

Vocal Pedagogy at the End of the Twentieth Century:

Revealing the Hidden Instrument

by

Rachel Velarde

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Graduate Supervisory Committee:

Jerry Doan, Chair
Andrew Campbell
Anne Kopta
David Britton
Theodore Solis

ARIZONA STATE UNIVERSITY

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ABSTRACT

The teaching of singing remained remarkably stable until, at the end of the twentieth century, advances in the understanding of voice science stimulated dramatic changes in approach to vocal pedagogy. Previously, the technology needed to accurately measure physiologic change within the larynx and breath-support musculature during the process of singing simply did not exist. Any prior application of scientific study to the voice was based primarily upon auditory evaluation, rather than objective data accumulation and assessment. After a centuries-long history, within a span of twenty years, vocal pedagogy evolved from an approach solely derived from subjective, auditory evidence to an application grounded in scientific data. By means of analysis of significant publications by Richard Miller, Robert Sataloff, and Ingo Titze, as well as articles from *The Journal of Singing* and *The Journal of Voice*, I establish a baseline of scientific knowledge and pedagogic practice ca. 1980. Analysis and comparison of a timeline of advancement in scientific insight and the discussion of science in pedagogical texts, 1980-2000, reveal the extent to which voice teachers have dramatically changed their method of instruction. I posit that voice pedagogy has undergone a fundamental change, from telling the student only what to do, via auditory demonstration and visual imagery, to validating with scientific data how and why students should change their vocal approach. The consequence of this dramatic pedagogic evolution has produced singers who comprehend more fully the science of their art.

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Chapter 1

INTRODUCTION: TIMES HAVE CHANGED

“Times have changed.”¹ Dale Moore (b. 1932) quoted the inimitable Cole Porter’s song, “Anything Goes,” during his president’s address to the 1996 National Association of Teachers of Singing (NATS)² Conference. He made his point, that after almost four hundred years of written vocal pedagogy, scientific knowledge and voice teaching had become integrated within the teaching studio. We know that a professional class of singing and formalized composition of solo repertoire emerged in the late 1500’s.³ For the next three hundred years, teachers⁴ wrote numerous books⁵ based upon external observation of the vocal instrument about best approaches to production, thereby extensively documenting the history of vocal pedagogy.

Yet, not until noted voice teacher Manuel Garcia, Jr. (1805-1906) (also known as Garcia II) presented details of laryngeal anatomy to the Royal Society in London in 1855, did medical professionals adopt the laryngoscope as a major diagnostic tool in medical practice.⁶ With the invention of the laryngoscope, for the first time it was possible to look down the throat of a singer and see the vocal folds in action. Three hundred years after the

¹ Dale Moore, “Times Have Changed,” *Journal of Singing* 53, no. 4 (Mar/Apr 1997): 3.

² See Appendix B: Definitions.

³ James Stark, *Bel Canto: A History of Vocal Pedagogy*, (Toronto: University of Toronto Press, 1999), xiii.

⁴ See Appendix B: Definitions.

⁵ For a chronological list of authors of treatises on singing written before or shortly after the 1855 introduction of the laryngoscope (and the ability to view the instrument within a living body) see Appendix C.

⁶ Stark, 6.

establishment of a class of professional singers, the voice was no longer the “invisible instrument.”⁷ Finally, doctors were able to look at a functioning larynx to see what internal movements took place during the creation of sound. Medical professionals subsequently began to take a heightened interest in the field of singing,⁸ and scientific research into the function of the speaking and singing voice abounded.

During the decades following Garcia’s invention, authors published many scientific, and pseudoscientific, textbooks on how to use the voice.⁹ In some cases, noted authors such as Douglas Stanley (1898?-1977) later reconsidered methods they had previously espoused:

“I have encountered a shockingly large number of voice students who have been seriously hurt through the incorrect use of the manipulations I have described—some of them were so badly injured that the training of their voices thereafter was impossible.”¹⁰

⁷ Richard Miller, “The Invisible Instrument,” in *Art of Singing (NATS Bulletin, 37, no. 2 (1980):25; repr. 1996), 224.*

⁸ Stark, xxii.

⁹ George Bernard Shaw’s July 1886 review of *Hygiene of the Vocal Organs* by Morell Mackenzie, M.D. began, “Though there must by this time be in existence almost as many handbooks for singers and speakers as a fast reader could skip through in a lifetime or so, publishers still find them safe investments.” Shaw notes that Mackenzie defines two registers of the voice, long reed and short reed. George Bernard Shaw, “A Book for Orators and Singers,” in *Bernard Shaw’s Book Reviews, Volume 1: Originally Published in the Pall Mall Gazette from 1885 to 1888*, ed. Brian Tyson (University Park, PA: Pennsylvania State University Press, 1991): 164. I was intrigued by Shaw’s review and so went to Mackenzie’s book. Mackenzie observed that the terminology ‘head voice’ was ludicrous, as the larynx is the “organ of the voice just as the eye is the organ of sight, or the ear of hearing. Every one would laugh at a man who should pretend to smell with his lips or see with his fingers.” This statement demonstrates only the beginning of arguments that regularly occurred between medical professionals and voice instructors at the end of the nineteenth century. Mackenzie states that he “shall endeavor to walk over the smouldering ashes of these disputes without stirring them up into flame...and confine myself to matters of fact.” Morell Mackenzie, *Hygiene of the Vocal Organs* (1886; repr. London: Macmillan, 1899), 27-28.

¹⁰ Douglas Stanley, *Your Voice: Applied Science of Vocal Art*, 3rd ed. (New York: Pitman Publishing, 1957), 358.

Stanley stated in his first book on vocal pedagogy that “proper use” of the voice depended upon knowledge of physics, anatomy, physiology, psychology, music fundamentals, interpretation, diction and speaking for the stage.¹¹ He also noted that, for the first time, advances in acoustic recordings had led to significant research into the subject of sound and its application to vocal technique, bringing science into the voice studio and creating “definite laws of the technic of singing and speech.”¹² His research led to the development of techniques of external laryngeal manipulation, the very techniques Stanley later renounced as harmful to the vocal instrument.

Previous attempts at using science to describe sound production by noted singers such as Lilli Lehmann (1848-1929) often resulted in what we now see as scientifically unsound statements such as, “In the sensation of [head tones]. . .m[y larynx] leans over to one side.”¹³ In her noted treatise, *How to Sing*, Lehmann uses physiological illustrations to show positioning of sensations within the pharyngeal areas (laryngo-pharynx, oro-pharynx, naso-pharynx) for vowels, chest and head voice, and other registration events. Noted pedagogues such as Berton Coffin (1910-1987) later agreed with an appreciable amount of what Lehmann said,¹⁴ even though much of what she stated was based upon her personal

¹¹ Douglas Stanley, *The Science of Voice: An Application of the Laws of Acoustics, Anatomy, Physiology and Psychology to the Problems of Vocal Technic, Including Sections on Music and Interpretation, Acoustics, Advice to Those Interested in the Radio and Talking Movies, and Descriptions of Original Researches* (New York: Carl Fischer, 1932), 1.

¹² Stanley, *Your Voice*, 5.

¹³ Lilli Lehmann, *How to Sing*, rev. ed. (New York: MacMillan, 1914), 97.

¹⁴ “It seems that Lehmann sensed that the Vowel Triangle of singing was smaller than that of speech. . .Did she have some advanced knowledge of formants and harmonics or was this a revelation through the senses when singing from the stage?” Berton Coffin,

experience of sensations, aiding in the pedagogic confusion of functional effects with functional causes. As a postscript to reviewing Lehmann's book, the eighteenth in a series for the *NATS Bulletin*¹⁵ of "Vocal Pedagogy Classics," Coffin wrote that he felt nothing new had occurred since the time of Garcia II, Mathilde Marchesi (1821-1913), William Shakespeare (1849-1931) et al., and that "much that is currently written is confusing and of questionable validity. We have much that is scientific and unrelated to the senses, to methodology, and to artistic singing...that would not be accepted by masters of the past."¹⁶ In 1984, more than one hundred years after the era of voice science was ushered in by Garcia II, Coffin articulated that voice science and vocal pedagogy were still on disparate tracks and had not come to terms with how to communicate with each other.

A gradual introduction of scientific methodology into the awareness of the voice professional is the hallmark of voice pedagogy treatises into the 1970's. In his seminal 1967 work, William Vennard (1909-1971) elucidated this conflict between science and studio teaching when he stated, "[Voice teachers] feel that knowledge of the anatomy of the vocal instrument only makes the student self-conscious, that any knowledge of the physics of its operation tends to make him mechanistic when he should be artistic."¹⁷ The question

"Lilli Lehmann: *How to Sing (1914)*," *NATS Bulletin* 40, no. 5 (May/June 1984; repr., *Historical Vocal Pedagogy Classics*, Metuchen, NJ: Scarecrow Press, 1989), 115.

¹⁵ See Appendix B: Definitions.

¹⁶ Coffin, "Lehmann," in *Historical Classics*, 121.

¹⁷ William Vennard, *Singing, The Mechanism and the Technic*, rev. ed. (New York: Carl Fischer, 1967), 1.

among voice professionals became how to incorporate new scientific information into standard pedagogical practices in the voice studio.¹⁸

The availability of scientific information to singing teachers about the function of the human voice increased exponentially during the 1980's and 1990's.¹⁹ As a result, teachers acquired a better understanding of the functional vocal results created by each vocalise.²⁰ This understanding enabled teachers to change their pedagogic strategies and tailor their teaching to individual students, resulting in a dramatic change in approach to that of teaching with a scientifically based pedagogic purpose. A purpose based in causality more than

¹⁸ “Almost all day I’ve been sitting here listening to the various presentations and wondering: Is there some underlying principle concerning all of these discussions and controversies which might be applied to the teaching of singing? . . . If I were to attempt to teach based only on these data, I would find them very confusing concepts. . . . So perhaps, one basic principle might be that in singing, we are searching more for isometric rather than isotonic contractions of pairs and muscles. . . . This would certainly explain why teachers often begin with legato exercises, where configurations and postures can be maintained in a very stable state and very controlled throughout the exercise. And then, some of the more virtuoso types of exercises are attempted later, once stability has been achieved.” Ingo Titze, “The Sound and its Origin: Panel Discussion,” Harry Hollien, Chair, in *Transcripts of the Seventh Symposium Care of the Professional Voice, Part I: The Scientific Papers*, Van Lawrence, ed., (New York: The Voice Foundation, 1978), 54-55, and “As a teacher of singing. . . it seems that each year, as I come to this symposium, that [teaching singing] is becoming more and more complicated. . . . What we have been zeroing in on today are the independent and yet, interdependent functions of phonation or the sound source and the resonance, and I think this can be very meaningful to us as teachers. The fact that they are now finding out that we *do* want the jaw to be as loose as possible can be very meaningful to us in our teaching, and we now know why it should be as loose as possible.” Oren Brown, “Panel Discussion,” 57-58.

