

A HISTORICAL APPROACH TO TRAINING  
THE VOCAL REGISTERS:  
CAN ANCIENT PRACTICE FOSTER CONTEMPORARY RESULTS?

A Monograph  
Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Musical Arts

in

The School of Music

by  
Taylor L. Ferranti  
B.M., Crane School of Music, 1996  
M.M., Boston Conservatory, 1999  
May 2004

## TABLE OF CONTENTS

LIST OF FIGURES.....	iii
ABSTRACT .....	iv
CHAPTER	
1 INTRODUCTION .....	1
2 MODERN SCIENTIFIC CONTRIBUTIONS .....	6
3 THE RISE AND FALL OF THE CASTRATO.....	20
4 HISTORICAL APPROACH TO REGISTRATION AND THE TWO-REGISTER THEORY .....	29
5 CONTEMPORARY APPROACH TO REGISTRATION AND THE DECLINE OF THE TWO-REGISTER THEORY .....	42
6 CONCLUSION .....	51
REFERENCES.....	53
APPENDIX A: VOCALIZES DEALING WITH REGISTRAL ISSUES .....	56
APPENDIX B: LETTER OF PERMISSION .....	59
VITA.....	60

## LIST OF FIGURES

1. Muscular activity (three register conditions).....	12
2. Registration balance (chest-register through falsetto-register) .....	13
3. Vocal fold bulge quotient.....	15
4. Singing F4 (falsetto-register) .....	18
5. Singing F4 (chest-register) .....	18

## ABSTRACT

A review of the extant vocal literature containing the writings of Tosi, Mancini, and García, shows that the topic of vocal registration appeared to be at the core of their training procedures. The essence of their vocal instruction centered around how the registers coordinated, separated, and developed to form the functional basis of a sound technique. However, of all the topics that encompass historical pedagogy, none will confound the diligent voice teacher more than the topic of vocal registers. For this reason, contemporary pedagogy has developed certain methodologies that appear to be at odds with the historical approach to training the vocal registers. Are these approaches so different, or is there common ground to be reached between the old masters and contemporary voice teachers?

# CHAPTER 1

## INTRODUCTION

The hallmark of any fine singer is a complete control over the mechanics of tone production. This type of technical efficiency frees the artist to successfully reveal the subtleties of phrasing and the variety of moods inherent in all great music. Furthermore, the artist who wishes to excel must constantly review the fundamental principles of technique in order to acquire skills, facility, and the ability to retain these via muscle memory. Faithful review of the fundamentals of tone production is crucial to the study of voice. Uninspired rote singing of scale passages proves useless unless the fundamentals of vocalism are understood as well as practiced.

Historical vocal pedagogy was based primarily on a few fundamental facts underlying the physical laws of sound. Thus, instruction became a matter of training vocal muscles with 'directed exercise' to coordinate them in the most efficient manner possible. At the same time, this directed exercise was designed to eliminate the activity of those muscles that interfered with efficient coordination. While the masters of the singing art have indeed laid down a functional process for voice training, much of contemporary pedagogy has taken a divergent path, away from the historical Italian model.

Contemporary training procedures are based largely on various theories of breathing, voice placement, and vocal registration. For some contemporary teachers of singing, establishing a historical precedent for training singers has not been an

imperative educational goal. Singular contributions to most fields of study rarely occur without serious examination of the work of those who have gone before.

In presenting an argument for establishing a historical precedent in the contemporary voice studio, teacher and noted voice scientist Dr. Stephen Austin writes:

Before one is able to make a personal contribution to the field of mathematics, for example, many years must be spent studying what has been learned by the great mathematicians of the past.  
...Trying to teach or work in mathematics without a thorough command of the information contained in the historical legacy of mathematics would be ludicrous.<sup>1</sup>

A review of the extant vocal literature containing the writings of Tosi, Mancini, and García *files*, shows that the topic of vocal registration appeared to be at the core of their training procedures. The essence of their vocal instruction centered around the development, purification, and gradual unification of the registers as a means of developing the functional basis of a sound technique.<sup>2</sup> However, of all the topics that encompass historical pedagogy, none will confound the diligent voice teacher more than the topic of vocal registers. Based on the extant pedagogical legacy, it is clearly evident that vocal registration was a vitally important aspect of historical vocal practices.

Contemporary pedagogical circles are replete with differing ideas regarding the proper balance of muscular activity employed in different registers, the number of

---

<sup>1</sup>Stephen Austin, "Scientific Support for the Two-Register Theory," in *The Modern Singing Master: Essays in Honor of Cornelius L. Reid*, ed. Ariel Bybee and James Ford. (Lanham: Scarecrow Press Inc., 2002), 63.

<sup>2</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 72.

registers, the training methods used to bring about their coordinate action, and in some cases, even the very existence of vocal register phenomena altogether.

In her book, *A Spectrum of Voices: Prominent American Voice Teachers Discuss the Teaching of Singing*, Dr. Elizabeth-Blades Zeller poses pedagogical questions to a panel of twenty noted voice teachers in the United States today. On the topic of “Strategies for Teaching Registration,” past *NATS* president, the late Dr. Bruce Lunkley, states, “We discuss registration when it rears its ugly head. Some students have little problem with it; others seemingly have a new register every three or four notes.”<sup>3</sup>

It is most interesting to observe that while contemporary voice teachers differ greatly in their views about registration, ancient and contemporary factions reach unanimous agreement when discussing the ultimate goal of training the vocal registers. The undisputed objective is the attainment of an ideal coordinate action of the vocal registers--a coordination capable of producing an utterly seamless grand-scale as well as imperceptible register transitions throughout the musical trilogy of pitch, vowel, and intensity.

The use of the term ‘vocal register’ was originally borrowed from organists, who used the term to describe those changes of sound quality which came about from changing the ‘stop’ combinations. When it was discovered that the human voice was capable of making distinctive and diverse tonal qualities, it seemed rather appropriate

---

<sup>3</sup>Elizabeth Blades-Zeller, *A Spectrum of Voices: Prominent American Voice Teachers Discuss the Teaching of Singing*. (Lanham: Scarecrow Press Inc., 2002), 52.

that each group of similar sounds be referred to as a 'register.' In his book *Bel Canto*, Cornelius Reid states:

An interesting parallel is to be drawn between the skilled organist and the voice teacher, for just as the organist is able to judge the approximate setup of the organ registration by listening to the sound quality of the instrument, so, too, the skillful voice teacher should be able to analyze every detail of the vocal technique by observing the relative development and balance of the registration as expressed in the quality of the tone produced.<sup>4</sup>

In 1841, Manuel García, famous singing teacher and widely credited inventor of the laryngoscope<sup>5</sup>, proposed the classic definition of registers, which has served as a point of reference ever since.

By the word register, we understand a series of consecutive and homogenous tones going from low to high, produced by the development of the same mechanical principle, whose nature differs essentially from another series of tones equally consecutive and homogenous produced by another mechanical principle.<sup>6</sup>

The great masters of the vocal art regarded registration as the means by which they could develop an instrument. Historical concepts of registration bring to the forefront the fact that voice teaching in centuries past could perhaps more accurately be termed 'voice-building.' The masters certainly knew the function of the voice intimately, even without the aid of electromyographic signals or spectrographic displays. Let us consider what García wrote in his text, *A Complete Treatise on the Art of Singing*, in 1841:

---

<sup>4</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 65.

<sup>5</sup>The laryngoscope was actually invented in 1830 by Benjamin Guy Babington, a British physician who made considerable contributions to epidemiology.

<sup>6</sup>Manuel García, *A Complete Treatise on the Art of Singing: Part One*, trans. Donald V. Paschke. (New York: Da Capo Press, 1982), xli.

The study of the mechanism of the human voice, very instructive for the physiologist, can also have undeniable advantages for the singer. Nothing, in fact, can be more valuable to him than to know by what procedures the vocal instrument manages to produce vibrations, to what operation of the organs we owe the range of the voice, the registers, the timbres, the ring of the tones, their intensity, their volume, the rapid succession of notes, etc.<sup>7</sup>

Addressing the need for contemporary voice professionals to acquire a firm foundation of pedagogical knowledge for use in the voice studio, Austin comments:

For some reason, the voice teaching profession has freed itself from this responsibility toward the accumulation of knowledge. ...However, there is no body of knowledge that all voice teachers are expected to know and understand before they begin teaching. As is true in so many other areas of our postmodern society, all are free to establish pedagogical truth as they experience it or imagine it. Nothing is considered to be absolute.<sup>8</sup>

Perhaps the unequivocal question the modern-day voice teacher might ask is: What benefit can I gain from studying the methods of centuries-old vocal masters, and how will that information enhance my teaching today?

---

<sup>7</sup>Ibid., xx.

<sup>8</sup>Stephen Austin, "Scientific Support for the Two-Register Theory," in *The Modern Singing Master: Essays in Honor of Cornelius L. Reid*, ed. Ariel Bybee and James Ford. (Lanham: Scarecrow Press Inc., 2002), 63.

## CHAPTER 2

### MODERN SCIENTIFIC CONTRIBUTIONS

The reasons for the inevitable decline of *Bel Canto* as a singing style are three in number: first, confusion growing out of the nomenclature; second, the appearance of the 'virtuoso' teacher; and third, entry of the scientific investigator into the field of vocal endeavor.<sup>8</sup>

García's invention of the laryngeal mirror opened the floodgates of scientific investigation into the nature of the singing voice.<sup>9</sup> Shortly after García made his findings public, scores of earnest investigators became actively engaged in similar research. Their interest in scientific investigation established a new profession within the field of voice training.<sup>10</sup> As a consequence, a new era--the 'age of the voice scientist'-- developed to meet the need for scientifically reliable information about the voice.

Therapy of vocal problems became the province of a new profession allied with the practicing physician. By 1870, the demand for researched information about functionally healthy and dysfunctional voices increased rapidly. Research equipment and tools became more sophisticated, and this in turn inspired new research.<sup>11</sup> A large

---

<sup>8</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 156.

<sup>9</sup>Edward Foreman, *Authentic Singing: Being the History and Practice of the Art of Singing and Teaching*, vol. 1. (Minneapolis: Pro musica press, 2001), 135.

<sup>10</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 170.

<sup>11</sup>Lloyd W. Hanson, "A Survey of Research on Vocal Falsetto," *Journal of Singing* 43 (January/February 1987): 13.

body of data has resulted from the greatly increased research done in the voice area.

Discussing the modern voice scientist, Stephen Austin writes:

Voice scientists are typically speech-voice scientists who do not have a necessary appreciation for the historical legacy that exists in the pedagogical literature concerning vocal registers. Nor do they appreciate the difficulty that a voice teacher encounters in bringing a promising young talent to its full potential as a mature performing artist.<sup>12</sup>

A complete analysis of the modern scientific contributions to the area of vocal registration is simply not possible in this brief review. However, this chapter will examine two of the more singular contributions to the research. Our discussion will attempt to bring to the forefront the fact that contemporary scientific investigations into vocal registration confirm the historical practices dating back to the earliest significant treatises of the singing voice. Austin continues:

Science does have a role to play in vocal pedagogy: to affirm and to direct us to the historical practice of utilizing the functional nature of the vocal registers in the art of voice teaching.<sup>13</sup>

Before proceeding further, I will offer a brief overview of the structure of the larynx and the vocal folds: Located in the trachea, the larynx is made up of several cartilages that form an enclosure for the vocal folds. The cartilages are connected by adjustable joints and ligaments that can change position relative to each other by the action of the intrinsic vocal muscles--the muscles housed within the larynx. The

---

<sup>12</sup>Stephen Austin, "Scientific Support for the Two-Register Theory," in *The Modern Singing Master: Essays in Honor of Cornelius L. Reid*, ed. Ariel Bybee and James Ford. (Lanham: Scarecrow Press Inc., 2002), 63.

