst. *The Elements of the Beautiful in Music*. London: Novello, 1876.
- Perkins, Leeman L. *Music in the Age of the Renaissance*. New York: W. W. Norton, 1999.
- Plucker, Jonathan. "Phillip E. Vernon." www.indiana.edu/~intell/vernon.shtml; accessed Feb. 28, 2010.
- Reese, Gustave. *Music in the Middle Ages, with an Introduction on the Music of Ancient Greek*. New York, W.W. Norton & Company, 1940.
- Rehding, Alexander. *Hugo Riemann and the Birth of Modern Musical Thought*. Cambridge: Cambridge University Press, 2003.
- Revesz, Gene. *Introduction to the Psychology of Music*. Norman: University of Oklahoma Press, 1954.
- Riemann, Hugo. *Analysis of J.S. Bach's Wohltemperirtes Clavier Vol.I and II*. Translated by J.S. Shedlock. New York: G. Schirmer, 1893.
- _____. *Dictionary of Music*. London: Augener &Co., n.d.

- _____. "Idea for a Study ' On The Imagination of Tone.'" *Journal of Music Theory*, Vol.36 (Spring, 1992): pp.81-117.
- Sabaneef, Leonid, and S.W. Pring. "Scriabin and the Idea of a Religious Art." *The Musical Times*, Vol. 72 (Sept., 1931): 789-792.
- _____, and S.W. Pring. " The Possibility of Quarter-Tone and Other New Scales." *The Musical Times*, Vol.70 (Jun. 1, 1929): 501-504.
- _____, and S.W. Pring. "The Relation between Sound and Colour." *Music & Letters*, Vol.10 (Jul., 1929):266-277.
- Saint-Saën, Camile and Fred Rothwell. "The Ideas of M. Vincent D'Indy." *The Musical Times* (March, 1920): 176-177.
- Samson, Jim. "Romanticism."
http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/23751?q=romanticism&search=quick&pos=1&_start=1#; accessed 10 Feb. 2010
- Samuel, Claude. *Olivier Messiaen Music and Colour*. Translated by E. Thomas Glasow. Portland, OR: Amadeus Press, 1994.
- Scholes, Percy A. *The Oxford Companion to Music*. New York: Oxford University Press, 1955.
- Shawn, Allen. *Arnold Schoenberg's Journey*. New York: Farrar, Straus and Giroux, 2002.
- Sitsky, Larry. *Music of the Repressed Russian Avant-Garde, 1900-1929*. Westport:CT:Greenwood Press, 1994.
- Steblin, Rita. *A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries*. Rochester: Univ. of Rochester Press, 2002.
- Strunk, Oliver. *Source Readings in Music History: from Classical Antiquity through the Romantic Era*. New York: W.W. Norton & Company, 1950.
- Strunk, Oliver. *Source Reading in Music History* vol.1. New York: Norton, 1998.
- Stubbs, Stephen. "Johann Mattheson- the Russian Connection: The Rediscovery of Boris Goudenov and his Other Lost Operas". *Early Music*, Vol.xxxiii, No.2, 2005: 279-288.
- Swan, Alfred J. *Scriabin*. London: John Lane, 1923.

- Taruskin, Richard. *The Oxford History of Western Music*, Vol.4. New York: Oxford University Press, 2005.
- Thayer, Alexander Wheelock. *Salieri: Rival of Mozart*. Edited by Theodore Albrecht. Kansas City: The Philharmonia of Greater Kansas City, 1989.
- Thomson, Andrew. *Vincent d'Indy and His World*. Oxford: Clarendon Press, 1996.
- Tovey, Donald Francis, Sir. *Beethoven*. Edited by Hubert J. Foss. New York: Oxford Univ. Press, 1965.
- _____. "Tonality." *Music & Letters*, Vol.9 (Oct 1928): 341-464.
- Turner, E.O. "Touch and Tone-Quality." *The Musical Times*, Vol.80 (May, 1939):376.
- Vernon, P.E. "The Individuality of Keys." *The Musical Times*, Vol. 83 (Apr., 1942): 105-107.
- _____. "The Individuality of Keys." *The Musical Times*, Vol. 83 (May, 1942): 138-139.
- Wason, Robert W. "Musica Practica: Music Theory as Pedagogy." In *The Cambridge History of Western Music Theory*, 46- 77. Edited by Thomas Christensen. New York: Cambridge University Press, 2007.
- Whomes, Edmund. "Key Colour." *Proceedings of the Musical Association*, 13th Sess. (1886-1887): 83-98.
- Winnington- Ingram, R.P. *Modes in Ancient Greek Music*. London: Cambridge University Press, 1936.
- Wintle, Christopher. "Hans Keller."
http://www.oxfordmusiconline.com.silk.library.umass.edu:2048/subscriber/article/grove/music/14843?q=hans+keller&search=quick&pos=1&_start=1#firsthit;
 accessed 2 February, 2010.
- Young, James O. "Key, Temperament and Musical Expression." *The Journal of Aesthetics and Art Criticism*. Vol.49, No.3 (Summer, 1991): 235-242
- Zarlino, Gioseffo. *On the Modes: Part Four of Le Institutioni Harmoniche*. Translated by David Cohen. Edited by Claude V. Palisca. New Haven: Yale University Press, 1983.