¹⁹ The establishment of the *Journal of Research in Singing* in 1977, the regular addition of voice science sessions at NATS Conferences beginning in 1971, the annual Voice Symposia begun by The Voice Foundation in 1971, and the addition of regular articles addressing voice science applications to pedagogy, not just pedagogical empiric approaches, to the *NATS Bulletin* in the early 1980's all contributed to the increased dissemination of information from scientists to voice teachers and contributed to the discussion of how to apply the science to voice pedagogy.

²⁰ See Appendix B: Definitions.

empiric results. Teachers had a scientific understanding of how the voice functioned and they understood function in application to the singing process. By the end of the twentieth century, voice science became a regular presence in the teaching studio and its incorporation into voice study was no longer a novel pedagogical approach. Voice pedagogy had integrated the latest in scientific understanding into studio teaching.²¹

To chart this radical change in pedagogic approach from that based upon external observations to that based upon scientific fact, I survey English texts published at the beginning of the 1980's and compare their combination of voice science and vocal pedagogy with those texts published into the late 1990's. I take into account articles published in the *Journal of Singing*,²² publication of NATS, the major professional organization of teachers of singing in North America,²³ and the *Journal of Voice*, the peer-reviewed publication of The Voice Foundation on scientific research in voice, and I examine the scientific knowledge of vocal function available to the larger body of voice teachers within the United States.

²¹ See Appendix B: Definitions.

²² See Appendix B: Definitions.

²³ See Appendix B: Definitions.

Chapter 2

THE STATE OF VOCAL PEDAGOGY: ca. 1980

To clarify the state of scientifically based vocal pedagogy in the early 1980's, it is necessary to briefly consider the state of vocal science in the years preceding 1980. NATS held the first American Institute of Vocal Pedagogy (AIVP) program in 1959 at Indiana University. "Completion of the courses led to a fellowship in the AIVP."²⁴ One hundred seventy-three persons composed the first class of Founder's Fellows in 1960.²⁵ Researchers, including Vennard, D. Ralph Appelman (1908-1993), and Kenneth Westerman (1889-1955), conducted substantial explorations of voice science and published significant works throughout the twentieth century.²⁶

Westerman opened his 1955 text, *Emergent Voice*, by stating that voice teaching is in the era of "examined data" and is now able to utilize "all the other aids to the voice scientist which electrical and engineering research have developed."²⁷ In his text he examines ways in which teachers have traditionally taught and then uses current knowledge of physiology²⁸ to explain why these methods were successful. Westerman was not alone in his scientific

²⁴ National Association of Teachers of Singing, "The History of NATS: The 50's," *About National Association of Teachers of Singing, Inc.* <http://www.nats.org/media/files/historybanners/50s.pdf> (accessed November 10, 2012).

²⁵ National Association of Teachers of Singing, "The History of NATS: The 60's," *About National Association of Teachers of Singing, Inc.* <http://www.nats.org/media/files/historybanners/60s.pdf> (accessed November 10, 2012).

²⁶ Contributors to the literature as listed by Moore, 3; Vennard, *Singing: Mechanism and Technique*; Ralph D. Appelman, *The Science of Vocal Pedagogy: Theory and Application* (Bloomington, IN: Indiana University Press, 1967); Kenneth N. Westerman, *Emergent Voice*, 2nd ed. (Ann Arbor, MI: Edwards Brothers, 1955).

²⁷ Westerman, "Foreward," vii.

²⁸ Westerman, 17.

studies of the voice and the application of those studies to voice pedagogy. Appelman and Vennard, among others, also wrote noted scientific texts directed at the studio teacher.²⁹

Vennard created, with Janwillem van den Berg (1920-1985), the award-winning 1960 medical research film, *Voice Production: The Vibrating Larynx*,³⁰ showing the anatomy and physiology of voice production in the excised larynx. Vennard's final version of his textbook, *Singing, The Mechanism and Technic*, was used consistently as a major resource in vocal pedagogy courses throughout the United States. He was the NATS President 1964-1966, and under his tenure, the AIVP name was changed to "The Fellowship Program" (although it was eliminated subsequently "in favor of MTNA certification for NATS teachers without degrees"³¹).

Appelman's 1967 text, *The Science of Vocal Pedagogy*, is a reference work regularly quoted in current research as a resource for accurate pictures of the diaphragm,³² as well as the muscles of inspiration and expiration. NATS master teacher, Shirlee Emmons (1923-2010),³³ stated: "Everyone thinks of him as a 'vowel' man. . .but, indeed his chapter about

²⁹ See Appendix B: Definitions.

³⁰ Janwillem van den Berg, *Voice Production The Vibrating Larynx* (University Park, PA: Pennsylvania State University, Penn State Public Broadcasting, 2006). (DVD Reprint of Stichting Film en Wetenschap. *Voice Production The Vibrating Larynx*. Utrecht: Stichting Film, 1960.)

³¹ "History of NATS: The 60's." The assumption was that those NATS teachers who had degrees had obtained sufficient training in vocal pedagogy and did not need further training.

³² Appelman, 32-33.

³³ Shirlee Emmons is listed as a Master Teacher for the NATS Master/Intern Teacher Program, Ohio State University, 1996 and NATS Master/Intern Teacher Program, North Texas University, 1992 in her online biography, "Selected Appearances before National and International Organizations," *Biography*, <http://www.shirlee-emmons.com/biography.html> (accessed December 12, 2012).

breathing is spectacular.”³⁴ Appelman was best known for his studies on vowel formation in the mouth and how those internal shapes affected the tone. His radiographs (x-rays) of the tongue position relative to the pharyngeal cavity and larynx³⁵ are visually striking and continue to be a source of basic information on the physiological aspects of vowel formation.

In 1971, the Voice Foundation began its annual symposia, ‘Care of the Professional Voice,’ bringing together “laryngologists, voice scientists, physicists, computer scientists, speech-language pathologists, singing teachers, acting teachers, voice coaches, singers, actors, and other professionals.”³⁶ Scientific information about the voice became more readily available to the teaching community through publications such as the *NATS Bulletin*,³⁷ and the *Journal of Research in Singing* (1977-1995).

In December 1976, the U.S.-Japan Joint Seminar on Dynamic Aspects of Speech Production convened, “motivated by...the need...for a better understanding...of the articulatory gestures...and the organization and coordination of the neural commands that control these gestures [in speech production.]”³⁸ It was during this conference that Minoru Hirano (b.1932) presented the morphological structure of the vocal fold and how the fold

³⁴ Elizabeth Blades-Zeller, *A Spectrum of Voices: Prominent American Voice Teachers Discuss the Teaching of Singing* (Lanham, MD: Scarecrow Press, Inc., 2002), 12.

³⁵ Appelman, 297-348.

³⁶ Robert T. Sataloff, “Introduction,” in *Professional Voice: The Science and Art of Clinical Care*, 2nd ed., Robert T. Sataloff, ed. (San Diego: Singular, 1997), 4.

³⁷ See Appendix B: Definitions.

³⁸ Masayuki Sawashima and Franklin S. Cooper, eds., “Foreward,” in *Dynamic Aspects of Speech Production: Current Results, Emerging Problems, and New Instrumentation* (Tokyo: University of Tokyo Press, 1977), v.

functioned during phonation. Robert T. Sataloff (b.1949) cites this presentation by Hirano³⁹ as primary in furthering understanding that the vocal fold “consists of multiple layers of tissue, all having different mechanical properties.”⁴⁰ Hirano’s study also investigated the relationships between vocal fold layers by studying the activity of blood vessels, whose results contradicted evidence previously reported by Hirano.⁴¹ One of the major implications of these research findings into vocal fold layers was that the previous concept of the vocal folds as a single structure was no longer valid. The voice had been exposed as an even more complex instrument than previously understood.

Through the aforementioned publications, biennial NATS Conferences, and the Voice Symposia, scientific knowledge was available to teachers. What was lacking was direction in how to relate the importance of science to the teaching of artistic singing. My survey of the *NATS Bulletin* revealed that it was not until 1980 that Richard Miller’s (1926-2009) column presented scientific aspects of voice pedagogy in every issue. Even though important advances in voice science had been published for years, many voice teachers still had very little training in how to apply scientific knowledge directly to their studio teaching. Many were even deficient in their understanding of what the vocal folds look like in action. At that time, video of the vocal folds in action was prohibitively expensive for the studio

³⁹ Robert Thayer Sataloff, Barbara G. Bustillos, and William S. Winholtz, *Care of the Professional Voice* (Philadelphia, PA: Voice Foundation, 2000; DVD Repr. of 1993 VHS).

⁴⁰ Minoru Hirano, “Structure and Vibratory Behavior of the Vocal Folds,” in *Dynamic Aspects of Speech Production*, 15. Further research into the variability of the vocal fold layers along its length was presented at the 1980 Conference on Vocal Fold Physiology. Hirano’s findings are published as “The Structure of the Vocal Folds,” in *Vocal Fold Physiology* (Tokyo: University of Tokyo Press, 1980).

⁴¹ Hirano, “Structure and Vibratory Behavior,” 21.

teacher,⁴² and many had never seen the exact function of the instrument about which they were considered experts. Scientific research did not efficiently reach into the voice-teaching community's pedagogic consciousness.

Perhaps because of a lack of facile application, science to voice pedagogy, some teachers of singing took strong positions as to how relevant voice science should be to singing pedagogy⁴³ in the process commonly known as building the voice.⁴⁴ Emphatic discussion occurred over how much conscious control of the intrinsic and extrinsic muscles of the larynx contributed to vocal production. Yet, many of the leading researchers in voice science held positions as professors of voice and voice pedagogy,⁴⁵ and were therefore at the forefront of integrating voice science into modern vocal pedagogy.