<sup>13</sup>Ibid., 63.

intrinsic muscles interconnect the cartilages of the larynx, whereas the extrinsic muscles connect the larynx to other surrounding structures, such as the sternum or the hyoid bone.<sup>14</sup>

The laryngeal foundation is the cricoid cartilage. The cricoid forms a solid ring that surrounds the laryngeal airway. Sitting on top of the wider portion of the cricoid cartilage are the paired, pyramidal arytenoid cartilages. The arytenoid cartilages move upon the cricoid. Each arytenoid has three prongs which insert via ligaments: a forward-extending prong, which inserts into the vocal fold itself, called the vocal process; an outward-extending prong called the muscular process; and an upward-and backward-extending prong called the corniculate. The largest cartilage, the thyroid, sits upon the cricoid; it is shaped like a shield, and in men, that portion protrudes from the neck and is called the 'Adam's apple.'

The intrinsic muscles of the larynx are named after the cartilages to which they are attached. When these muscles contract, they move the cartilages relative to each other and in so doing affect the shape of the glottis (airspace between the vocal folds).<sup>15</sup> When the vocal folds separate, thus opening the airway, the arytenoids swing open. The swinging action is a function of the posterior cricoarytenoid muscle. In bringing the folds together, the arytenoids swing in the opposite direction. This movement

---

<sup>14</sup>Ingo Titze, *Principles of Voice Production*. (Iowa City: National Center for Voice and Speech, 2000), 10.

<sup>15</sup>James Stark, *Bel Canto: A History of Vocal Pedagogy*. (Toronto: University of Toronto Press, 1999), 7.

toward the midline in preparation for phonation is a function of the lateral cricoarytenoid and the vocalis muscles.

The cricothyroid (CT) muscle courses between the cricoid and the thyroid cartilages in the front portion of the larynx. When the CT muscle contracts, the distance between the thyroid cartilage and the vocal processes is increased to elongate the vocal folds. This action increases vocal fold tension and results in the raising of pitch.

With regard to the structure of the vocal folds, the five layers of tissue can be grouped into three distinct sections: the cover, consisting of the epithelium and superficial layer of the lamina propria; the transition, consisting of the intermediate and deep layers of the lamina propria (the vocal ligament); and the body, consisting of the vocalis, or thyroarytenoid muscle (TA), which makes up the bulk of the vocal fold. Upon contraction, unopposed by other muscles, the TA relaxes the vocal folds and assists in glottal closure. Upon contraction, opposed by other muscles, the TA increases longitudinal vocal fold tension.<sup>16</sup>

The first significant scientific research study into the function of the intrinsic laryngeal musculature was "*A Series of Four Electromyographic Studies*" published by Minoru Hirano, the late William Vennard, and John Ohala in 1970-71. The study explored intrinsic laryngeal muscular activity by way of electromyography (EMG). Electromyography involves the detection and recording of an electrical wave called a

---

<sup>16</sup>Willard Zemlin, *Speech and Hearing Science: Anatomy and Physiology*. (Needham Heights: Allyn & Bacon, 1998), 129-130.

*muscle action potential* or, MAP. The researchers recorded EMG signals as subjects performed a variety of singing activities.

This technique of electromyography dates as far back as 1950, with the work of Katsuki. Although valuable from a research standpoint, Katsuki's work had a decided flaw: Katsuki used needle electrodes. Essentially, the bare tips of two needles were inserted into an intrinsic laryngeal muscle in order to record electrical activity in the zone between them. However, the needle electrodes were far too bulky once inserted into the muscle. Thus, they produced a feeling of great discomfort in the singer's throat, which rendered an accurate reading of muscular activity next to impossible.

In *Clinical Measurement of Speech and Voice*, Baken and Orlikoff discuss the complications arising from the use of needle electrodes, saying:

Although needle electrodes have been used successfully to investigate the behavior of the larynx and facial muscles, they are not ideally suited to examine speech behavior. Their rigidity and large size may restrict muscle activity. Shear forces acting on them, when muscles move beneath the skin, cause needle displacement that produces electrical artifacts and significant patient discomfort.<sup>17</sup>

In order to circumvent the problems of needle conductors, Basmajian and Stecko (1962), as cited in Baken and Orlikoff,<sup>18</sup> developed what are known as hooked-wire electrodes.<sup>19</sup> They are made by passing a loop of extremely fine (similar to a

---

<sup>17</sup>R. J. Baken and Robert Orlikoff, *Clinical Measurement of Speech and Voice*. (San Diego: Singular Publishing Group, 2000), 514.

<sup>18</sup>Basmajian, J.V., & Stecko, G., "A New Bipolar Electrode for Electromyography," *Journal of Applied Physiology*, 17 (1962): 847-859.

<sup>19</sup>R. J. Baken and Robert Orlikoff, *Clinical Measurement of Speech and Voice*. (San Diego: Singular Publishing Group, 2000), 514.

strand of human hair) insulated wire through a hypodermic needle. The needle is then removed from the loop, the bare wire is cut, and the two free ends are folded back over the needle tip. After sterilization, the needle is inserted into the muscle and then withdrawn, leaving the wire ends hooked on the muscle fibers.<sup>20</sup>

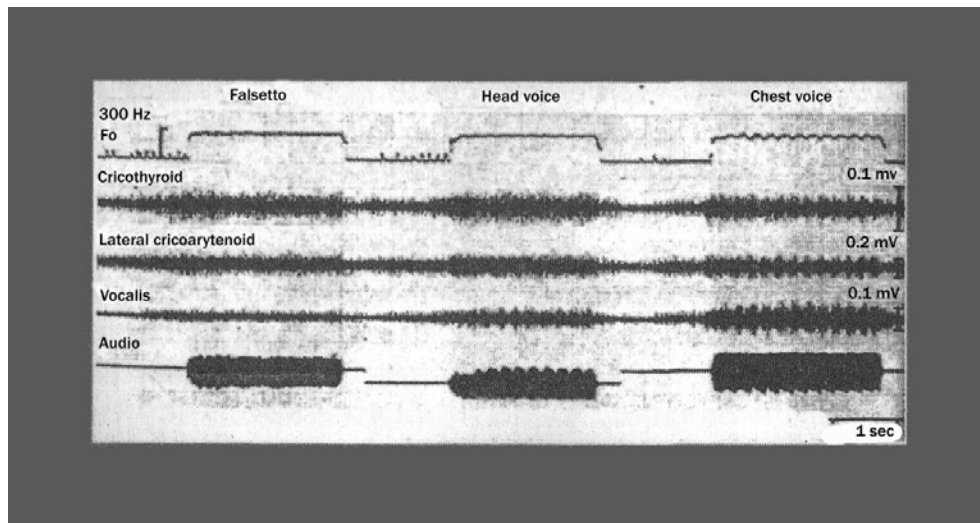
For the EMG studies of 1970-71, Hirano and associates used the updated hooked-wire technique. With this new technique, the electrodes caused only minor discomfort to the subject, rendering normal phonation possible for an indefinite period of time. This fact alone is of paramount importance because researchers could finally document an accurate account of laryngeal muscular activity signals during phonation in trained singers. I stress the term *trained singers* here with the understanding that most of contemporary scientific experiments in the field of voice involve speech subjects, not singing subjects, and rarely are the subjects trained singers.

For the data compiled in Figure 1, Hirano had male and female subjects sing the same pitch over three register conditions: falsetto, head voice, and chest voice. Electrodes were placed in the following three intrinsic laryngeal muscles: the cricothyroid (CT), the lateral cricoarytenoid (LCA), and the vocalis, or TA muscle. By this time, Hirano had perfected the skill of placing the electrodes in the larynx. In fact, bass William Vennard actually served as a subject for this study. Even after the electrodes were inserted, Vennard remarked that he could sing normally in all the registers of his voice.

---

<sup>20</sup>Ibid.

Hirano's premise was that when a muscle produced a thicker electrical signal, this indicated an increase in muscular activity within that muscle for the given vocal task. At last, voice science researchers could begin to study the muscles involved in register events.



**Muscular activity (three register conditions)**

**Figure 1<sup>21</sup>**

For the vocal task depicted in Figure 1, the data revealed:

- 1) When a single pitch was sung across three different register conditions, the only signal that changed significantly was that of the vocalis (TA) muscle.
- 2) The signal depicted by the vocalis muscle was most pronounced in the chest-register.
- 3) The activity of the CT was unchanged throughout all three register conditions.

These findings are extremely significant to our understanding of register mechanics.

Hirano and associates further discovered:

- 1) If the quality of the voice was 'chesty,' (produced by the lower-register, or chest-register), the vocalis muscle was highly active.
- 2) If the quality of the voice was "heady and falsetto-like," the vocalis

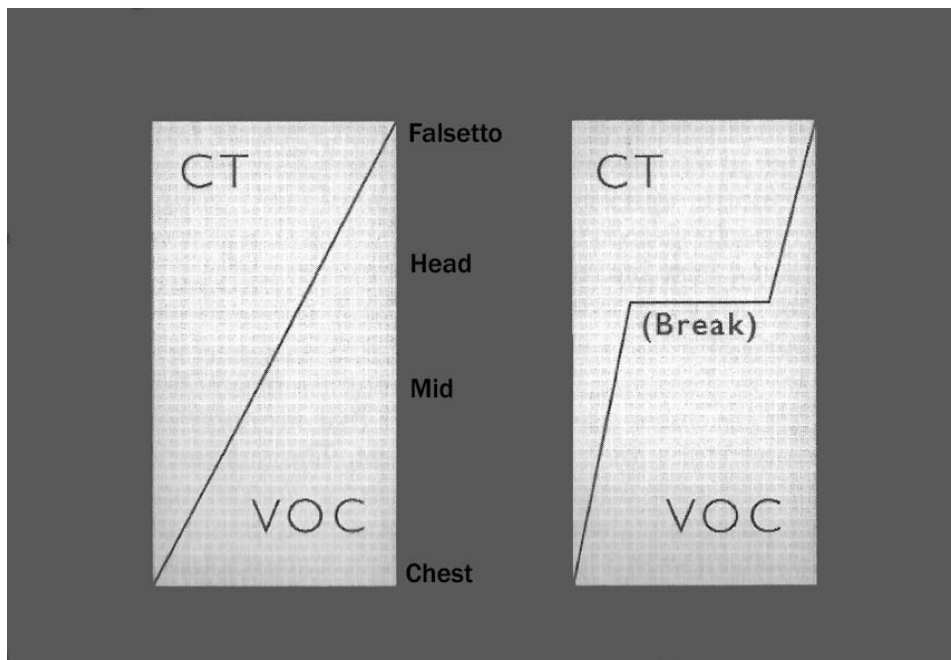
---

<sup>21</sup>All figures are used with permission from the publisher.

- was not active.
- 3) Since the CT was stable (mostly inactive) throughout the three register conditions, this muscle was clearly not involved in determining registration events.
  - 4) Vocal registration (register shifts) is determined by the muscular activity in the vocalis muscle.
  - 5) The CT muscle is the primary pitch agent.

Figure 2, Hirano demonstrates a useful two-register model of vocal registration.

The register model suggests that as a singer goes from heavy-mechanism to light-mechanism, the activity of the vocalis and CT are in a constantly changing balance of strength or activity.<sup>22</sup> In the lower pitch area, the vocalis muscle is highly active, while the CT is largely passive. The reverse is true as pitch rises through the registers, toward falsetto.



**Registration balance (chest-register through falsetto)      Figure 2**

<sup>22</sup>Stephen Austin, "Scientific Support for the Two-Register Theory," in *The Modern Singing Master: Essays in Honor of Cornelius L. Reid*, ed. Ariel Bybee and James Ford. (Lanham: Scarecrow Press Inc., 2002), 67.