NATS member and prominent voice teacher Cornelius Reid (1911-2008) specifically discounted the teachings of resonance by both Vennard and Appelman.⁴⁶ He chose to focus, instead, on the synergy between the muscle systems, the "positioning process,"⁴⁷ and in his 1974 book he stated that the vocal cords are "self-vibrating. . .virtually independent of

⁴² The Voice Foundation, "Publications," *Journal of Research in Singing* 3, no. 2 (Nov/Dec 1980), 40.

⁴³ See Dwayne Jorgenson, "A History of Conflict," *NATS Bulletin* 36, no. 4 (Mar/Apr 1980), 31-35.

⁴⁴ A standard term used throughout the vocal pedagogy literature and in the teaching studio. See Wormhoudt, *Building the Voice*, as an exemplar.

⁴⁵ William Vennard taught at University of Southern California, Ralph Appelman at Indiana University, Oren Brown at the Washington University School of Medicine and later the Juilliard School of Music. All were members of NATS.

⁴⁶ Cornelius L. Reid, *Voice: Psyche and Soma* (New York: Joseph Patelson Music House, 1975), 27-28.

⁴⁷ Reid, *Voice*, 24-25.

breath pressure and responsive solely to those motor impulses from the nervous system.”⁴⁸ Even at that time, this assertion had long been contradicted by scientific investigation, and the myoelastic-aerodynamic theory of voice production⁴⁹ presented by van den Berg in 1958⁵⁰ was consistently espoused by Vennard and Appelman. In 1973, Raymond H. Colton (b. 1942) and Harry Hollien (b.1926) stated that, “the aerodynamic-myoelastic theory of laryngeal function is a logical amalgamation of two separate views of the physiology of the larynx.”⁵¹ Dissention between approaches to voice pedagogy and the application of voice science research had yet to be resolved.

Prominent publications ca. 1980 reflect this dichotomy between a traditional observational approach to voice instruction and an evidence-based analytical approach. As such, writers still needed to ensure that they wrote in terms familiar to their audience, while advancing the scientific information learned about the voice. Scientific leaders such as Dr. Friedrich Brodnitz (1899-1995), to whom Vennard gives the credit for opening his eyes to the world of voice research,⁵² perhaps demonstrated a way to demystify voice science by

⁴⁸ Reid, *Voice*, 74.

⁴⁹ The myoelastic-aerodynamic theory of voice production explains vocal fold oscillation by stating that Bernoulli (negative) forces cause the vocal folds to be drawn together, closing the airspace within the glottis (the opening between the vocal folds). With the folds thus closed, air pressure from the lungs builds up until sub-glottic pressure is sufficient to “blow open” the glottis. Myoelastic refers to muscular elasticity of the vocal folds. Aerodynamic refers to the airflow through the vocal system.

⁵⁰ Janwillem Van den Berg, “Myoelastic-Aerodynamic Theory of Voice Production,” *Journal of Speech and Hearing Research* 1 (1958):227-244.

⁵¹ Raymond H. Colton and Harry Hollien, “Physiology of Vocal Registers in Singers and Non-Singers,” in *Symposium on Vocal Registers in Singing: Proceedings of a Symposium*, John W. Large, ed. (The Hague: Mouton, 1973), 105-106.

⁵² Vennard, iii. Brodnitz’ 1959 publication, *Vocal Rehabilitation*, quotes Vennard in discussion of “voice practice,” commonly called today vocal rehabilitation. He cites the

utilizing an entire chapter to describe a visit to the doctor and the exact procedures followed during a laryngoscopic exam in his 1973 book, *Keep Your Voice Healthy*.⁵³ His gentle approach and clear enumeration of clinical procedure compassionately allay the singer's fear of the unknown.

In 1979, Richard Alderson's *Complete Handbook of Voice Training* focused on analyzing several areas of vocal technique to help teacher and student understand the causes of differing technical difficulties. Alderson designed the book to assist teaching vocal music to young singers, specifically relating modern vocal research with modern vocal training, while validating many of the old techniques.⁵⁴ After establishing his ideal guidelines for voice teaching, he aspired to help the voice teacher solve specific vocal issues by exposing underlying causalities and proposing a broad range of solutions for these issues, via examination of standard vocal exercises.⁵⁵

Alderson disguises voice science in the way he terms vocal folds “vocal bands,”⁵⁶ and equates their intrinsic qualities to those of rubber bands that can be stretched and shaped by various laryngeal muscles. He speaks of the differing textures, as well as the relative thickness and stretch of rubber bands as analogous to the way the “vocal bands” function. He specifically states that he speaks in terms of analogies, as the mechanism of the voice is

1950 first edition of Vennard's *Singing: The Mechanism and the Technic*. Friedrich S. Brodnitz, *Vocal Rehabilitation: Prepared for the Use of Graduates in Medicine* (Rochester, MN: Whiting Press, 1959), 78.

⁵³ Friedrich S. Brodnitz, “What the Doctor Can See,” in *Keep Your Voice Healthy* (Springfield, IL: Charles C. Thomas, 1973), 120-136.

⁵⁴ Richard Alderson, *Complete Handbook of Voice Training* (West Nyack, NJ: Parker Publishing, 1979), 7.

⁵⁵ Alderson, 9.

⁵⁶ Alderson, 63.

well-described in numerous other texts on vocal pedagogy.⁵⁷ In describing resonance, he speaks of having a conversation with a musicologist who insisted that vocal resonance be described only with aural terms, rather than the traditional kinesthetic terms.⁵⁸ In basing his discussion of resonance on this precept, Alderson is able to correlate traditional terms of resonance that describe tones in terms of sight and sensation⁵⁹ with a contemporary scientific explanation that includes discussion of harmonics and vowel formants.⁶⁰ Alderson's consistent approach to vocal pedagogy works to reassure the uncertain voice teacher about the importance of a foundational understanding of voice science while reinforcing the validity of traditional teaching methods.

Pearl Shinn Wormhoudt (b. 1915) based her 1981 text, *Building the Voice as an Instrument*, on relating “the scientific language I use to the non-scientific language traditionally used.”⁶¹ As a student of Vennard, Wormhoudt understood the importance of voice science research, and, like Alderson, she details specific exercises and their technical aims. She is also very clear in her aim of creating a resource for teachers. The first five

⁵⁷ Alderson, 63.

⁵⁸ Perhaps because the voice is an invisible instrument and singers and teachers physically cannot get their hands on it, voice teachers traditionally teach students to feel for placement of the sound within the body to determine the physical positioning of the resonators within the pharyngeal space. This dependence upon kinesthetics, in part, created the common terms head voice and chest voice, as the head and chest are frequently the center of physical sensation when singing specific tones. To speak of resonance in aural terms is to rely upon the science of acoustics, using terms such as overtones, harmonic series, formants and vocal tract tuning.

⁵⁹ Commonly used terms include: “Place the tone in the face/mask,” “Sing the tone forward and narrow,” “Feel the note go up and out the back of the head.”

⁶⁰ Alderson, 102-104.

⁶¹ Pearl Shinn Wormhoudt, *Building the Voice as an Instrument: With a Studio Reference Handbook for Singing Teachers and Singers* (Oskaloosa, IA: William Penn College, 1981), 1.

chapters detail the function of the vocal systems, while relating stories of teaching and applying information in the studio. The subsequent twelve chapters deal directly with how to teach this information, from a detailed description of a first lesson, no matter the singing experience of the student, to a statement of principles for “vocalising to build the voice.”⁶² She speaks of teaching the student what to do to establish a healthy functioning instrument, rather than treating the symptoms, by always having the student think positively about what he needs to do correctly, rather than of what he is doing incorrectly.⁶³

How then, could teachers of voice become more comfortable in applying their knowledgeable about current scientific research? Although NATS coordinated with the International Association of Experimental Research in Singing (IAERS, publishers of the *Journal of Research in Singing*) on presentations in voice science at the National Conferences beginning in the 1970’s,⁶⁴ and the Voice Foundation annually invited teachers of singing to its Symposia, teachers did not yet regularly apply scientific knowledge to their vocal pedagogy, perhaps because although volumes of research was being completed, the connection of how to apply the science in the studio was not yet clear.⁶⁵ Although the *NATS Bulletin* regularly published articles on voice pedagogy and standard texts included

⁶² Wormhoudt, 76-78.

⁶³ Shirlee Emmons and Alma Thomas state that some of the chief characteristics of high-achievement performers are: “Maintenance of positive thoughts and imagery throughout performance; high confidence that is unshakeable; an ability to remain focused and concentrated, without distractions; thinking that is committed and disciplines; control over performance,” *Power Performance for Singers* (New York: Oxford University Press, 1998), 14. This type of thinking was demonstrated in the positive thinking that Wormhoudt espoused, and was validated by scientific research, as quoted by Emmons and Thomas.

⁶⁴ Moore, 3.

⁶⁵ See footnote 18 detailing 1978 comments by Titze and Brown.

information on voice science, it took the contributions of targeted texts from authors such as Wormhoudt and Alderson to set the stage for texts like Meribeth Bunch's 1982 publication, *Dynamics of the Singing Voice*.⁶⁶

⁶⁶ Meribeth Bunch, *Dynamics of the Singing Voice* (Vienna: Springer-Verlag, 1982).

Chapter 3

DYNAMICS OF THE SINGING VOICE: 1982

The first edition of *Dynamics of the Singing Voice*, by Vennard student⁶⁷ Meribeth Dayme Bunch (b.1938), opens with her statement of the goal to make voice science approachable for the voice teacher. She declared her desire to facilitate communication between medical professionals and teachers. She was not alone in her concerns. Bunch's call to clarify communication between voice professionals was echoed one year later at the 12th *Symposium on the Care of the Professional Voice*.⁶⁸ Yet, in a departure from the afore-mentioned books by Wormhoudt and Alderson, Bunch does not enumerate specific vocal exercises and an analysis of their purpose.

This approach to teaching singing without recourse to specific vocal exercises is in prominent contrast to *The Vocal Performer* by Jeffrey Foote⁶⁹ and Miller's⁷⁰ seminal 1986 work,

⁶⁷ Bunch, 1982, ix.

⁶⁸ “Results of relevant research must be disseminated in a less intimidating and more accessible manner. Language must be simplified; jargon must be eliminated; elitist attitudes must be resisted. If articles and even presentations here at this symposium could be summarized simply at their conclusions for the non-specialist—if conclusions could include the inferring of possible applications of results obtained to training or to practice, then instead of voice scientists and physicians doing research for on another, you could be fueling my creative fires and certainly improving my knowledge of the scientific bases for what I teach.” Bonnie N. Raphael, “Bridging the Gap between Theoretical Research and the Needs of the Voice Professional,” in *Transcripts of the Twelfth Symposium Care for the Professional Voice, Part I: Scientific Papers*, ed. Van L. Lawrence (New York: Voice Foundation, 1983), 42.