This is evident by the straight diagonal line extending from chest to falsetto in the model on the left. The vocalis is highly active in chest-register, but this muscle is largely inactive in falsetto. Conversely, the CT is largely inactive in chest-register, but the muscle becomes highly active as the singer ascends in pitch, out of the chest-register, toward the falsetto or head-voice. This changing balance of muscular activity is readily observable by the width of the two triangles. Thus, the model on the left exhibits a state of ideal register coordination in singing.

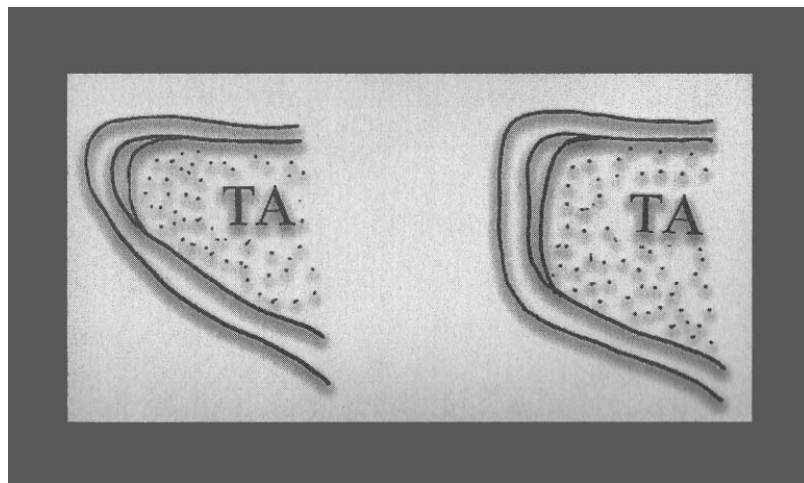
The model on the right illustrates the type of voice some voice teachers work with on a daily basis: These students lack much of the coordinate ability that accounts for a seamless register transition from heavy to light mechanism. In this model, the vocalis muscle is overly energized, causing an inefficient transfer of muscular activity to the CT muscle as the singer traverses the stages of vocal registration. This inefficient coordination results in an abrupt and audible shift in the registration, known as the register 'break.'

All highly trained singers learn to regulate the ratio of tension shared between the TA and CT muscle groups. When the ratio of tension between the two muscle groups is impeccably regulated by the singer, the rough underlying mechanics of registration is obscured, and the voice is capable of producing a seamless scale from bottom to top.

The second noteworthy contribution of modern voice science has been the work of Dr. Ingo Titze and his examination of the cross-sectional shape of the vocal fold. Titze examined the role of the thyroarytenoid muscle (TA), which is known to be active in chest-register and bulges or rounds the vocal fold medially, below the level of the vocal

process. This bulging creates a deeper vibrating surface within the structured layers of the vocal fold. Thus, upon contraction, the TA muscle stimulates a shift in vocal fold vibration from the epithelium and superficial layers (associated with falsetto-register) to the deeper surfaces of the vocal fold, namely the ligament and body.<sup>23</sup> As we discussed earlier, the 'body' of the vocal fold refers to the TA muscle itself, which makes up the bulk of the vocal fold.

In Figure 3, we observe Titze's cross-sectional profiles of the vocal fold based on the effect of contraction of the TA muscle. The vocal fold on the left is devoid of this bulged quality. This indicates that the chest-register is either underdeveloped, or simply not in use. The vocal fold on the right clearly exhibits the bulged quality associated with an active participation of the TA muscle, which we associate with the use of the chest-register.



Vocal fold bulge quotient

Figure 3

---

<sup>23</sup>Ingo Titze, *Principles of Voice Production*. (Iowa City: National Center for Voice and Speech, 2000), 291.

Upon phonation, vocal folds with a bulged, or rounded underside display a spectrographic envelope characterized by high levels of acoustic energy in the upper-partials<sup>24</sup>. Energy in the upper-partials gives the voice a richer, fuller sound. Austin has further noted that rounded vocal folds promote a vocal onset which is characterized by less aerodynamic effort, or 'breath-energy.'<sup>25</sup> Furthermore, rounded vocal folds embody that desirable chesty quality, so admired by singers and audiences alike since Gilbert-Louis Duprez sang the first 'high C from the chest' in 1831.<sup>26</sup>

Additionally, when the TA muscle is contracted in the upper-register of the male voice, a clustering of acoustic energy in the area of 2800-3500 Hz (unit of frequency) occurs. This clustering of acoustic energy is now known as the singer's formant or the ring in the voice.<sup>27</sup> The presence of the singer's formant for operatic singing is invaluable when one considers the fact that operatic singing often involves the use of large orchestras for accompaniment.

Increasingly, the acoustic factors of singing are being subjected to investigative study. In classical singing, a sound that strikes the ear as aesthetically pleasing is the result of verifiable acoustic conditions. Figures 4 and 5 represent two unaccompanied

---

<sup>24</sup>A *partial* (harmonic, or overtone) is a vibration frequency that is an exact multiple of the vibration rate of the fundamental frequency.

<sup>25</sup>Stephen Austin, "Scientific Support for the Two-Register Theory," in *The Modern Singing Master: Essays in Honor of Cornelius L. Reid*, ed. Ariel Bybee and James Ford. (Lanham: Scarecrow Press Inc., 2002), 70-71.

<sup>26</sup>Duprez was part of a trend in which 'Ab - C#,' and finally, in this century, even 'D' came to be sung more *de poitrine*.

<sup>27</sup>In 1978, Sundberg noticed the peak of acoustic energy as he was analyzing recordings of the famous tenor Jüssi Björling (1911-1960).

versions of the author singing 'F4' in both falsetto and chest-registers, on a sustained Italian [a] vowel that is held over a five-second time duration. The pitch is then graphed on a spectrographic analysis software program which measures frequency on the Y axis, and time on the X axis. An increase of acoustic energy, or vocal intensity, is identified by the degree of darkness present in the sound waves.

Judging from what we know about the acoustic properties involved in the production of the various registers, we can infer that Figure 4 suggests a relaxed TA muscle. Additionally, we notice the sample possesses little acoustic energy in the area of the singer's formant. Therefore, the acoustic envelope in Figure 4 shows a falsetto-register production, devoid of the singer's formant, and possessing little of the carrying power requisite to compete with an orchestra. This spectrogram reveals a typical registrational inefficiency we can associate with the young college-age student who may lack the TA contraction necessary to produce a viable chest-voice quality.

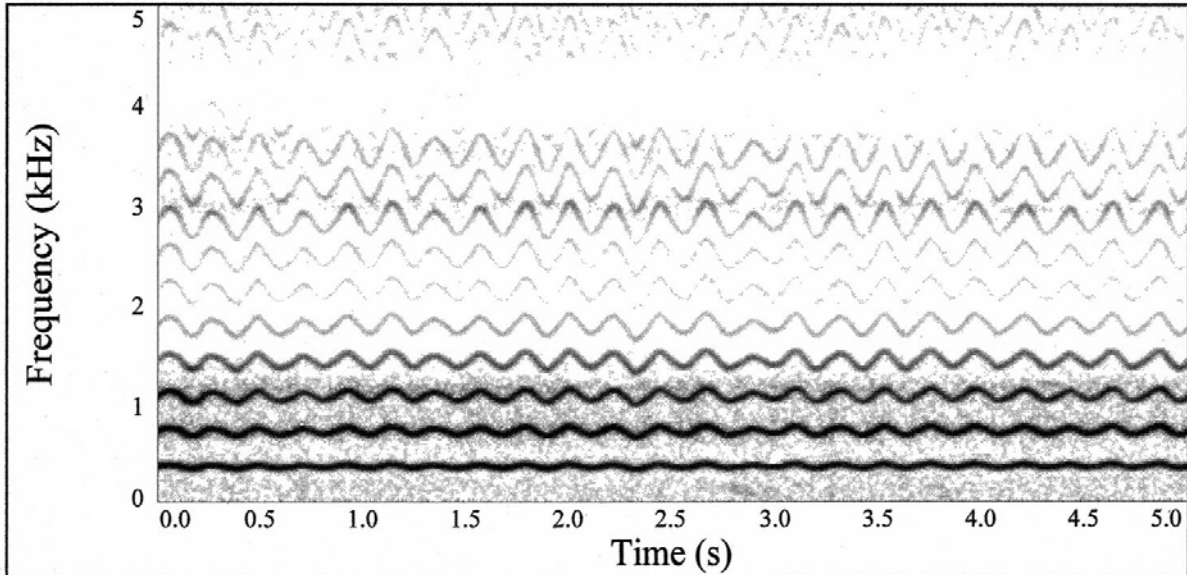
Figure 4 further indicates the presence of a 'breathy' phonation<sup>28</sup>. In breathy phonation, the glottal closure is inefficient<sup>29</sup>. When glottal closure is inefficient, this indicates that excess air is escaping through the glottis. Consequently, the effect of a

---

<sup>28</sup>A 'breathy' phonation is quite typical in the young singer, especially the young female voice. This phonation is partially due to registrational factors. However, it is also due to the sheer age and growth of the larynx. Thus, teachers should use caution when trying to eliminate all remnants of 'breathiness' in the young female by use of explosive glottal onset pressure.

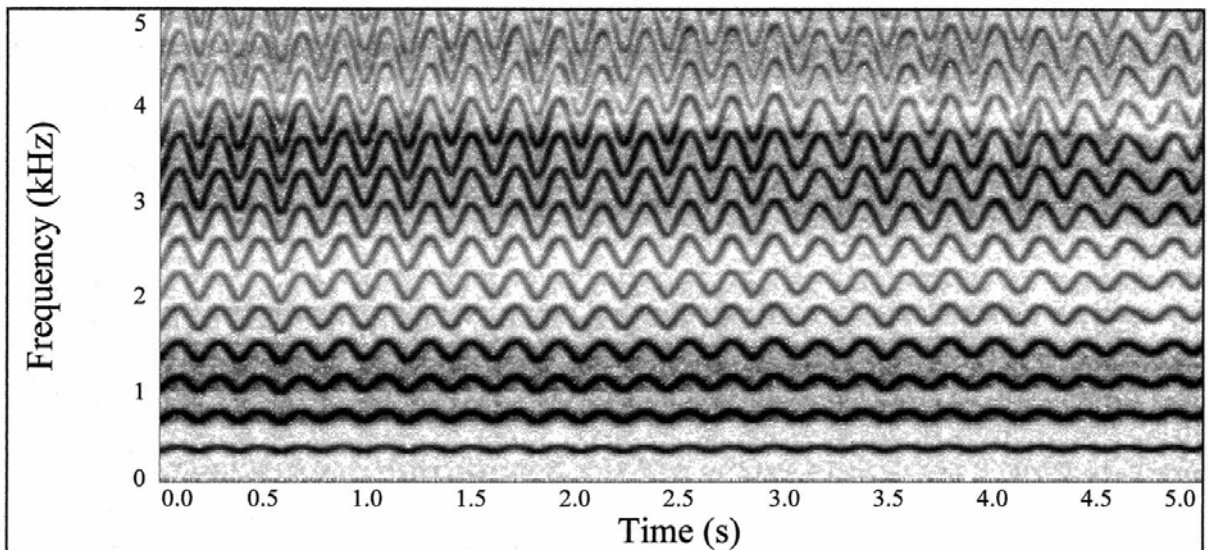
<sup>29</sup>With regard to registration, breathy phonation can be useful in encouraging an overly overactive TA muscle to give way to the action of the CT. The interested reader is encouraged to examine the writings of Douglas Stanley and Cornelius Reid in relation to this issue.

breathy phonation on the sound spectrum is an overall reduction of power in the upper-partials. This reduction of power can also be recognized by the light-colored bands present in the area of 2800-3500 Hz, which indicate a reduction in upper-partials.



Singing F4 (falsetto-register)

Figure 4



Singing F4 (chest-register)

Figure 5

Figure 5 depicts a much different tonal quality. Based on the degree of darkness in the spectrum, we must conclude an actively contracted TA muscle. We also note a large peak of acoustic energy in the area of 2800-3500 Hz, already identified as the area of the singer's formant or the source of vocal ring.<sup>30</sup>

It is important to mention the fact that the spectrum envelope of an orchestra peaks at about 500 Hz and falls off monotonically. Therefore, the singer, assuming the chest-register is engaged, has a wealth of acoustic energy far surpassing that of the orchestra. If the singer's formant were absent from the singing event, the singer would be difficult to hear above an orchestra.<sup>31</sup>

Both the EMG studies done by Hirano and associates and the cross-sectional vocal fold analysis done by Titze assert the valuable contributions that voice science has applied toward our understanding of vocal registers in an age of modern vocal pedagogy. These findings serve to confirm historical practices of voice training.

When we consider the wide variety of influences that have determined the progress of singing pedagogy, it is evident that knowledge of current scientific research will certainly enhance the skills of singing teachers in their efforts to help their students to reach their fullest potential.

---

<sup>30</sup>In recent years, Sundberg and Titze consider the epilaryngeal tube to be the source of the singer's formant. This is a narrow tube above the vocal folds that is bounded by the epiglottis.

<sup>31</sup>Ingo Titze, *Principles of Voice Production*. (Iowa City: National Center for Voice and Speech, 2000), 265.

### CHAPTER 3

#### THE RISE AND FALL OF THE CASTRATO

Impoverished parents sought out surgeons, or, as we shall learn, did the job themselves, in the hope of securing a comfortable old age supported by a famous castrato's fortune. At a time during the eighteenth century, when the reign of the castrati was supreme, it is estimated that as many as four thousand boys were castrated in Italy each year.<sup>32</sup>

It cannot be denied that the castrati--both as teachers and as singers--were virtually the sole motivating agents in the foundation of "the old Italian singing methods."<sup>33</sup> There is scarcely any extant vocal ornamentation that does not find its genesis in the castrati. Seventeenth and eighteenth century Europe was in fact strongly reliant on Italy for singers as well as singing teachers. Moreover, it was not until the early twentieth century that a singer trained outside the stamp of Italian schooling was able to attain even consequential success.<sup>34</sup>

Use of the castrato voice developed out of the fact that women were expressly forbidden to sing in the church. Thus, polyphonic parts in sacred vocal music were entrusted to boy singers or to men who artificially imitated the female voice (falsetto singers, today known as counter-tenors).<sup>35</sup> However, boy's voices were largely

---

<sup>32</sup>Henry Pleasants, *The Great Singers: From the Dawn of Opera to Our Own Time*. (New York: Simon & Schuster, 1970), 38.

<sup>33</sup>Philip Duey, *Bel Canto in its Golden Age: A Study of its Teaching Concepts*. (New York: Da Capo Press, 1951), 58.

<sup>34</sup>Ibid.

<sup>35</sup>Rodolfo Celletti, *A History of Bel Canto*. (New York: Oxford University Press, 1991), 108.

unreliable, and more importantly, they could be of no use for singing after the voice change occurred in adolescence. In addition, artificial falsettists frequently made unpleasant sounds. The castrato voice offered a solution to the difficulties faced by the papal and court chapels of the time.<sup>36</sup>

Equally significant to the practice of castration was the severe economic crisis which struck Italy about 1620. While Venice managed to keep much of its industry intact despite lagging performance, in many other places, deindustrialization forced the upper classes to turn toward landholding as their main source of income. With these economic problems came an unusual increase in the numbers of monks and nuns, which was most marked in the period 1580-1650.<sup>37</sup>

For wealthier families, putting a son or daughter into a monastic order was probably less costly than setting up a son in a career position or marrying off a daughter. Likewise, for the poorer sects of Italian communities, children who became monks or nuns held out a hope of financial security when troubled times arose.

Naturally, not all monks became castrati. They were celibates, though not always of their own choice. A castrato could be thought of as an enforced celibate with an unusual chance of securing income for his family, and, if the talent was good enough—perhaps a fortune.<sup>38</sup>

---

<sup>36</sup>Ibid.

<sup>37</sup>John Rosselli, *Singers of Italian Opera: The History of a Profession*. (New York: Cambridge University Press, 1992), 35.

<sup>38</sup>Ibid., 35-36.

Many extant contracts survive that bind young Italians as apprentices to singing teachers. Many of these public documents openly set as a condition that the boy was to be castrated. The parents and uncle of Paolo Nannini, of Viterbo, in 1671 undertook to have him castrated within a few weeks at the teacher's expense, so that he "may learn music and keep his voice."<sup>39</sup>

The practice of castration, known as orchietomy, was imported from the East via Spain. The earliest arrivals of castrati to Italy took place in 1562, when Spaniards Francisco Soto and Hernando Bustamante offered their services to the papal chapel and the court of Ferrara, respectively.

Orchietomy subdued the growth of the larynx before the mutational changes that occur in young boys. An operation was therefore carried out on the testes. During surgery, either the testicular cord was bound, or the testes were removed entirely. The effect of the surgery was known at the time, but the cause was not—a stoppage of testosterone secretion, the hormone that causes laryngeal growth.<sup>40</sup>

There have been numerous studies of castration in modern times from every viewpoint imaginable. It has been a rather difficult task for any researcher to get at the facts. The use of castration for its effects on the voice is certainly no exception. Perhaps the best known first-hand investigation was made by English musicologist Charles Burney during his trips to Italy in 1770 and later. Burney was quite intent on

---

<sup>39</sup>Ibid., 37.

<sup>40</sup>Rodolfo Celletti, *A History of Bel Canto*. (New York: Oxford University Press, 1991), 109.

uncovering the precise information about the practice of orchiectomy on young boys.

This task proved next to impossible, as Burney states:

I inquired throughout Italy at what place boys were chiefly qualified for singing by castration, but could get no certain intelligence. I was told at Milan that it was Venice, at Venice that it was Bologna, but at Bologna the fact was denied, and I was referred to Florence; from Florence to Rome, and from Rome I was sent to Naples. The operation is most certainly against law in all these places, as well as against nature; and all the Italians are so much ashamed of it, that in every province they refer it to some other.<sup>41</sup>

Through orchiectomy, the castrato voice retained the ring, freshness, and unique timbre of a boy's voice. Along with the obvious vocal abilities, secondary manifestations of the body also occurred. The castrato developed pseudo-feminine characteristics, and a so-called keel-chest, with a noticeable expansion of the rib-cage, which left more space for the development of the lungs.<sup>42</sup> Moreover, the mammary glands, ordinarily dormant in the male, developed in a marked way. This accounted for the castrati being able to assume feminine roles with success on the operatic stage. In his book, *The Great Singers: From the Dawn of Opera to Our Own Time*, Henry Pleasants writes:

The vocal consequences of castration went well beyond the mere perpetuation of a boyish treble. The child continued to grow, and so did his voice; or at least his physical powers to exploit the voice he already had. Under the rigid

---

<sup>41</sup>Philip Duey, *Bel Canto in its Golden Age: A Study of its Teaching Concepts*. (New York: Da Capo Press, 1951), 46.

<sup>42</sup>Rodolfo Celletti, *A History of Bel Canto*. (New York: Oxford University Press, 1991), 108.

discipline to which he would now be exposed <sup>43</sup>, his lung capacity and diaphragmatic support would be augmented to an extraordinary degree, enabling him to sustain the emission of breath in the projection of tone up to a minute or more, which is beyond the ability of most adult male and female singers. The mature castrato was a boy soprano or alto with all the physical resources of a grown man, although there was, of course — ‘something missing.’<sup>44</sup>

The rise of the castrati vocalist coincided with the growth of opera in the early seventeenth century. After the opening of the first public opera house in 1637 in Venice, Italian opera spread rapidly throughout Italy and Europe, and the castrati gained much fame and influence. They were challenged only by a few female singers,<sup>45</sup> and they often earned far more than the composers whose operas they performed.

By the early seventeenth century there were castrati employed all over Italy as court singers of ruling princes, in chamber, chapel, or both. To a much lesser extent, the castrati also developed in Germany, first in the southern capitals, then, by mid-century, in Dresden. The research reveals that nearly all of the castrated males of this time period were Italians and were trained in Italy. The insignificant numbers of locally produced voices in Germany and Spain quickly faded into Italy’s castrati monopoly. The castrati continued to flourish throughout much of the eighteenth century and into the nineteenth.

---

<sup>43</sup>In the Roman school during the seventeenth century, this included 3-4 hours of daily practice, plus as many hours devoted to theory, counterpoint, composition and harpsichord.

<sup>44</sup>Henry Pleasants, *The Great Singers: From the Dawn of Opera to Our Own Time*. (New York: Simon & Schuster, 1970), 41-42.

<sup>45</sup>There was a famous incident where a female soprano passed herself off as a castrato under the name “Bellino,” specializing in female roles.

Their exceptional mastery of breath control and breathing power, combined with assiduous training, was responsible for the flexibility, the ease of legato, the soft edge, and other qualities which, although common to all fine singers of the time, were unquestionably present in a decidedly spontaneous and marked way in most castrati.<sup>46</sup> The castrati took great care in developing the notion of the 'singing on the breath' method, championed by the early Italian pedagogues Tosi and Mancini, both of whom were castrati themselves.

The age of castration marked the advent of a 'singing machine.' The important principle was that of exploiting and strengthening in adult humans certain features and characteristics of the boy's voice. Without question, castration had several important ramifications on the vocal registers. In his text, *A History of Bel Canto*, Rodolfo Celletti writes:

Among 'white' voice, the boy's voice is that which in the natural range known in vocal jargon as 'chest voice' has the largest number of notes: from Bb to D'' or E''. Fairly often, therefore, the range is from A to F'', which means that from ten to thirteen notes can be sung with full voice in the chest register, as against approximately half that number in the female soprano voice. The advantage is obvious if we consider the strength, the fullness, the 'bite' of the chest or 'natural' voice as compared with the more penetrating but less vibrant and rounded sounds of the female 'head-voice.'<sup>47</sup>

This quote from Celletti is absolutely staggering. It serves to support our discussion in the previous chapter regarding the vitality and acoustic properties of

---

<sup>46</sup>Rodolfo Celletti, *A History of Bel Canto*. (New York: Oxford University Press, 1991), 109.

<sup>47</sup>Ibid.

tones emitted by the chest-register. Furthermore, when we put this knowledge into the context of the castrato's competing female contemporaries, an interesting fact begins to emerge.

It seems rather apparent that the instrument belonging to a female soprano simply could not compete with the vocal prowess available to even the average castrato. Orcheictomy gave the castrati an obvious advantage in the area of vocal registration. Subsequent to the operation, the range of the chest-register was nearly double that of the female. This information could perhaps explain the reason why female sopranos often resorted to pretending to be a castrato <sup>48</sup> in order to find favor in casting decisions.

Equally important is the fact that the castrati were most likely the first singers who trained their voices with the idea of smoothing out the register transitions, or the area known as the *passagio* or, passageway. Tosi was the first teacher to advocate a register change from chest to falsetto-register <sup>49</sup> as pitch ascended. He looked upon the change in register as the primary means of avoiding strident sounds. Without the register change, the acquisition of high notes was largely unattainable.