⁶⁹ Jeffery Foote, *The Vocal Performer: Development through Science and Imagery* (Mt. Pleasant, MI: Wildwood Music, 1983).

⁷⁰ Richard Miller is cited throughout this work, hereafter noted as Miller. He is not to be confused with Donald G. Miller, most of whose work falls after the period of vocal pedagogy under discussion and who is active in both NATS and the Voice Foundation.

The Structure of Singing,⁷¹ both of which demonstrate a strong connection to voice science, but also spend several chapters discussing vocal exercises (vocalises) and detailing their function. Because her intention to enhance communication between singers and scientists contrasts with Foote and Miller's objective to educate the voice professional in vocal function, Bunch's limitations on the material included in her book,⁷² presenting only comprehensive scientific information on the physiology of the voice, enhances its status as a research-based work congruous with publications by the scientific community. The manner in which this data is stated gently eases the unsuspecting voice teacher into understanding how voice science enlightens vocal pedagogy.

The prominence of *Dynamics of the Singing Voice* was not immediately apparent. As a monograph of a scientific publisher, it did not receive much attention in the voice community. There was no review of the text in any of the major voice research publications of the time. Yet, the structure of Bunch's text and her clear approach to presenting the science of the voice is repeated in vocal pedagogy texts of the 1990's, demonstrating its influence over time upon vocal pedagogy. Renewed demand for the book was evidenced by the appearance of a second edition, substantively identical to the first edition, in 1993,⁷³ and its subsequent re-issue as third and fourth editions in 1995 and 1997.

⁷¹ Richard Miller, *The Structure of Singing: System and Art in Vocal Technique* (New York: Schirmer Books, 1986).

⁷² The limitations on subjects covered, as well its publication by noted publisher of scientific texts, Springer-Verlag, as a monograph in a series on "Disorders of Human Communication," [*Dynamics*, 1982, Editors' Foreword] validates Bunch's text for the scientific community.

⁷³ Meribeth Bunch, *Dynamics of the Singing Voice*, 2nd ed. (Vienna: Springer-Verlag, 1993).

The first chapter of *Dynamics of the Singing Voice* specifically details the “Psychological Aspects of Singing,”⁷⁴ a topic broadly addressed by other authors in treatises on singing, although often in only one or two paragraphs on maintaining emotional health.⁷⁵ Bunch begins by identifying the “Aspects of Communication” in a flow chart that shows the interconnectivity of thought from the initial mental concept to performance,⁷⁶ discussing how voice production is so interrelated with personality that any voice professional must operate with active cognition of both, when working with either a healthy or a disordered voice. She states that factors of language use and word choice, vocal clues to a person’s self-image, physiological factors of physical structures, acoustic factors of auditory discrimination and hearing, and environmental factors of performance (from the acoustics of the hall to the psychological environment between the teacher and the student) must all be taken into account when determining the viable function of the sound production.

The chapter continues to expand upon this information in detailed sections, 1) referencing current treatises on psychology⁷⁷ to compare the use of the speaking voice to the quality of the singing voice,⁷⁸ 2) in relating to the psychological aspect of sound production, 3) commencing a preliminary discussion on breathing and the body as the vocal

⁷⁴ Bunch, 1982, 4.

⁷⁵ For example, Barbara Kinsey Sable, *The Vocal Sound* (Englewood Cliffs, NJ: Prentice-Hall, 1982), 52.

⁷⁶ Bunch, 1982, 5.

⁷⁷ This type of approach is validated by Miller, when he states “it seems particularly important. . .for singing teachers to be cognizant of developments in related fields and their potential to enhance teaching,” in “The Singing Teacher in the Age of Voice Science,” in *Professional Voice: The Science and Art of Clinical Care*, Robert T. Sataloff, ed. (New York: Raven Press, 1991), 375.

⁷⁸ Bunch, 1982, 6.

instrument,⁷⁹ 4) introducing the idea of vocal acoustics as a new field of research, and 5) discussing music perception as “the intuitive recognition of aesthetic qualities of music.”⁸⁰ Via the lens of this non-traditional approach to discussing the vocal instrument, Bunch unthreateningly applies scientific methodology to territory familiar to the studio, the mental state of the singer. Bunch directly addresses the voice teacher on how best to interact with their pupil,⁸¹ and she concludes the chapter by addressing the issue of artistry and creating a healthy pedagogical atmosphere in the singing studio, one based on confidence and creativity.⁸²

As Bunch continues her discussion of physiological studies of breathing in humans, scientific terminology comes to the forefront.⁸³ Bunch cites studies of breathing patterns, but notes that these studies have rarely included singers, leading researchers and singing teachers to reach differing conclusions, while utilizing inconsistent and often conflicting terminology so that even a basis of research needs could not be communicated between the two groups. She posits that this may be because of the lack of study of singers and breathing

⁷⁹ The first of the humorous drawings Bunch utilizes throughout the text to illustrate her points, further drawing in the tentative reader, occurs here as an illustration on hyper- vs. hypofunctional singers. Bunch, 1982, 10. Further drawings are found on pages 18, 22, 75, and 95.

⁸⁰ Bunch, 1982, 13.

⁸¹ “The teacher of singing has the responsibility of educating the performer as well as the listener and therefore must cultivate their perceptions. . .it is best to be mindful of helpful choices that can be made in the [intimate] relationship [between pupil and teacher],” Bunch, 1982, 13-14.

⁸² Bunch, 1982, 16.

⁸³ Terms such as primary phonatory mechanism, breathing apparatus and auxiliary muscles. Ibid., 9-10.

habits on the part of researchers,⁸⁴ but states that the problems are likely exacerbated by the lack of scientific knowledge of the breathing processes on the part of the singing teacher.⁸⁵ In this chapter, Bunch links correct bodily alignment directly to efficient breathing and she introduces Eastern philosophy by positing that physical alignment and balance directly affect mental balance.⁸⁶ Again, by introducing that of the philosophical, Bunch removes the intimidation of the scientific jargon utilized within her text. Yet, she brings this call for physical balance back to the scientific by stating that physiologists have shown head position on the neck to govern postural reflexes.⁸⁷ In moments, Bunch moves from detailing Eastern philosophy to Western medicine, yet she relates the two in such a way that they enhance each other, rather than detract or intimidate.

Not only does this chapter on breathing deal with posture, but the clear illustrations and figures that are a hallmark of this book are utilized for the first time, detailing the external and internal intercostal muscles of respiration.⁸⁸ The depth here of anatomical

⁸⁴ How the singer and non-singer differently utilize the breathing mechanism was scientifically addressed the following year by Rolf Leanderson, Johan Sundberg, Curt von Euler and Hugo Lagercrantz. They state that the information coming from the scientific community on diaphragmatic activity on expiration directly contradicts the experience reported by singers and teachers of singing. They found “variation of the transdiaphragmatic pressure during singing, apparently reflecting the diaphragmatic activity.” Leanderson, et. al, “Diaphragmatic Control of the Subglottic Pressure During Singing,” in *Transcripts of the Twelfth Symposium Care for the Professional Voice: Part I: Scientific Papers*, ed. Van L. Lawrence (New York: Voice Foundation, 1983), 218.

⁸⁵ Bunch, 1982, 17.

⁸⁶ Bunch, 1982, 18.

⁸⁷ Bunch, 1982, 20.

⁸⁸ Bunch, 1982, 21. To maintain the flow of text with detailed scientific jargon, many of the figures and illustrations have lengthy explanations in the captions; these captions alone are a strong reason to read this text. Anatomical photographs throughout are by permission of the Anatomy Department of the Royal College of Surgeons of England.

information matches that found in any anatomy book,⁸⁹ yet Bunch keeps the focus firmly on the function of these muscles in the act of singing, while citing scientific studies whose research details additional information on their function. The chapter concludes with Bunch again emerging from scientific detail in order to relate scientific facts to kinesthetics of breathing and singing.⁹⁰

The central portions of the book cover the physiology and function of the systems of vibration, resonance and articulation of the vocal instrument, with an abundance of factual and complete scientific information. Clean illustrations and diagrams continue to explain with detail and clarity how each muscular system functions. Bunch furthers her research-based presentation of scientific aspects of vocal production, while bringing the function of the science back to the experience of the singer and voice teacher.

Throughout *Dynamics of the Singing Voice*, Bunch comprehensively defines the anatomic structures of breathing (inspiration and expiration), phonation, resonance and vocal quality (pharynx and vocal acoustics), and articulation. Into each section, Bunch inserts statements such as, “Muscles like the masseter...are capable of many gradations [enabling] the singer to hold or lock the jaw into a variety of positions, all detrimental to good singing,”⁹¹ that remind the reader all of this knowledge is in service to a better informed voice community. Indications of how the function of certain muscle groups of physical habits can affect the singing voice abound throughout the text.

⁸⁹ Henry Gray, *Anatomy of the Human Body* (Philadelphia: Lea & Febiger, 1918; repr., Bartleby.com: 2000), www.bartleby.com/107/ (accessed November 18, 2012).

⁹⁰ Bunch, 1982, 49.

⁹¹ Bunch, 1982, 105.

Bunch closes the book in the same manner in which she began, by moving away from the intensive scientific terminology contained in the central chapters into terms more familiar to the studio teacher. In Chapter Seven, “Vocal Problems: Their Prevention and Care,”⁹² Bunch directly addresses the medical aspects of singing, utilizing the same presentation methods from in chapter one when speaking of the psychological aspects of singing. She addresses the issue of how singers can best help their doctors by being well prepared for an initial visit when in vocal distress. She also discusses the physical care of the body as one of the best pro-active treatments of the voice.

Her conclusions of chapter Eight, “Co-ordination, Spontaneity and Artistry,”⁹³ are the closest Bunch comes to giving specific directions in how and what a teacher should teach, while directly addressing the common fear that a singer who knows too much will no longer be capable of artistry. In Chapter Eight, Bunch almost demands that the singer become a “dynamic performer [who] steps out of himself and allows...timelessness to pervade his being so that...his making of music is a flowing, ever changing, spontaneous entity.”⁹⁴ She relates the long process by which a singer dedicates himself to the study of singing to the way an elite athlete approaches learning his sport. She advocates the understanding of body language,⁹⁵ and maintaining a love of the art.⁹⁶ Bunch draws the body-mind connection into one dynamic unit, so that the science contained within her text

⁹² Bunch,1982, 110-121.