Based on the pedagogical writings of Tosi, we could infer that much of his teaching was concerned with bringing the falsetto downwards, and therefore, blending it into the chest-register. Celletti continues:

---

<sup>48</sup>I refer the reader to the aforementioned Rosselli text.

<sup>49</sup>The term *falsetto* used here would be synonymous with the term *head-voice* in twenty-first century pedagogy.

It could be presumed that until the beginning of the eighteenth century, the castrati had used for high notes a sort of reinforced falsetto or, *falsettotone* sufficiently round and bright; ...furthermore, that they adjusted the intensity and strength of the chest notes to bring them to some extent into line with the *falsettotone*.<sup>50</sup>

With the arrival of the Bolognese school of Antonio Pistocchi and the Neapolitan school of Niccolò Porpora,<sup>51</sup> people began to speak more of chest-voice production in the upper-range.<sup>52</sup> These nationalistic schools of singing began to blend into the falsetto-register characteristics of the chest-register. This marked the beginning of full, ringing high notes on the operatic stage.

The years 1715-1720 marked the beginning of resonant chest-voice vocalism. Famed castrati such as Bernacchi, Farinelli, and Carestini were adherents of this vigorous production. Without question, the use of the chest-voice seemed ideally suited to the bravura singing style to which they were accustomed.

Around 1730, an economic revival began in Italy. In a limited way, prospects for Italian-born sons began to improve. Thus, economic revival, a decline in membership to religious orders, and the fact that people were beginning to disapprove of the operation prompted the end of an era.

Throughout the reign of the castrati, there was little understanding about actual vocal physiology. However, of singular significance is the fact that the eunuchs were

---

<sup>50</sup>Rodolfo Celletti, *A History of Bel Canto*. (New York: Oxford University Press, 1991), 112-113.

<sup>51</sup>Both teachers were castrati.

<sup>52</sup>Rodolfo Celletti, *A History of Bel Canto*. (New York: Oxford University Press, 1991), 113.

the first to discover and teach the technique that enabled a singer to traverse the *passagio*, and therefore, change registers. This knowledge, coupled with a vigorous use of the chest-voice for the upper notes, began to lay the foundation of vocal pedagogy which continued, to a lesser and lesser degree, for the next two hundred years.

Unequivocally, although their knowledge base may appear to have been primitive, the castrati were the first known researchers into the effects of registers on vocal technique. As the castrati voice ascended in pitch, a change to the falsetto-register became necessary in order to avoid forced, muffled, or strident sounds. The practice developed by the castrati is still in use today as many singers employ registrational principles throughout the various stages of technical progress.

CHAPTER 4  
HISTORICAL APPROACH TO VOCAL REGISTRATION  
AND THE TWO-REGISTER THEORY

Both Tosi and Mancini were explicit in describing the typical characteristics of each register as well as the means to be employed in developing them. ...The very first step in voice training, therefore, should be devoted to finding the two registers and then exercising each in such a manner as to bring out their special characteristics.<sup>53</sup>

The great masters of the art of singing had very definite ideas concerning registration, but it was not until the middle of the nineteenth century that a concerted effort was made to give a logical explanation of the phenomenon. During the seventeenth and eighteenth centuries all references to registers acknowledged prevalent characteristics of sound quality rather than specific mechanical principles.<sup>54</sup>

Early teachers spoke of *voce di petto*, or voice of the chest, and *voce di testa*, or voice of the head<sup>55</sup>. The mechanics of tone production, as they are understood today, did not hold much interest for them. Consider what noted Italian teacher Blanche Marchesi wrote in 1932: "When I was a child I well remember that such terms as vocal cords, larynx, etc., were completely unknown."<sup>56</sup>

Without a physiological basis on which to identify a register, the only alternative available to teachers in previous centuries was to describe registers using sense

---

<sup>53</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 79.

<sup>54</sup>*Ibid.*, 64.

<sup>55</sup>The early masters firmly believed that the human voice contained only two registers.

<sup>56</sup>*Ibid.*

impressions. Thus, the terms ‘chest,’ ‘falsetto,’ and ‘head voice’ came into being.

Traditionally the chest register was considered a complete tone quality as opposed to a false tone quality, or falsetto. While efforts have been made to introduce new register terminology, chest, falsetto, and head remain the most widely used terms to describe vocal registers.<sup>57</sup>

Throughout the eighteenth and nineteenth century, the basis of correct singing involved the unification of the falsetto with the chest register. The method used to accomplish this unification was to strengthen the weaker register while restraining the stronger register. Although these early masters had not yet realized that vocal registration was physiologically based, they had discovered the mechanical principles necessary to rectify register maladies. They believed the vocal registers were the means by which they could develop the singing voice.

Describing the historical approach to registration, Cornelius Reid states:

The ability to favor one register over the other enables the teacher to alter the balance of tension distributed between the tensors of the vocal folds. Imbalances between the opposed systems are the source of all vocal problems. To accomplish the development of a seamless scale, one set of conditions must be able to give way to another; otherwise the only available option would be the maintenance of a status quo. ...The practice of favoring any particular register balance obviously has its pitfalls. ...On the basis of these observations, the real pitfall is to be found with a misunderstanding of vocal mechanics as they apply to the development and integration of the vocal registers.<sup>58</sup>

---

<sup>57</sup>Cornelius Reid, “Vocal Mechanics,” in *The Modern Singing Master: Essays in Honor of Cornelius L. Reid*, ed. Ariel Bybee and James Ford. (Lanham: Scarecrow Press Inc., 2002), 6.

<sup>58</sup>Ibid., 39.

A remarkably complete record of the opinions of the early teachers of singing has been preserved and is contained in the writings of several men whose teaching represented the highest traditions of the historic Italian school of singing. In addition, the belief that the human voice is composed of only two registers can be traced back to the late sixteenth century<sup>59</sup>, marking the beginning of the virtuoso era.<sup>60</sup>

Like so many musicians of the Renaissance period, Giulio Caccini was a famous singer and teacher of singing as well as an excellent composer and instrumentalist. His *Le Nuove Musiche* (1602) was a proclamation of a new style of solo singing. Caccini identifies the two registers as the *voce piena e naturale* (full and natural voice) and the *voce finta* (feigned voice, or falsetto). Caccini developed a dislike for falsetto, due to its lack of nobility and other innate limitations.

Caccini's compositions were written in a rather limited vocal range. James Stark asserts, "Caccini was apparently a one-register singer who eschewed falsetto and knew nothing of covered singing."<sup>61</sup> *Le Nuove Musiche* lightly touches upon some of the challenges of voice training as it was understood and practiced during his time. However, Caccini's disclosures suffer from a want of detailed analysis.<sup>62</sup>

---

<sup>59</sup>The interested reader should look at Lodovico Zacconi's *Prattica di musica* (1592). This text provides the most detailed early description of registers.

<sup>60</sup>James Stark, *Bel Canto: A History of Vocal Pedagogy*. (Toronto: University of Toronto Press, 1999), 58.

<sup>61</sup>Ibid, 60.

<sup>62</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 15.

An important eighteenth century vocal treatise was *Opinioni de' cantori antichi, e moderni, sieno osservazioni sopra il canto figurato* (1723)<sup>63</sup> by Pierfrancesco Tosi. He was the first known castrato to write about singing. Given the time period, Tosi naturally addressed his text primarily to sopranos, as castrati were fast becoming the reigning stars of Italian opera, and were the exponents of exemplary singing practices.

Tosi used the terms *voce di petto* and *voce di testa* to describe the two registers, and said that the singer must learn to use both registers. He offers important technical advice on the topic which is remarkably clear and complete, saying:

A diligent instructor, knowing that a soprano without the falsetto<sup>64</sup> must sing within the narrowness of a few notes, should not only attempt to acquire it, but should leave no means untried so that he unites it to the chest voice, in such a way that one cannot distinguish the one from the other, since if the union is not perfect, the voice will be of many registers, and consequently will lose its beauty.<sup>65</sup>

Following Tosi, there were a number of authors who subscribed to the two-register theory. Giambattista Mancini, another celebrated teacher of singing, published perhaps the most authoritative source material written on the topic of vocal registers in

---

<sup>63</sup>English translation, *Observations on the Florid Song*, (1743) is by Galliard.

<sup>64</sup>During this period of singing the term 'falsetto' is used to describe the upper-register of the voice, or, head-voice. Falsetto used here does not describe the light, breathy production with which some contemporary pedagogical circles associate the term.

<sup>65</sup>Pierfrancesco Tosi, *Observations on the Florid Song*, 1723, trans. J. E. Galliard (London: Stainer & Bell, 1987), 14-15.

the history of vocal pedagogy. His text, *Pensieri riflessioni pratiche sopra il canto figurato* (1774),<sup>66</sup> went through several editions, including a French translation.

Mancini may be considered a legitimate heir to the most authentic and authoritative sources and traditions of Bel Canto.<sup>67</sup> As a pupil of Bernacchi,<sup>68</sup> he became one of the great singers of the eighteenth century. Later, in his role as a teacher, it is probable that he retained intact the principles of vocal technique he had learned as a student.<sup>69</sup>

Like Tosi, Mancini was a castrato. Also like Tosi, he divided the voice into two registers, the chest and the head, stating:

The voice in its natural state is ordinarily divided into two registers, one of which is called the chest, the other the head or falsetto. I say, ordinarily, because there are rare examples in which one has received from nature the most unusual gift of being able to execute everything in the chest voice. I am speaking only of the voice in general divided into two registers, as commonly happens.<sup>70</sup>

Noted scholar Edward Foreman considers the preceding quote to be “the single most famous statement of the eighteenth century Italian literature” regarding vocal

---

<sup>66</sup>English translation, *Practical Reflections on Figured Singing*, (1774 & 1777) is edited by Foreman.

<sup>67</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 16-17.

<sup>68</sup>Bernacchi was a celebrated mezzo-soprano, who concluded his career by passing on the Bolognese tradition as the teacher of Senesino, Carestini, and the German tenor, Anton Raff.

<sup>69</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 16.

<sup>70</sup>Giambattista Mancini, *Practical Reflections on Figured Singing*, 1774, 1777, trans. E. Foreman. (Minneapolis: Pro musica press, 1996), 17.

registers.<sup>71</sup> Furthermore, when the teachers of the era noted the tendency that the voice ordinarily divided itself into two-registers, they discovered the first significant insight into the guiding principles of voice production.

Mancini believed that when the coordinate action of the registers was insufficiently developed or improperly combined, this lack of coordination had to be dealt with on a functional level. Thus, Mancini developed the most logical and practical solution to register problems the singing art had seen to date.

He advocated the theory that each vocal register could be isolated and exercised independently of the other. Furthermore, if this process was arduously followed by both master and pupil, a coordinate action of the registers was eventually achieved.

Let us consider what Mancini wrote regarding register isolation. Throughout the following two quotations, notice the markedly practical, and therefore, applicable advice given to solve register issues.

Here, Mancini speaks of a voice in which the chest-register is dominant, saying:

For example, take a scholar who has strengthened his chest tones, but has those of the head weak out of all proportion.... Then suppose: the head voice being in need of help, since it is separated from the chest, the most certain method to help unite them is for the scholar, without losing time, to undertake in his daily studies the manner of holding back the chest voice and of strengthening little by little the unfriendly notes of the head, in order to render the latter equal to the former in the best possible way.... He must subdue a portion of the voice which is strong, and render vigorous another portion, which is by nature weak.<sup>72</sup>

---

<sup>71</sup>Edward Foreman, *Authentic Singing Being The History and Practice of The Art of Singing and Teaching in Two Volumes*. (Minneapolis: Pro musica press, 2001), 70.

<sup>72</sup>Giambattista Mancini, *Practical Reflections on Figured Singing, 1774, 1777*, trans. E. Foreman. (Minneapolis: Pro musica press, 1996), 33-34.

Mancini now speaks of the voice in which the head-register is dominant, saying:

It remains for me now to speak of those voices which are slender and weak throughout their registers.... One observes that these voices are very weak in the chest notes, and a greater majority deprived of any low notes, but rich in high notes, or head voice.... There is not a method more sure to obtain this end, I believe, than to have such a little voice sing only in the chest voice for a time.

The exercise should be done with a tranquil solfeggio; and as the voice enriches itself with greater body, and range, one may blend it as much as possible with the low notes.<sup>73</sup>

These quotations are worthy of careful study by the contemporary voice teacher.

They include pointed suggestions for directed study and practice<sup>74</sup>. Discussing the quotations above, Stephen Austin states:

It is interesting to note that in Mancini's book no examples of exercises are given. The assumption made must be made that he didn't think his readers needed them. Many of his principles were much better understood then and to write them out would have been to state the obvious.<sup>75</sup>

Patricio Rodriguez Manuel García II (1805-1906) is a unique figure in the history of music. After a brief singing career<sup>76</sup> he entered the teaching profession. García's major publications include *Mémoire sur la voix humaine* (1840), *Traité complet de l'Art du chant* in

---

<sup>73</sup>Ibid.

<sup>74</sup>In *Bel Canto: A History of Vocal Pedagogy*, author James Stark offers a thorough review of the historic approach to registration found in the significant extant manuscripts of historical pedagogy. However, while Stark has indeed made a singular contribution to contemporary vocal pedagogy, his appraisal of Mancini's beliefs into registration are largely misinterpreted.

<sup>75</sup>Stephen Austin, "Scientific Support for the Two-Register Theory," in *The Modern Singing Master: Essays in Honor of Cornelius L. Reid*, ed. Ariel Bybee and James Ford. (Lanham: Scarecrow Press Inc., 2002), 73.

<sup>76</sup>García *filis* appeared as *Figaro* in the Rossini opera at age 20. His strenuous performing routine at a young age (at times he sang tenor roles for his indisposed father) no doubt contributed to his early vocal demise.

two volumes (1841, 1847),<sup>77</sup> and *Hints on Singing* (1894). García would labor as a teacher of singing for nearly seventy-five years.

His classic definition of a vocal register has remained the benchmark of historical pedagogy since its inception. At the time there was nothing controversial about García's definition of a register. Its major distinction rests with its having been the first technically accurate description of a previously unrecognized vocal fact. Being crucial to any historical review into registration, we will examine the definition once again.

García writes:

By the word register, we understand a series of consecutive and homogenous tones going from low to high, produced by the development of the same mechanical principle, whose nature differs essentially from another series of tones equally consecutive and homogenous produced by another mechanical principle.<sup>78</sup>

During his early years as a teacher, García appears to have perpetuated the principles of vocal registration he had learned from his father. However, García remained largely dissatisfied with the length of time necessary to acquire vocal mastery under the old system.<sup>79</sup> This dissatisfaction caused García to move away from traditional training methods as he became increasingly reliant on the physiological and scientific principles involved in voice training.

---

<sup>77</sup>English translation, *A Complete Treatise on the Art of Singing*, (1841, 1847) is edited by Paschke. The *Traité* is considered to be his most important contribution to historical pedagogy.

<sup>78</sup>Manuel García, *A Complete Treatise on the Art of Singing: Part One*, trans. Donald V. Paschke. (New York: Da Capo Press, 1982), xli.

<sup>79</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 167.

In García's case, there is little doubt that he was searching for the mechanical basis for the failure of his own voice, which deteriorated when he was in his mid-20s.<sup>80</sup>

Moreover, following García's example, many voice teachers of that era tried to devise ways of shortening the training period.<sup>81</sup>

Describing García's eventual departure from traditional methods, Reid states:

With the dawn of the scientific era and general speedup of everyday life by mechanization and industrialization, however, he grew somewhat restive and impatient with the slow-but-sure procedures of voice training and sought some means of shortening the period of apprenticeship heretofore understood to be indispensable to vocal mastery. With this object in mind he invented the laryngoscope...<sup>82</sup>

At last, it became possible to observe the vocal folds in operation and study their varied responses to register impetuses. Thus, García developed and conducted numerous experiments on the vocal mechanism. He did this with the sole purpose of gaining direct control over the vocal organs themselves. Reid continues:

It was García who in a lifetime of teaching introduced many theories widely at variance with the practices of the early masters. Many of the ideas of tone production initiated by him are still in vogue today, and the complete disappearance of the old system of training is to a very great extent his responsibility.<sup>83</sup>

In an attempt to rectify errors caused by his departure from tradition, García published a retraction in the *London Music Herald* in 1894, stating:

---

<sup>80</sup>Edward Foreman, *Authentic Singing Being The History And Practice of the Art of Singing And Teaching in Two Volumes*. (Minneapolis: Pro musica press, 2001), 132.

<sup>81</sup>Prior to García's *filis*, the average time required to produce a fine voice was six years.

<sup>82</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 169.

<sup>83</sup>Ibid.

Avoid all these modern theories and stick closely to Nature. I do not believe in teaching by means of sensations of tone. The actual things to do in producing tone is to breathe, to use the vocal cords, and to form the tone in the mouth. The singer has to do with nothing else. I began with other things; I used to direct the tone in the head, and do peculiar things with the breathing, and so on, but as the years passed by I discarded them as useless, and now speak only of actual things and not mere appearances.... I condemn that which is spoken of nowadays, viz., the directing of the voice forward, or back and up. Vibrations come from puffs of air. All control of the breath is lost the moment it is turned into vibrations, and the idea is absurd that a current of air can be thrown against the hard palate for one kind of tone, the soft palate for another, and reflected hither and thither....

With regard to the position of the larynx, higher or lower, the singer need only to follow natural emotional effects, and larynx, palate and the rest will take care of themselves.<sup>84</sup>

This statement from García is telling. Although he had authored many of the more modern developments in voice teaching, his counsel is to “avoid all these modern theories and stick closely to Nature.” Thus, during his final years of teaching García was compelled to return to the abandoned procedures he had originally inherited from his father and other predecessors.<sup>85</sup>

Based on García’s classic definition of the term register, we notice that he (like his Italian predecessors) recognized two main registers. In his model, the lower register was called the ‘chest-register,’ and the upper register was called the ‘falsetto-head register.’ This falsetto-head register was formed by the adjoining of two parts, with the lowest taking the name ‘falsetto,’ and the highest taking the name ‘head.’ Thus, he

---

<sup>84</sup>Ibid., 167.

<sup>85</sup>Ibid., 168.

considered the head-register to be an upward extension of the falsetto-register, but with certain differences that justified a separate name.<sup>86</sup>

With the aid of the laryngoscope, García surmised that the two main registers were produced by two distinct modes of vibration of the vocal folds. He noted that in the chest voice, the folds vibrate throughout their depth and length; in the falsetto-head voice, only the inner margins of the vocal folds vibrate. These modes of vibration are considered to be the mechanical principle that distinguished the two main registers.<sup>87</sup> García considered a register to be a series of sounds that not only had unique textural properties, but also owed their being to a special type of mechanical arrangement.<sup>88</sup>

Some confusion arose from García's placing the falsetto between the chest and head voice in his register model. Stark writes:

García was sensitive to this misunderstanding, and he later capitulated and adopted a three-register model that abandoned the term falsetto for the middle portions of the voice and was thus more easily accepted. In *Hints on Singing* (1894) he wrote, 'Every voice is formed of three distinct portions, or registers, namely *chest, medium, and head*.'<sup>89</sup>

Proof of García's ability as a teacher of singing lies in the large number of exceptional singers of several nationalities who were his students. Richard Miller

---

<sup>86</sup>James Stark, *Bel Canto: A History of Vocal Pedagogy*. (Toronto: University of Toronto Press, 1999), 68.

<sup>87</sup>*Ibid.*, 69.

<sup>88</sup>Cornelius Reid, *The Free Voice: A Guide to Natural Singing*. (New York: Coleman-Ross Company, Inc., 1965), 33-34.

<sup>89</sup>James Stark, *Bel Canto: A History of Vocal Pedagogy*. (Toronto: University of Toronto Press, 1999), 71-72.

states, “Never in the history of solo singing has one individual so influenced vocal pedagogy as did Manuel García.”<sup>90</sup>

With a few exceptions, nearly all that is known of the two-register historical approach to singing is contained in the writings of Tosi, Mancini, and García *files*. These authors are in almost unanimous agreement with regard to the principles and mechanics involved in registration. Findings of other sources are certainly less authentic, but also further the validity and accuracy of the experience of these early writers.

It appears apparent that very few authentic exponents of the historical Italian model of vocal registration existed in the twentieth century. One advocate for the Italian model was British pedagogue and scientist Douglas Stanley, who published *The Science of Voice* in 1929. Stanley’s views on registration appear to fall in line with the historical Italian model. In fact, Stanley takes García’s definition a step further and develops a far more concise and satisfactory version of the original. Stanley avoids general terms and focuses on the source of the mechanical action, stating:

There are two groups of muscles: The arytenoid and the cricothyroid groups, which act as tensors of the vocal cords. The preponderance of effect of one group over the other determines a register. There are consequently two and only two registers in the human voice.<sup>91</sup>

---

<sup>90</sup>Richard Miller, “Historical Overview of Vocal Pedagogy,” in *Vocal Health and Pedagogy*, ed. Robert Thayer Sataloff. (San Diego: Singular Publishing Group, Inc., 1998), 305.

<sup>91</sup>Douglas Stanley, *The Science of Voice*. (New York: Carl Fischer Inc., 1929), 7.

On the topic of register isolation, Stanley's views are reminiscent of Mancini's advice offered more than a century before *The Science of Voice* was published, Stanley argues:

In the process of training a voice, the only possible method of strengthening the muscles of the larynx is to isolate the coordinations which determine the registers, and in this way to work on the muscles which predominate for each register *separately*, paying special attention to those of whichever register is weaker.<sup>92</sup>

Stanley's ideas were further developed by his protégé, Cornelius L. Reid. A skillful writer on the topic of vocal registers, Reid occupies a singular position in the field of vocal pedagogy. His trilogy of texts consisting of *Bel Canto: Principles and Practices* (1950), *Voice: Psyche and Soma* (1975), and *The Free Voice: A Guide to Natural Singing* (1965) represent well-researched writings on the Italian school of singing.<sup>93</sup>

While many modern-day pedagogues claim to teach registrational concepts that are rooted in the Italian Bel canto tradition, few teachers of singing have ever examined the body of knowledge that comprised its inception. This wealth of material is rich in fundamental truths that need to be understood before effective teaching can take place.

---

<sup>92</sup>Ibid., 48.

<sup>93</sup>Reid's *Bel Canto* represents one of the finest reviews of the old Italian school ever written. Furthermore, his synthesis and practical application of Mancini's register separation techniques remain unsurpassed. Reid has remained active in teaching well into his nineties.

CHAPTER 5  
CONTEMPORARY APPROACH TO VOCAL REGISTRATION  
AND THE DECLINE OF THE TWO-REGISTER THEORY

At no time in the history of singing has the diversity of ways in which vocal sound can be manipulated been more apparent. Nor has there ever been less agreement on how to achieve those diverse sounds, or what constitutes 'good singing.'<sup>94</sup>

Through the years, teachers of singing have taken many different paths in an effort to devise methods to bring about a state of functional efficiency within the vocal mechanism. However, it appears evident that the teaching practices employed up until the middle of the nineteenth century were superior to those that were devised later.<sup>95</sup>

Despite the efforts of the early Italian masters to lay down training methods which dealt directly with vocal function, much of their work is considered 'ancient' and therefore, is dismissed by many modern-day voice teachers.<sup>96</sup> In fact, some modernists have claimed that historical singing methods have been lost because the early teachers carried their carefully guarded secrets to their graves.