⁹³ Bunch,1982, 122-131.

⁹⁴ Bunch, 1982, 129.

⁹⁵ Bunch, 1982, 126.

⁹⁶ Bunch, 1982, 127.

remains in the service of creating music, rather than as its own pursuit. In so doing, Bunch strives to allay fears of teachers who believe knowing too much about the function of the voice leads to a lack of communicative skill and artistry in the singer,⁹⁷ and she opens a path for the nascent scientific vocal pedagogue to combine this knowledge and apply it in the studio.

Dynamics of the Singing Voice was different from other voice pedagogy texts written in the early 1980's, with its clear presentation of scientific information relating to vocal production and voice science, its lack of vocal exercises, and its attention to new developments in cognitive science. Yet it also became the template for vocal pedagogy texts in the 1990's, as discussed later in this paper. With this book, the trajectory of vocal pedagogy moved from descriptive writing to a factual analysis of vocal production.

⁹⁷ Vennard, 1.

Chapter 4

PEDAGOGY AND SCIENCE: WORKING TOGETHER INTO THE 1990's

From early in the history of NATS, American teachers had access to advances in voice science. In 1969, five papers were presented at a meeting of the Acoustical Society of America, in the effort to spur research into the singing voice. These papers were re-presented (with a sixth added) at the subsequent 1970 Silver Jubilee Convention of the National Association of Teachers.⁹⁸ This presentation was an opportunity for scientists and voice teachers to interact, yet scientific research into the singing voice still did not become commonplace, even into the 1980's.

From November 1980 through January 2002, Miller's column *Sotto Voce* was a regular feature in the NATS Bulletin.⁹⁹ The column appeared in each edition of the publication and dealt with matters of vocal pedagogy. As a regular part of the publication of the major North American professional association for teachers of singing, Miller's columns were also one of American teachers' main sources of information on adjustments in approach to in vocal pedagogy.¹⁰⁰ Miller's first column, "The Invisible Instrument," set forth his guiding principle that science and artistry should combine. He stated that, although the singing teacher cannot see every internal aspect of the instrument, by using an excellent

⁹⁸ John Large, "Introduction," in *Vocal Registers in Singing: Proceedings of a Symposium*, John W. Large, ed. (The Hague: Mouton, 1973), 7.

⁹⁹ See Appendix B: Definitions.

¹⁰⁰ Many of these columns, from 1980-1995, are collected in Miller's 1996 publication, *On the Art of Singing* (New York: Oxford University Press, 1996). None of the reprints have the original citations attached to them, so it is difficult to discern in which order and when the columns were printed. This author utilized the *Journal of Singing* online index, http://www.nats.org/component/chronoconnectivity/?connectionname=JOS_Index (accessed November 23, 2012), to determine which articles appeared in which issue, so this author could cite them here as reprints. Additional articles by Miller from various other publications are also reprinted in *On the Art of Singing*, again without specific citation.

eye in conjunction with an excellent ear, much can be determined by external visual examination about the status of the invisible instrument hiding within the body of the singer.¹⁰¹ Throughout the decade, Miller repeatedly returned to the previously mentioned discussion of the precedence of artistry over science.¹⁰²

Miller was not a voice in the wilderness in his call for teachers to apply scientific knowledge to their art of teaching the mastery of the vocal instrument. Other pedagogues calling for inclusion of voice science into the art of vocal pedagogy included Dwayne Jorgenson,¹⁰³ Reid,¹⁰⁴ Re Koster (1900-?),¹⁰⁵ Robert Edwin (b.1946) in his *NATS Journal*¹⁰⁶ column, “The Bach to Rock Connection,”¹⁰⁷ Theophil Otto (b. 1940) (his column “Checklist of Recent Research” in *Journal of Research in Singing* contained three “Vocal Pedagogy” topics

¹⁰¹ Miller, “The Invisible Instrument.”

¹⁰² Notably in the following articles reprinted from *Art of Singing*: “On the Invasion of Vocal Pedagogy by Science,” (*NATS Bulletin*, 39, no. 1 (1982):38) 222-223; “The Misuses of ‘Scientific Information’ in the Teaching of Singing,” (*NATS Bulletin*, 39, no. 3 (1983):28) 249-252; “Open Windows: Keynote Address, National Convention of the National Association of Teachers of Singing, Minneapolis, Minnesota, July 3, 1983,” (*NATS Bulletin*, 40, no. 1 (1983):26-30) 88-96; “The Flat Earth School of Vocal Pedagogy,” (*NATS Journal*, 44, no. 1 (1987):17-18), 70-74; and “Let’s Build a Straw Man! (The Technique-versus-Artistry Debate),” (*NATS Journal*, 45, no. 5 (1989):14), 247-248.

¹⁰³ Jorgenson, “A History of Conflict.”

¹⁰⁴ Cornelius Reid, “Functional Vocal Training,” Parts 1 and 2, in *Journal of Orgonomy*, 4, no. 2 (1970):231-49; 5 no. 1 (1971):36-64 and “Science and Vocal Pedagogy,” in *Journal of Research in Singing*, 7, no. 2 (Sep/Oct 1984):23-33.

¹⁰⁵ Re Koster, “Some Thoughts on the Teaching of Singing,” in *Journal of Research in Singing*, 8, no. 1 (Jul/Aug 1984):39-41.

¹⁰⁶ See Appendix B: Definitions.

¹⁰⁷ Notably Edwin’s article, “He Told You to do What?” in *NATS Journal* 43, no. 2 (1986):38.

from 1982-1993),¹⁰⁸ and Thomas Cleveland in his *NATS Journal* column, “Voice Pedagogy in the Twenty-First Century,” beginning in 1988 with a column titled, “Teach and Sing with High Tech,”¹⁰⁹ and continuing through 1996.

Not only did *NATS Journal* include regular columns on pedagogy, it also included regular articles from Ingo Titze (b.1941), voice researcher, and Van L. Lawrence (d. 1990), laryngologist.¹¹⁰ These regular articles presented the latest in scientific research directly to the voice teaching community. Sataloff and Titze state, “The [NATS] organization’s success at disseminating information has already produced obvious changes for the better among singing teachers and singers.”¹¹¹ Scientific articles published in the *NATS Bulletin*¹¹² covered a myriad of subjects from the how airplanes affect voice use,¹¹³ to admonitions to exercise,¹¹⁴

¹⁰⁸ Otto Theophil, “Checklist of Recent Research: No. 3—Vocal Pedagogy,” “Checklist of Recent Research: No. 15—Vocal Pedagogy: Update of Checklist No. 3,” and “Checklist of Recent Research: No. 23—Vocal Pedagogy: Update of Checklist No. 15,” in *Journal of Research in Singing*, 5, no. 2 (Sep/Oct 1982); 12, no. 1 (Jul/Aug 1989); 16, no. 1 (Jul/Aug 1993).

¹⁰⁹ Thomas Cleveland, “Voice Pedagogy for the Twenty-First Century: Teach and Sing with High Tech,” *NATS Journal* 45, no. 1 (Sep/Oct 1988):27.

¹¹⁰ Maria L. D’Antoni and Robert T. Sataloff, “Introduction: Van L. Lawrence, M.D.: The Teacher’s Teacher,” in *Vocal Health and Science: A Compilation of Articles from The NATS Bulletin and The NATS Journal*, Robert T. Sataloff and Ingo R. Titze, eds. (*NATS Journal* 46, no.2 (Nov/Dec 1989); repr. Jacksonville, FL: The National Association of Teachers of Singing, 1991), 1.

¹¹¹ “Preface,” in *Vocal Health and Science: A Compilation of Articles from The NATS Bulletin and The NATS Journal*, Robert T. Sataloff and Ingo R. Titze, eds. (Jacksonville, FL: The National Association of Teachers of Singing, 1991), ii.

¹¹² See Appendix B: Definitions.

¹¹³ “The moisture level of cabin air is approximately at 10% relative humidity. . .The cruise noise and conversational speech have similar frequency ranges. There is considerable interference. . .at noise levels of 90-95 db speech becomes abnormal in 80% of subjects.” Robert J. Feder, “Singing and Flying,” in *Vocal Health and Science: A Compilation of Articles from The NATS Bulletin and The NATS Journal*, Robert T. Sataloff and Ingo R. Titze, eds. (*NATS*

and many other issues of scientific and medical import to singers, bringing these ideas and information to teachers of singing.

How did scientists learn what it was teachers needed to know? The annual voice symposia, 'Care of the Professional Voice,' created in 1971 by the Voice Foundation, provide a forum for researchers and voice professionals to interact and share ideas with each other.¹¹⁵ The first symposium was entitled "Short Course on Basic Concepts of Voice for Teachers of Singing and Speech."¹¹⁶ In 1981, the Voice Foundation created the annual G. Paul Moore lecture in order for leaders in their field to provide an overview of their particular field of interest and to proffer their philosophical and personal perspective on voice, with a focus on information of value to an interdisciplinary audience.¹¹⁷ This annual lecture created an additional forum for researchers and other voice professionals to interact

Bulletin 40, no.1 (Sep/Oct 1984); repr. Jacksonville, FL: The National Association of Teachers of Singing, 1991), 105-106.

¹¹⁴ "Singing is an athletic activity," in Robert T. Sataloff's first article as a continuing contributor on matters of vocal health and care, "Ten Good Ways to Abuse Your Voice: A Singer's Guide to a Short Career (Part I)," in *Vocal Health and Science: A Compilation of Articles from The NATS Bulletin and The NATS Journal*, Robert T. Sataloff and Ingo R. Titze, eds. (*NATS Journal* 41, no.1 (Sep/Oct 1985); repr. Jacksonville, FL: The National Association of Teachers of Singing, 1991), 136. In this article, Sataloff also directly addresses a new subject to vocal pedagogy circles, stating that, "Too often, our elite teachers refuse to teach singers interested in popular music careers, restricting their studios to "serious" signers. This forces popular singers to study with less experience teachers, stylists who call themselves teachers, or worse." Sataloff thus advocates for knowledgeable vocal instruction for all professional voice users.