Reid maintains that acquiring knowledge into the training methods used by the early masters is possible for any voice teacher who begins to diligently research

---

<sup>94</sup>Edward Foreman, *Authentic Singing Being The History and Practice of Singing and Teaching in Two Volumes*. (Minneapolis: Pro musica press, 2001), 151.

<sup>95</sup>Cornelius Reid, *The Free Voice: A Guide to Natural Singing*. (New York: Coleman-Ross Company, Inc., 1965), 3.

<sup>96</sup>Once García implemented the use of the laryngoscope in 1854, historical practices began to diminish due to efforts to obtain more direct control over vocal function. Although it is doubtful that this was García's original intention, the laryngoscope effectuated a move away from more traditional methods.

historical vocal pedagogy with an open mind. In stating his strong opinion on the efficacy of historical methods, Reid straightforwardly states:

These early teachers were not part of a cult, and their students were not sworn to a code of silence. Perhaps the obstacles which bar our understanding have been of our own making and will be removed once we become aware of the inaccuracy of most of our present opinions regarding voice.<sup>97</sup>

The ultimate goal should be to move historical practices from the realm of abstruse mysteries toward the realm of comprehensible truths. Then we can begin to implement these fundamental principles, once again, into modern pedagogical usefulness.

Contemporary teachers of singing often employ methods of vocal registration that have worked most satisfactorily in their own singing. Thus, they acquire knowledge through studying voice one-on-one with a particular teacher or teachers, and by listening to recordings of the great singers.

Few teachers who are successful performers have either the time to carry out elaborate studies into historical voice teaching methods. Their lives are filled with learning repertoire to be performed, singing engagements, and other obligations.<sup>98</sup>

Thus, the study of pedagogy is relegated to the bottom of the singer's 'to do' list. Reid remarks:

Therefore, when the proper time arrived to take up the duties of teaching, those who had once been leading singers taught only those principles of tone

---

<sup>97</sup>Cornelius Reid, *Bel Canto: Principles and Practices*. (New York: Joseph Patelson Music House, 1950), 156.

<sup>98</sup>*Ibid.*, 162.

production made known to them by *their* teachers, and the mistake consistently made has been merely duplicating a pedagogic procedure they themselves had experienced as students.<sup>99</sup>

In an expressly strong statement, Foreman asserts:

Unfortunately, this has led many fine singers to teach badly at the end of their performing careers, because they teach the distortions and compromises which have enabled them to survive when good vocal emission was absent, or failed.<sup>100</sup>

Moreover, a large portion of the learning process is also acquired through experimentation with students until the teacher finds an approach which works. Thus, more overtly empirical methodologies abounded during the twentieth century.

Foreman aptly describes the picture of vocal pedagogy in the twentieth century, saying it was a time of “contentious and apparently willful argumentation.”<sup>101</sup>

Describing the pedagogical literature of the twentieth century, Foreman continues:

Most noticeable is that the majority of books written in the twentieth-century are polemics without much in the way of exercises, at least in the old style. Few vocalizes, fewer solfeggi, but cross-sections of the head and throat, diagrams of various methods of breathing, diagrams of “tone sensations,” suggest that a purely mechanical approach has replaced common sense and a trained and perceptive ear.<sup>102</sup>

Naturally, concepts of registration were not immune to the decimation brought about by newer *en vogue* methodologies. Consider the words of Dr. H. Holbrook Cutis<sup>103</sup> in 1901:

---

<sup>99</sup>Ibid.

<sup>100</sup>Edward Foreman, *Authentic Singing Being The History and Practice of The Art of Singing and Teaching in Two Volumes*. (Minneapolis: Pro musica press, 2001), 152.

<sup>101</sup>Ibid., 153.

<sup>102</sup>Ibid., 158.

The author has for a long time been convinced of the many fallacies which have been obtained in the theories as to the so-called 'registers' of the human voice, and the absurdities of the deductions as to the manner of vibration of the vocal cords made from photographs taken during tone production.<sup>104</sup>

The twentieth century marked the beginning of the 'celebrated singer' publication. Lilli Lehmann initiated this type of authorship with *How to Sing* (1903). The figure depicting Lehmann's subjective tone-placement sensations moving up and down in the body in response to pitch has been very influential on twentieth-century teachers.

While Lehmann is regarded as one of the finest singers in history, her pedagogical observations are entirely suspect. She devotes countless pages to describing the sensations *she* experienced in singing, thus proposing that *any* singer could 'feel' the same sensations she had experienced. Here, Lehmann dismisses vocal registers, saying:

Do registers exist by nature? No. It may be said that they are created through long years of speaking in the vocal range that is easiest to the person, or in one adopted by imitation, which then become a fixed habit.<sup>105</sup>

Subsequently, the voice profession began to confuse ends with means, and functional effects with functional causes. Unfortunately, in midst of this confusion the essential body of knowledge relating to vocal register function learned from the past

---

<sup>103</sup>Curtis, along with tenor Jean De Reske, instituted the idea of 'placing the tone in the facial resonators,' commonly referred to in contemporary circles as 'forward placement.' Apart from the fact that it is acoustically impossible to direct or place sound vibrations, placement concepts further induce overt nasality, constrictor tensions, and a distortion of vowel quality. I would also note that both Jean and Edouard De Reske, leading exponents of this school, lost their voices prematurely.

<sup>104</sup>H. Holbrook Curtis, *Voice Building and Tone Placing*. (New York: D. Appleton & Co., 1900), 3.

<sup>105</sup>Lilli Lehmann. *How To Sing*, (New York: Macmillan, 1903), 107.

and important to the present became lost.<sup>106</sup> García recognized two important principles when he defined a register as being a series of homogenous sounds produced by one mechanism, differing essentially from another series of equally homogenous sounds produced by another mechanism. Firstly, he recognized, like Mancini, that the voice divided into two registers that were separated by the 'break.' Secondly, García considered a register to be a series of sounds not only having textural properties but also being produced by a *mechanical arrangement of the laryngeal musculature*--by a mechanical principle.

Why do some factions of contemporary pedagogy contend with the historical two-register model? The main reason is that use of defective terminology has caused the once clear concepts of 'head' and 'chest' to drift from their original meanings. Cornelius Reid argues:

Factually speaking, the vocal organs are neither in the 'head' nor the 'chest,' but in the throat; and it is in the throat that the muscles which position the vocal cords and establish a condition favorable to resonance are to be found. Thus, the mechanisms to which García alluded are in the laryngeal pharynx, not elsewhere, and the registration is created through adjustments made by laryngeal muscles.... The unfortunate aspect of the terminology employed by the early teachers of singing was that it contained no reference to the *mechanics* of the vocal function at all, but merely described the *by-products* of that function.<sup>107</sup>

This quotation points out that the conceptual clarity the early masters developed for the vocal registers describes only the *by-products* of the mechanical action necessary to bring out those qualities pertaining to a register. Consequently, succeeding

---

<sup>106</sup>Cornelius Reid, *The Free Voice: A Guide to Natural Singing*. (New York: Coleman-Ross Company, Inc., 1965), 35.

<sup>107</sup>*Ibid.*, 34.

generations of pedagogies have increasingly focused on the sensations of vibration peculiar to each register, i.e., the by-products, rather than on the patterns of pitch, vowel, and intensity which activates the registration.

The early masters did indeed consider that the sensations of vibration associated with the head register created the impression of the tone being concentrated in the upper cavities of the body, i.e., the head area, while the sensations of the chest register created the impression of the tone being concentrated in the sternum area, i.e., the chest.

The crux of the matter is the issue that contemporary instruction ardently attempts to establish a correct functional arrangement without regard for the mechanical principles which bring about this arrangement. In doing so, the two-register model is rejected, and is instead replaced by imprecise vernacular such as, 'place'<sup>108</sup> the tone in the mask, 'sing it farther forward,' 'focus your voice,' and other methodologies that patently fail to improve the *function* of the intrinsic musculature involved in vocal registration.<sup>109</sup>

Voice teaching can be either a functional process or an aesthetic process. A functional process is one which encourages natural movement and removes muscular

---

<sup>108</sup>Singing in the head voice created the impression that the tone had been 'focused' or 'brought forward.' This eventually led to the assumption that the tone had been 'placed.' However, the exact place has long been a moot question, and is therefore a source of disagreement among voice teachers.

<sup>109</sup>Cornelius Reid, *The Free Voice: A Guide to Natural Singing*. (New York: Coleman-Ross Company, Inc., 1965), 35.

interferences. An aesthetic process taken to excess would be one which attempts to fix the voice note by note, without due consideration to underlying vocal function.

As I close this chapter, I will attempt to further illustrate my survey of the contemporary approach to registers by including a number of quotations from some twentieth-century voice teachers. They are borrowed from the chapter dealing with registration in *A Spectrum of Voices: Prominent American Voice Teachers Discuss the Teaching of Singing*, by Dr. Elizabeth-Blades Zeller.<sup>110</sup>

**Marcia Baldwin:**

It's particularly important to bring the head down into the chest with descending exercises from top to bottom so that you don't have a yodel effect going into chest.<sup>111</sup>

**Joan Wall:**

My premise is that registers are produced by a combination of laryngeal, resonance, and breath adjustments and that singers can develop considerable control over registers.<sup>112</sup>

**The late Edward Baird:**

I'm basically a three-register person. I understand all the various thinkings that go along with two registers, five registers, etc.; but basically, I believe that there are three registers because that's what I find most people have when they come in to work. They've got two adjustments, which means three registers.<sup>113</sup>

---

<sup>110</sup>Zeller received her DMA from the *Eastman School of Music*. Currently, she is an Associate Professor at *Heidelberg College* in Tiffin, Ohio. I have had the pleasure of getting to know Elizabeth through several conventions that we attended. Her book provides a look into the wide-range of methodologies currently in use.

<sup>111</sup>Elizabeth Blades-Zeller, *A Spectrum of Voices: Prominent American Voice Teachers Discuss the Teaching of Singing*. (Lanham: Scarecrow Press Inc., 2002), 48.

<sup>112</sup>*Ibid*, 42.

<sup>113</sup>*Ibid*.

**Helen Swank:**

We're back to establishing a feel for placement because that changes, and we're establishing an understanding of air flow through the passagio....

When you work with aspects of placement, a student develops awareness that they "felt" they had more space here or there; they begin to identify some of those things, then they can begin to utilize air flow connecting to tubal space on the inside.<sup>114</sup>

**Carol Webber:**

Drawing exclusively on registration is counter-productive and, again, I avoid anything that is *so* pre-set that each student has to fit *it*, rather than the point-of-view fitting each student.<sup>115</sup>

**Marvin Keenze:**

I consider registration to be the ability to color a tone in any part of the range for the communication of emotion, poetic atmosphere, or for vocal production ease.<sup>116</sup>

**Oren Brown:**

As to the number of registers, there's been a lot of study. Harry Hollien and his research group in Florida devised "loft, flute, modal, and pulse" as registers. "pulse is the lowest, "modal" is the speaking voice, "loft" compares to falsetto, and "flute" is the very highest. He devised these terms because these were qualities that he [Hollien] could identify on his scientific instruments.<sup>117</sup>

**Laura Brooks Rice:**

I talk about "pulling back" to go forward (pulling back the arches of the soft palate). You always have to feel the sound forward in the mask as you're going, no matter where you are.<sup>118</sup>

---

<sup>114</sup>Ibid., 43.

<sup>115</sup>Ibid.

<sup>116</sup>Ibid.

<sup>117</sup>Ibid., 45.