¹¹⁵ Robert T. Sataloff, "Introduction," in *Professional Voice: The Science and Art of Clinical Care*, 2nd ed., ed. Robert T. Sataloff (San Diego: Singular, 1997), 4.

¹¹⁶ Wilbur James Gould and Gwen Susan Korovin, "Laboratory Advances for Voice Measurements," in *Journal of Voice*, 8, no. 1 (1994):8. Reprinted in *Voice Perspectives*, Robert T. Sataloff, ed. (repr. San Diego: Singular, 1998), 181.

¹¹⁷ Robert T. Sataloff, "Preface," in *Voice Perspectives*, Robert T. Sataloff, ed. (San Diego: Singular, 1998), xi.

and raise questions and concerns about the state of the art in both research and pedagogy.¹¹⁸ Occasional issues of the *Journal of Voice* focus on specific issues, such as the initial issue focused on respiration. A notable article by NATS master teacher Shirlee Emmons, “Breathing for Singing,” brought voice pedagogy terminology to the scientist, speech pathologist and medical professionals. The paper was presented at the sixteenth symposium, ‘Care of the Professional Voice’.¹¹⁹

The effect of these discussions between researchers and other voice professionals was the creation of a body of knowledge that was immediately available and useful to the voice teacher. Sataloff said, “We finally have enough information to include effectively in our voice care armamentarium the most important missing component: rational thought. It has raised the standard of voice care and training forever.”¹²⁰ With Bunch’s 1982 *Dynamics of the Singing Voice* demonstrating a viable way for voice pedagogy to embrace voice science, several textbooks published during the late 1980’s and early 1990’s dealt directly with voice science and voice pedagogy as one integral unit.

¹¹⁸ Topics included are “A Cultural History of the Human Voice,” by Hans von Leden in 1982; “That Golden Voice—Talent or Training?” by Harry Hollien in 1984; “Vocal Mechanisms in Singing: Laryngological and Phoniatric Aspects,” by Minoru Hirano in 1987; “Voice Research: The Next Ten Years,” by David W. Brewer in 1988; “What’s so Special About Singers?” by Johan Sundberg in 1989; “Rational Thought: The Impact of Voice Science upon Voice Care,” by Robert T. Sataloff in 1994; and “The Odyssey of Orpheus: The Evolution of Solo Singing,” by Richard Miller in 1995. All of the above article were presented at the annual Symposia, originally published in either *Transcripts of the Symposium Care for the Professional Voice* (1981-1986) or in *Journal of Voice*, and then reprinted in *Voice Perspectives*, Robert T. Sataloff, ed. (San Diego: Singular, 1998), in which form this author encountered the articles.

¹¹⁹ Shirlee Emmons, “Breathing for Singing,” in *Journal of Voice* 2, no. 1 (1988):30-35. Emmons’ article is cited frequently in publications of the early 1990’s.

¹²⁰ Robert T. Sataloff, “Rational Thought: The Impact of Voice Science upon Voice Care,” in *Journal of Voice* 9, no. 3 (1995):232. (Repr. *Voice Perspectives*, Robert T. Sataloff, ed. (San Diego: Singular, 1998), 222).

One of the first of these books was Barbara Doscher's (1922-1995) *The Functional Unity of the Singing Voice*, published in 1988.¹²¹ Doscher states that her book is not a methodology of singing, but rather an overview of the systems of singing and their function.¹²² In her introduction, she states that many teachers are still afraid of the word "science," but admonishes them that students have placed their physical body under the care of their teacher. Teachers are therefore as responsible for their student's wellbeing as a doctor or an athletic coach would be. As such, we are under a moral obligation to know the functions of the complex physiological systems of vocal acoustics and production.¹²³

Doscher speaks of the need for clear terminology in order to minimize a "semantic swamp," made possible by indiscriminate use of terms without regard to their precise meaning.¹²⁴ She proceeds to detail, with supporting evidence footnoting proceedings of the Voice Symposia and articles in NATS publications, the physiology of respiration, the anatomy of the larynx, considerations of phonation and posture, a chapter on the physical nature of sound, issues of vocal resonance, fixed formants and vowel modifications and vocal registers. After all this information, the concluding chapter addresses the vocal system as a gestalt, whose totality is greater than the sum of its parts. In conclusion, Doscher states,

When the voice works as a functional unit, it allows singers to develop good tone quality, an even scale, a seamless legato, secure intonation, sufficient transmission or projection of sound, and a wide palette of tonal colors. These are the sensuous building blocks of their art [with which] mastery of that art is possible."¹²⁵

¹²¹ Barbara Doscher, *The Functional Unity of the Singing Voice* (Metuchen, NJ: Scarecrow Press, 1988).

¹²² Doscher, 1988, 2.

¹²³ Doscher, 1988, 2.

¹²⁴ Doscher, 1988, 4.

¹²⁵ Doscher, 1988, 167.

In Doscher's second edition of *Functional Unity of the Singing Voice*,¹²⁶ she made significant revisions to reflect research advancements in the field and create a greater syntactical clarity.¹²⁷ Of special note are additions to chapters on registration and vibrato that reflect the state of research. She notes current research by Johan Sundberg (b. 1936) in the field of vocal acoustics¹²⁸ and Titze in the fields of vocal efficiency and vocal registers.¹²⁹ In the chapter on registration, Doscher also addresses the topic of pop singing and belting, a relatively new field of pedagogical writing, citing research by Jo Estill (1921-2010) and Edwin, as well as Sataloff's perspective on the subject.¹³⁰

¹²⁶ Barbara Doscher, *The Functional Unity of the Singing Voice*, 2nd ed. (Metuchen, NJ: Scarecrow Press, 1994).

¹²⁷ Doscher, 1994, ix.

¹²⁸ Doscher cites Johan Sundberg, "Vocal Tract Resonance in Singing," *NATS Journal* 44, no 4 (1988), 1-19, 31; "What's so Special about Singers?" in *Journal of Voice* 4:2 (1990), 107-119; and Sundberg, Björn Lindblom and Johan Liljencrants, "Formant Frequency Estimates for Abruptly Changing Area Functions: A Comparison Between Calculations and Measurements," in *Journal of the Acoustical Society of America* 91, no 6 (1992), 3478-3482.

¹²⁹ Doscher cites Ingo R. Titze, "A Brief Introduction to Muscles," *NATS Journal* 46, no. 4 (1990), 16, 21; "A Framework for the Study of Vocal Registers," *Journal of Voice* 2, no. 3 (1988), 183-194; "Glottal Resistance," *NATS Journal* 48, no. 4 (1992), 23, 51; "Male-Female Differences in the Larynx," *NATS Journal* 44, no. 2 (1988), 31; "Messa di Voce," *NATS Journal* 48, no. 3 (1992), 24; "Phonation Threshold Pressure: A Missing Link in Glottal Aerodynamics," *Journal of the Acoustical Society of America* 91, no 5 (1992), 2926-2935; "Pressed Voice: A Problem for Singers and Speakers," *NATS Journal* 46, no. 2 (1987), 22; "Sources of Irregularity in Vocal Fold Vibration," *NATS Journal* 45, no. 1 (1988), 23; "Vocal Efficiency," *NATS Journal* 45, no. 3 (1989), 31-34; "A Word about Words," *NATS Journal* 45, no. 4 (1989), 19-20; and Titze and Sundberg, "Vocal Intensity in Speakers and Singers," *Journal of the Acoustical Society of America* 91, no. 5 (1992), 2936-2946.

¹³⁰ Doscher, 1994, 188-191.

In 1993, Miller published *Training Tenor Voices*,¹³¹ his first book publication since *The Structure of Singing* in 1986.¹³² In *Training Tenor Voices*, Miller utilizes his considerable experience in spectrum analysis of the great singers, as well as his expertise achieved within the teaching studio, to directly address issues of vowel modification and registration events specific to the tenor voice. Miller chose this voice type, specifically, because there are numerically fewer tenors than any other voice type and “the tenor requires an even higher level of precise function than do other singers.”¹³³ As in *The Structure of Singing*, Miller addresses physiological issues first, then delves into the peculiarities of the tenor voice, specifically regarding “covering,” how to achieve tenoral resonance, and issues specific to the tenor voice. Miller speaks directly to different types of tenor voices and states that every singer may require a different pedagogical approach to achieve success, although said approach must always have a sound physiological and acoustic basis.¹³⁴ While based upon years of experience and research,¹³⁵ Miller does not consistently footnote current research in his writing. His text is one aimed at pedagogy and voice teachers, not science and scientists.

¹³¹ Richard Miller, *Training Tenor Voices* (New York: Schirmer Books, 1993).

¹³² Although, of course, Miller’s regular “Sotto Voce” column in *NATS Journal* was published five times a year, so his writing presence before teachers of singing remained prominent.

¹³³ Miller, *Training Tenor Voices*, ix.

¹³⁴ “There is no single pitch in the mounting scale at which all vowels modify for all singers in a uniform fashion, as is sometimes assumed. Although vocal *Fach* and the corresponding *passaggi* points dictate vowel modification, individual morphology must also be taken into consideration.” Miller, *Tenor Voices*, 42.

¹³⁵ For example, see Miller’s “The Mechanics of Singing: Coordinating Physiology and Acoustics in Singing,” in *Vocal Arts Medicine: The Care and Prevention of Professional Voice Disorders*, Michael S. Benninger, Barbara H. Jacobson and Alex F. Johnson, eds. (New York: Thieme Medical, 1994), 61-71.

In 1994, Vennard's student James McKinney (1921-1998), revised and expanded his 1982 textbook *The Diagnosis and Correction of Vocal Faults*,¹³⁶ with the intention of aiding voice instructors in not only identifying a vocal fault, but in correctly classifying causality in order to positively affect change. He states specifically that vocal pathologies are not among the faults addressed within the text and lists several references for further study into such pathologies.¹³⁷ The thrust of the textbook is in identifying optimal function of the various systems of the voice, from posture to breathing to registration, reporting faults that frequently occur within those systems, and detailing corrective procedures whereby said faults can be corrected or mitigated. Throughout the text, where available, McKinney footnotes current and past research in support of his methods.

The New Voice Pedagogy, published in 1995, is defined by Marilee David (b.1944) as one based upon an understanding of the structure and function of the vocal and respiratory tracts of the human body.¹³⁸ Throughout the text, David cites current research on a specific vocal system and provides vocal exercises helpful in achieving optimal function of said system, be it removing breathiness from the tone or ameliorating registration events. David directly credits many of these exercises to her major teachers.¹³⁹ This text, like Bunch's *Dynamics of the Singing Voice*, includes a chapter on vocal hygiene, with the inclusion of an additional chapter discussing the relatively recent field of voice therapy, in order that the

¹³⁶ James C. McKinney, *The Diagnosis and Correction of Vocal Faults: A Manual for Teachers of Singing and for Choir Directors*, rev. and expanded (Nashville, TN: Genovox Music Group, 1994).

¹³⁷ McKinney, vii.

¹³⁸ Marilee David, *The New Voice Pedagogy*, first paperback ed. (1995; repr. Lanham, MD: Scarecrow Press, 2002), xii.

¹³⁹ Oren Brown, Robert Olson, and Gianna d'Angelo. David, x.

voice professional have a better understanding of procedures to follow when such therapy is indicated, after examination by a qualified laryngologist.¹⁴⁰ Throughout the book, David references classic pedagogical teaching techniques and validates them by citing current scientific research.

Well-known vocal pedagogue Oren Brown (1909-2004)¹⁴¹ published numerous articles and influenced the push toward science-based voice pedagogy. Yet, not until 1996 did he publish a book dedicated to his approach to voice pedagogy. *Discover Your Voice* had its roots as a nineteen-page syllabus;¹⁴² it became a two hundred forty-four page textbook. Within his text, Brown speaks consistently of “letting” the sound occur and finding the “release in the voice”¹⁴³ so that autonomic systems are able to fully function in support of the vocal sound. He admonishes singers to think about the sound before it comes out, in order to have a better autonomic response. Yet, even though Brown frequently utilizes non-scientific terms, his directives both come from long experience and have strong scientific underpinnings. Throughout his text, based upon decades of real experience at the forefront of the field, Brown proffers the art of teaching, skillfully overlaid upon the foundation of voice science.

¹⁴⁰ David, xiii.

¹⁴¹ Listed in Blades-Zeller as a nationally recognized master teacher and frequently cited as a “pioneer in the evolution of voice care as a medical subspecialty.” Robert T. Sataloff, “Foreward,” in *Discover Your Voice: How to Develop Healthy Voice Habits*, by Oren L. Brown (San Diego: Singular Publishing, 1996), vii.

¹⁴² Oren L. Brown, *Discover Your Voice: How to Develop Healthy Voice Habits* (San Diego: Singular Publishing, 1996), ix.

¹⁴³ Brown, 11.

As with any foundation, the science is not immediately obvious, but without it, the construction would not stand as firm or well-ordered. Brown arranges his text in a significantly different manner than the texts cited above. He begins with information on posture, breathing, range and registers, and articulation—with exercises on how to achieve the stated goals included throughout and extra guidance on the accompanying CD. Yet, it is not until he concludes extended discussions of interpretation, requirements for a career, and the advantages of choral singing, that Brown details the physical facts of laryngeal anatomy in Chapter Fifteen. He states in his introduction that Chapters Fifteen through Nineteen are “for the kind of student and teacher who want to have scientific explanation.”¹⁴⁴

Although Brown does not bring pure science to the fore until more than half way through his book, he states that “the more you understand the anatomy and physiology of voice production, the better equipped you will be to sing or to teach singing.”¹⁴⁵ At the end of the chapter on laryngeal physiology, Brown returns to his mantra of trust in the instrument, so that it will function as designed.¹⁴⁶ In concluding a detailed discussion of the nerves involved in vocal production in Chapter Seventeen, “Neurology and the Brain,” Brown again restates that we, as singers, must learn to keep out of our own way. Knowledge is power, but it mustn’t impede the organic function of the body.¹⁴⁷

After a discussion of hearing and voice disorders, Brown brings his text to completion by providing hints for teachers. He emphasizes that every student is different,

¹⁴⁴ Brown, xiv.

¹⁴⁵ Brown, 169.

¹⁴⁶ Brown, 180.

¹⁴⁷ Brown, 194.

both physiologically and in mental approaches to learning. Yet, even though much of his text does not specifically address scientific issues, he states,

Here is where a knowledge of anatomy and physiology and all other sciences pertaining to voice use can be of value. If you do not know the potential and the limits of the human voice, how can you tell how much or how little to expect from a student?¹⁴⁸

He broaches the variance in thought on vocal registers, while indicating that he believes scientists are coming closer to understanding what occurs during registration events.¹⁴⁹

Throughout his text, Brown acknowledges the importance of historical teachings, emphasizing that a singer and teacher (and a singer also serves as his own teacher) must fully understand the vocal instrument. The book culminates with the admonition that teachers must continue to learn everything possible about their own voices so that they both increase their knowledge of vocal function and continue to have empathy for their students who are learning the hidden instrument that is their voice.¹⁵⁰

¹⁴⁸ Brown, 237.

¹⁴⁹ Brown, 240.

¹⁵⁰ Brown, 244.

Chapter 5

THE STATE OF RESEARCH: CA. 2000

In her forward to the 1997 fourth edition of *Dynamics of the Singing Voice*, Bunch states that, “a number of advances are helping to create rapid change in bridging gaps in communication [between scientist and voice pedagogue] and in adding new information [to the scientific body of knowledge].”¹⁵¹ Sataloff clarifies several of these scientific advances in voice science in his 1998 text, *Vocal Health and Pedagogy*,¹⁵² where he also details the clinical history of the voice. Some historical facts most pertinent to the current topic include: 1) Drs. Hans von Leden (b. 1918) and G. Paul Moore (1907-2008) established the first formal, academically based, interdisciplinary voice clinic in the United States at Northwestern University in 1954, 2) 1981 saw the publication of “the first extensive article in the English medical literature intended to teach clinicians how to approach professional singers,” and 3) Sataloff established his interdisciplinary practice in 1981, when he hired a singing teacher and speech-language pathologists in full-time positions at his medical practice.¹⁵³ Sataloff’s practice, along with the National Center for Voice and Speech,¹⁵⁴ headed by Ingo Titze, is now one of the leading medical resources for professional voice users in the world.

Sataloff continues, stating that “modern singing...teachers...have acquired new scientific understanding of the voice and use their new knowledge to augment and refine

¹⁵¹ Meribeth Bunch, *Dynamics of the Singing Voice*, 4th ed. (Vienna: Springer, 1997), v.

¹⁵² Robert T. Sataloff, ed., *Vocal Health and Pedagogy* (San Diego: Singular, 1998).

¹⁵³ Robert T. Sataloff, “Introduction,” in *Vocal Health and Pedagogy*, ed. Robert T. Sataloff (San Diego: Singular, 1998), 3.

¹⁵⁴ See Appendix B: Definitions.

their traditional approaches to voice training.”¹⁵⁵ Many examples of advances in research during the 1990’s may be cited, including a 1991 article which revealed information on connective structure (the basement membrane) within the vocal folds,¹⁵⁶ raising research questions about healing ability following trauma and the development of certain vocal fold pathologies and changing surgical approaches. In 1994, research into the fiber distributions within the laryngeal muscles revealed that, due to their fibrous structure, the muscles have superior fatigue resistance.¹⁵⁷ This knowledge helps the voice teacher to understand what kinds of recovery time are scientifically possible between events of heavy singing, although every vocal instrument, just as every athlete, is different. Even such a fundamental, and highly debated, concept in vocal production as vibrato was subject to new findings in 1993 on the specific mechanisms responsible for its creation in the singing voice.¹⁵⁸

Research in 1991 showed that the clear three-layer structure of the vocal folds cannot be consistently observed until age 15,¹⁵⁹ implying the importance of a separate pedagogical

¹⁵⁵ Robert T. Sataloff, “Introduction,” in *Vocal Health and Pedagogy*, ed. Robert T. Sataloff (San Diego: Singular, 1998), 3.

¹⁵⁶ Robert T. Sataloff, “Clinical Anatomy and Physiology of the Voice,” in *Vocal Health and Pedagogy*, ed. Robert T. Sataloff (San Diego: Singular, 1998), 10.

¹⁵⁷ Sataloff, “Clinical Anatomy,” 13.

¹⁵⁸ Many of these new findings, specifically aimed at the singing voice, were published as the book *Vibrato*, P.H Dejonckere, Minoru Hirano, and Johan Sundberg, eds. (San Diego: Singular, 1995). In the Preface, Dejonckere states that the collection of selected papers previously presented at the Congress of the Collegium Medicorum Theatri was intended to stimulate creative thinking in all the disciplines involved with “the artistic use of the human voice and care of the professional singing voice,” vii.

¹⁵⁹ Steven D. Gray, Minoru Hirano, and Kiminori Sato, “Molecular and Cellular Structure of Vocal Fold Tissue,” in *Vocal Fold Physiology: Frontiers in Basic Science*, Ingo R. Titze, ed. (San Diego: Singular, 1993), 5. This book is seventh in a series of conferences and books on *Vocal Fold Physiology* begun in 1980 as a project of The Voice Foundation. “Acknowledgements,” xiii.

approach for younger singers. Differing research in the same year showed that rotation at the cricothyroid joint, the most apparent movement between the cricoid, thyroid and arytenoid cartilage joints, also has the greatest effect on voice production.¹⁶⁰ Specific vocal exercises targeting this rotational movement of the cricoid can be used to adjust the length and tension of the vocal folds before and during phonation, as a result of the activation of laryngeal muscles.¹⁶¹ New findings into the how the pulmonary system affects the laryngeal system showed that control of expiratory duration during vocalization is linked to the pressure of the air in the lungs and airways, and evidence also shows that during phonation, the inspiratory depth is related to the length of the planned utterance.¹⁶² This knowledge can be applied by singers to better prepare for each musical phrase.

All of these data, directly applicable to some pedagogical aspect, come via advances in technology. Researchers continued to have fundamental revelations about both the structure and the function of the voice. Yet, teachers were unsure how to utilize this extensive scientific information, this seeming minutiae, within the teaching studio. Hollien directly addressed this need for coordinating science into the voice pedagogy during his G. Paul Moore lecture at the 1984 Voice Symposium. He stated that voice teachers had four major issues.

¹⁶⁰ Donald S. Cooper, Lloyd D. Partridge, and Fariborz Alipour-Haghighi, “Muscle Energetics, Vocal Efficiency, and Laryngeal Biomechanics,” in *Vocal Fold Physiology: Frontiers in Basic Science*, Ingo R. Titze, ed. (San Diego: Singular, 1993), 65.