<sup>118</sup>Ibid., 46.

### **The late Bruce Lunkley:**

We discuss registration when it rears its ugly head. Some students have little problem with it; others seemingly have a new register every three or four notes... I help them find the correct resonance in the pitch area above the problem and then carry it down--that tends to solve the problem.<sup>119</sup>

A singer is capable of making beautiful sounds only to the extent that the coordinative process of the laryngeal muscles involved in phonation will permit. This obstacle is ever-present for the modern-day voice teacher. Instructors who insist on using tonal qualities representative of the singer's optimum aesthetic potential could possibly be arresting student progress. To conquer vocal problems, attention must focus on changing the coordinative habits of muscular responses involved register events.

As the voice teacher learns to hear functionally rather than aesthetically, student progress will be greatly increased.

---

<sup>119</sup>Ibid., 52.

## CHAPTER 6

### CONCLUSION

Upon examination of the manuscripts written by the early masters of the art of singing, we note that their training procedures largely centered around the development, purification, and gradual unification of the two registers of the singing voice. They believed that two registers were invariably a part of every voice, regardless of type and classification. Thus, there was no functional difference whatsoever between the soprano, alto, tenor, or bass voices. In addition, understanding the mechanics behind the vocal registers, they recognized that in both males and females the voice generally divided itself in approximately the same place: E-F above middle C.

Entirely unaware of the 'age of voice science' to come, the early teachers were forced to rely on hearing discernment. Therefore, their ears became highly adept at correctly estimating the physical status of the laryngeal musculature, i.e., the registers, based on the tonal qualities emitted by the singer.

Most inefficient tonal qualities were the product of imbalances within the registration. These imbalances were corrected by the use of carefully directed vocal exercises used to bring out the inherent mechanical characteristics of each register. Once the inherent characteristics of each register were developed separately, the gradual process of complete unification, or joining commenced.

The goal of this joining process was the attainment of a state of perfect coordination, where each register had been fully developed and smoothly united. The

early masters believed that when a singer could execute the *messa di voce* flawlessly--a state of ideal register coordination had been achieved.

When the two registers blended and worked together, the voice was capable of achieving a plethora of tonal qualities by varying the degree of tension in the cricothyroid and thyroarytenoid muscle systems. Historical pedagogy viewed the functional qualities of registration as the means by which a teacher could literally 'build' a voice. Therefore, twenty-first century voice teachers should be committed to understanding the tenets of the historical approach to registration. In doing so, they too will acquire the means by which they can 'build' voices.

In closing, I leave you with an encouraging quote from Mancini:

It may be the case that the blending of the two registers has not yet reached an ideal in evenness, nevertheless, I beg the teacher and student not to lose faith, because I am sure in the end success will crown the effort....  
And all the other tones of the voice will be benefited greatly by the exercise.<sup>120</sup>

---

<sup>120</sup>Giambattista Mancini. *Practical Reflections on Figured Singing, 1774, 1777*, trans. E. Foreman. (Illinois: Pro musica press, 1996), 61.

## REFERENCES

- Austin, Stephen F., "Confessions of a Golf-Playing Voice Scientist," *Australian Voice* (1998): 1-3.
- \_\_\_\_\_. "Principles of Voice Science: Studio Applications," *Australian Voice* (1996): 1-9.
- Blades-Zeller, Elizabeth. *A Spectrum of Voices: Prominent American Voice Teachers Discuss the Teaching of Singing*. Lanham: Scarecrow Press Inc., 2002.
- Brown, Oren. *Discover Your Voice: How to Develop Healthy Voice Habits*. London: Singular Publishing Group, Inc., 1996.
- Bybee, Ariel and James E. Ford, ed., *The Modern Singing Master: Essays in Honor of Cornelius L. Reid*. Lanham: Scarecrow Press Inc., 2002.
- Celletti, Rodolfo. *A History of Bel Canto*. New York: Oxford University Press, 1991.
- Coffin, Berton. *Historical Vocal Pedagogy Classics*. Lanham: Scarecrow Press Inc., 1989.
- Curtis, Holbrook. *Voice Building and Tone Placing*. New York: D. Appleton, 1901.
- Duey, Philip A. *Bel Canto in Its Golden Age*. New York: Da Capo Press, 1980.
- Foreman, Edward V. *Authentic Singing: Being the History and Practice of the Art of Singing and Teaching in Two Volumes*. Minneapolis: Pro musica press, 2001.
- Garcia, Manuel. *A Complete Treatise on the Art of Singing: Part One, 1841, 1872*. Edited & Translated by Donald V. Pashke. New York: Da Capo Press, 1984.
- \_\_\_\_\_. *Hints on Singing*. Edited by Hermann Klein. New York: E. Asherberg and Co., 1894.
- Hanson, Lloyd. "A Survey of Research on Vocal Falsetto." *The NATS Bulletin* (January/February 1987) : 9-13.
- Heriot, Angus. *The Castrati in Opera*. New York: Da Capo Press, 1974.
- Hirano, M., "Regulation of Register, Pitch, and Intensity of Voice." *Folia Phoniatica* (Vol. 22, 1-20; 1970).

- Hirano, Minoru, John O'hala, and William Vennard. "Vocal Mechanisms in Singing: Laryngological and Phoniatic Aspects." *Journal of Voice* (Vol. 2, No. 1, 51-69).
- Hirano, Minoru, John O'hala, and William Vennard. "A Series of Four Electromyographic Studies." *The NATS Bulletin* (October/December 1970; February/May 1971).
- Joiner, James Richard. *Charles Amable Battaille*. Lanham: Scarecrow Press Inc., 1989.
- Lehmann, Lilli. *How to Sing*. New York: Macmillan Publishing, 1903.
- Mancini, Giambattista. *Practical Reflections on Figured Singing, 1774, 1777*. Edited by Edward Foreman. Champaign: Pro musica press, 1996.
- Miller, Richard. *The Structure of Singing: System and Art in Vocal Technique*. New York: Schirmer Books, 1996.
- Pleasants, Henry. *The Great Singers: From the Dawn of Opera to Our Own Time*. Simon and Schuster, 1966.
- Reid, Cornelius L. *Bel Canto: Principles and Practices*. New York: Joseph Patelson Music House, 1950.
- \_\_\_\_\_. *The Free Voice: A Guide to Natural Singing*. New York: Joseph Patelson Music House, 1975.
- Rosselli, John. *Singers of Italian Opera: The History of a Profession*. Cambridge: Cambridge University Press, 1992.
- Sataloff, Robert Thayer. *Vocal Health and Pedagogy*. London: Singular Publishing Group, Inc., 1998.
- Stanley, D. *The Science of Voice*. New York: Carl Fischer, Inc., 1939.
- \_\_\_\_\_. *Your Voice: Applied Science of Vocal Art*. New York: Pitman Publishing Co., 1957.
- \_\_\_\_\_. *The Voice: Its Production and Reproduction*. New York: Pitman Publishing Co., 1933.

Stark, James. *Bel Canto: A History of Vocal Pedagogy*. Toronto: University of Toronto Press, 2000.

Steane, J.B. *Voices: Singer and Critics*. Portland: Amadeus Press, 1992.

Stockhausen, Julius. *A Method of Singing*. Translated by Sophie Löwe. London: Novello, Ewer, and Co., 1884.

Sundberg, Johan. *The Science of the Singing Voice*. DeKalb: University of Northern Illinois Press, 1987.

Tiger DRS. *Spectrographic Analysis in Real-Time Display Format with Record Capabilities*. Sacramento: California, 1998.

Titze, Ingo R. *Principles of Voice Production*. Iowa City: National Center for Voice and Speech, 1994.

Tosi, P. F. *Observations on the Florid Song, 1723*. translated by J. E. Galliard, edited by M. Pilkington. London: Stainer & Bell, 1987.

Turabian, Kate L. *A Manual for Writers of Term Papers, Theses, and Dissertations*, 6<sup>th</sup> ed. Chicago: University of Chicago Press, 1996.

Vennard, William. *Singing: The Mechanism and the Technic*. New York: Carl Fischer Inc., 1968.

Zemlin, Willard R. *Speech and Hearing Science: Anatomy and Physiology*. Needham Heights: Allyn & Bacon, 1998.

# APPENDIX A

## VOCALIZES DEALING WITH REGISTRAL ISSUES

### Isolating the Chest-Register: Males

*ff* >

y[a]  
y[ae]                      y[a]  
y[ae]                      y[a]  
y[ae]

etc.

(descend to lowest chest-register pitch before "vocal fry" tones; ascend to D or Eb4)

*f* (with marked portamento throughout)

y[a]                      etc. (up to D4 or Eb4)

*f* (with marked portamento throughout)

y[a]  
y[o]                      etc. (up to D4 or Eb4)

*f* (with marked portamento throughout)

y[a]  
y[o]                      etc. (up to D4 or Eb4)

### Isolating the Chest-Register: Females

*ff* (with marked portamento throughout)

y[a]  
[i]                      etc. (down to G3, up to Eb or E4)

**ff** (with marked portamento throughout)

[ i ] or [ a ] etc. (up to Eb or F4)

**ff**

y[a] ya ya ya ya  
y[e] ye ye ye ye etc. (start at F4 and descend to G3 or F#3)

**Isolating Falsetto-Head Register: Males**

Hooty and breathy

[u] etc. (stop at C5)

Hooty and breathy  
No chest-register integration  
on bottom note

[u] etc. (work the G3 to C5 pitch range)

**Isolating Head-Register: Females**

**p**

[u]  
[o] etc. (work the F4 to Bb6 pitch range)

slowly, on one breath

*pp*

[u] etc. (work the Eb4 to Ab6 pitch range)

(with marked portamento throughout)

*mp*

[u] etc. (work the F4 to G5 pitch range)

**Register Blending in Both Genders**

(with marked portamento throughout)

[u] [a]... [u] [a]... etc. (work in the appropriate ranges of the different voice types)

(no portamento)

y[a] y[a] etc. (work in the appropriate ranges of the different voice types)

APPENDIX B

LETTER OF PERMISSION

**Scarecrow Press**

4501 Forbes Boulevard, Suite 200, Lanham, Maryland 20706 USA

February 12, 2004

Dear Professor Ferranti,

This permission grants, no fee, the non-exclusive right to use the following material:

Figures 1, 2 and 3 from *Scientific Support for the Two-Register Theory* by Stephen Austin, as they appear on pages 66, 67 and 68 in The Modern Singing Master, edited by Ariel Bybee and James E. Ford and published by Scarecrow Press.

Permission is granted for your research and dissertation at Louisiana State University only. If you should decide to publish at a later date, permission must be re-cleared.

Please use the standard citation.

Sincerely,

Patricia Zline

Permissions

phone: 301-459-3366, ext.5420

fax: 301-429-5748

e-mail: pzline@rowman.com

## VITA

Taylor Ferranti, tenor, is currently an Assistant Professor of Voice at Cedarville University, in Cedarville, Ohio, where he teaches studio voice, opera literature, and vocal pedagogy. He is also completing a Doctor of Musical Arts degree at Louisiana State University in vocal performance and voice science.

A native of Long Island, New York, Taylor received the Bachelor of Music degree from the Crane School of Music in New York, and the Master of Music degree from Boston Conservatory. He has performed numerous roles in both opera and music theatre genres. An accomplished musician, Taylor has accompanied and/or conducted choirs, operas, music theater productions, and solo recitals. He can also be heard singing back-up vocals for pop recording artist, Billy Joel.

His teachers have included Stephen F. Austin, Oren Brown, and Cornelius L. Reid. In the summer of 2001, Taylor earned the Certificate of Vocology from the University of Iowa and the National Center for Voice and Speech, where he studied with eminent voice scientist, Ingo Titze.