¹⁶¹ Cooper, Partridge and Alipour, 70.

¹⁶² Pamela J. Davis, Donald Bartlett, and Erich S. Luschei, “Coordination of the Respiratory and Laryngeal Systems in Breathing and Vocalization,” in *Vocal Fold Physiology: Frontiers in Basic Science*, Ingo R. Titze, ed. (San Diego: Singular, 1993), 199.

The first issue identified by Hollien is that of oversimplification, of having to deal with complex issues in an inappropriately simple manner due to teacher training, lack of appropriate data, and adherence to “traditional” training. By critically examining the old, simple, and easy traditions, teachers are able to obtain success in making enlightened decisions.¹⁶³ The second issue, assimilation of new data that can challenge some of the strongest and longest held beliefs, must be faced head on by the teacher, according to Hollien. Teachers must seek out new information and upgraded concepts and be willing to accept new relationships of technique to language. The third issue is that of missing information. Hollien warns that this issue is insidious, because the teacher does not even realize the lack of scientific guidance. He uses the genre of belting as a demonstration of how little is known about a particular vocal technique and how teachers often “make do” with the information they know.¹⁶⁴ The fourth issue Hollien identifies is the need to train the teacher, rather than the performer. He quotes a co-authored unpublished manuscript stating that when a number of training programs were assessed, the focus was almost exclusively upon training performers or public school teachers, not private voice instructors. He challenges programs, including those for public school teachers, to include courses in physiology, acoustics, and voice teaching techniques.¹⁶⁵

Publications such as *Journal of Singing* (NATS) and *Journal of Voice* (Voice Foundation) are primary sources for voice professionals of all levels that aid in understanding advances in voice science and their pedagogical applications. These publications include regular

¹⁶³ Harry Hollien, “That Golden Voice—Talent or Training?” *Journal of Voice* 7, no. 3 (1993):200-201.

¹⁶⁴ Hollien (1993), 202-203.

¹⁶⁵ Hollien (1993), 203-204.

discussions of controversies within the application of voice science to vocal pedagogy.¹⁶⁶ Biennial NATS Conferences regularly present sessions on the latest in voice research.¹⁶⁷ The Voice Foundation presents its annual symposia, ‘Care of the Professional Voice,’ focusing in large part on advances in scientific research and medicine, while providing all voice professionals with a setting to present and discuss a variety of concepts, including targeted sessions on voice pedagogy.¹⁶⁸ Yet, it is through a complete discussion of voice pedagogy and its application, in textbooks such as Clifton Ware’s (b.1937) *Basics of Vocal Pedagogy*,¹⁶⁹ that scientific information comes together, creating an accessible analytical pedagogy for the everyday voice teacher.

¹⁶⁶ For example: Cornelius L. Reid, “Vocal Mechanics,” *Journal of Singing* 54, no. 1 (Sep/Oct 1997): 7-10; Harry Hollien, Oren Brown, and Rudolf Weiss, “Another View of Vocal Mechanics,” *Journal of Singing* 56, no. 1 (Sep/Oct 1999): 11-22.

¹⁶⁷ These are titled the “Voice Science Advisory Committee Sessions.” Also, in 2004 Pre-Convention Sessions acting as mini-workshops concentrating on a relevant pedagogical topic were introduced. William A. Vessels, “Dynamics,” *InterNos* 37, no. 1 (Winter 2004):1.

¹⁶⁸ For full disclosure, at the time of writing, this author is scheduled to present a reduced version of this research paper on June 2, 2013 at the ‘Care of the Professional Voice’ symposium during the Voice Pedagogy sessions.

¹⁶⁹ Clifton Ware, *Basics of Vocal Pedagogy: The Foundations and Process of Singing* (Boston: McGraw-Hill, 1998).

Chapter 6

BASICS OF VOCAL PEDAGOGY: 1998

Teachers needed guidance in how to best learn to apply increased scientific knowledge to extant vocal pedagogy. Clifton Ware's 1998 text, *Basics of Vocal Pedagogy*,¹⁷⁰ addressed this issue. It became and remains a standard textbook for university-level pedagogy classes.¹⁷¹ When *Basics of Vocal Pedagogy* was published, Ware's class voice¹⁷² text, *Adventures in Singing*, was in its second edition¹⁷³ and in consistent use on college campuses. As an established professor at the University of Minnesota and active member of NATS, Ware's was a well-known name in the world of vocal pedagogy.¹⁷⁴ In *Basics*, Ware demonstrates his stake in producing singers and teachers who think and communicate about their instrument and their art by concluding each chapter with a "Study Review" of probing questions about concepts discussed, designed to develop thought about singing and methods of voice production. Also, mapping the same approach Bunch utilized in *Dynamics of the Singing Voice*, Ware does not immediately delve into the anatomy of the vocal system. Instead, he begins with chapters titled "The Philosophy of Singing," "Psychology of Singing," and "Body-Mind Integration."

¹⁷⁰ Ware.

¹⁷¹ Ware's textbooks *Adventures in Singing* and *Basics of Vocal Pedagogy* are widely adopted throughout the United States, Canada and Australia, with a Chinese translation of *Basics* released in 2012. <http://www.clifware.com/> (accessed December 10, 2012).

¹⁷² Class Voice is a course commonly taught on college campuses to those not enrolled as vocal music majors. At its core, it constitutes group singing lessons.

¹⁷³ Ware, viii.

¹⁷⁴ Active participation in NATS throughout his career is detailed in *Clifton Ware – Biographical Data*, downloaded from <http://www.clifware.com/#!books> (accessed December 10, 2012).

In Chapter One, “The Philosophy of Singing,” Ware encourages singers and teachers to ask basic questions about what draws them to the art of singing and to consider the “singing gesture” of vocal expression used for heightened communication.¹⁷⁵ He includes a discussion of current neuroscience as an introduction to Appelman’s definition of singing: a psychophysical “dynamic...act of coordinating instantaneously the physical sensations of respiration...phonation...resonation...and articulation...into a disciplined utterance.”¹⁷⁶ Ware uses this definition to guide his discussion, and introduces the idea that the primal singing gesture, demonstrated by a baby’s cry, probably came even before the development of the speaking voice.¹⁷⁷

Ware continues by introducing differing aesthetics and tonal preferences of singing, contrasting popular music with Western (European) art music. He addresses Miller’s discussion of tonal aesthetics in *Structure of Singing*,¹⁷⁸ and uses said discussion to support his assertion that the tonal ideal in Western art music tradition comes from a physiologically and psychologically uninhibited position, rather than one of maladjustment, as can be found in other world music traditions.¹⁷⁹ Ware also encourages the establishment of criteria or standards to determine good or bad works of art as well as the equitable application of said criteria, irrespective of genre (broadly categorized as classical and popular). He warns against the tendency of young singers to mimic recorded performances of star singers, no matter the

¹⁷⁵ Ware, 1.

¹⁷⁶ Appelman, 9.

¹⁷⁷ Ware, 2.

¹⁷⁸ Miller, *Structure*, 205.

¹⁷⁹ Ware, 4-5.

genre, as that habit frequently utilizes abnormal physical accommodations to create the desired sound, resulting in what Ware terms a “dishonest copycat mechanism” that develops unwanted vocal habits.¹⁸⁰ He states his premise clearly, “Most types of popular vocal music can be performed with functionally correct vocal production, using the natural voice with which each individual is endowed,”¹⁸¹ and delineates many of the benefits of vocal study.

The “Psychology of Singing” comprises Chapter Two of Ware’s text and is devoted to helping the student and teacher understand the underlying psychological web of entanglements that can impede learning until causes are understood and modified to allow for constructive thinking, leading to appropriate behavior. Ware encourages realistic thinking about a singer’s natural endowment and taking an honest, complete self-inventory. Ware here introduces exercises for obtaining information both about the singer themselves and professional performers.¹⁸² This consistent direction into stretching personal communication boundaries is a hallmark of the entire text. The uses of mental imagery, an understanding of the perceptual modes of the visual, analytical, kinesthetic, and aural, and a discussion about conceptions of singing bring Ware to a discussion of the two-part brain: left vs. right, rational vs. intuitive, external vs. internal life, and how these various concepts help a singer to analyze whether their personality is suited to their chosen career path. He encourages long-term, medium-term and short-term goal planning to help favorably influence the personal learning process.

¹⁸⁰ Ware, 9.

¹⁸¹ Ware, 10.

¹⁸² Ware, 16.

Chapter Three is entitled “Body-Mind Integration,” and addresses the issue of the vocal athlete. He states that the singer needs to draw from mental, physical, emotional and spiritual sources to have the energy needed for a complete performance. He encourages the singer to care for their body in the same manner an Olympic athlete maintains vigilance over muscular conditioning and other health factors, such as weight. He gives guidelines for minimal aerobic exercise, diet and nutrition, and using sleep and relaxation to mediate stress. Relaxation exercises and other mind-body strategies are discussed in depth, including physical-vocal exercises to encourage muscular antagonism and efficient body alignment.¹⁸³ Throughout these opening chapters, Ware prepares the student to think analytically about the voice via pointed study questions and his integration of interdisciplinary sciences.

Ware begins Chapter Four, “The Vocal Process: Making Connections,” by quoting Bunch’s four reasons singers should understand voice science, outlined in her 1982 *Dynamics of the Singing Voice*.¹⁸⁴ He includes Bunch’s admonition that teaching without a scientific foundation is obsolete and unwarranted,¹⁸⁵ as “a fine teacher is always concerned with imparting accurate information to students and providing them with precise and objective analyses of the sounds they make.”¹⁸⁶ What has changed most, from Bunch to Ware, seems to be the acceptance that a basic understanding of voice science is integral to the teaching process, rather than an idea presenting an alternative method of teaching. This understanding of voice science is implicit in Ware’s approach throughout his text. To

¹⁸³ Ware, 46-47.

¹⁸⁴ Ware, 52.

¹⁸⁵ Bunch, 1982, 2-3.

¹⁸⁶ Bunch, 1997, 4.

increase this scientific awareness, Ware strongly encourages teachers to stay abreast of current pedagogical thinking by reading the *Journal of Singing*, attending regular meetings with colleagues, and taking courses in vocal pedagogy and other voice-related subjects.

This fourth chapter details brain function and how neural impulses motivate sound production, in order to help future teachers understand how better to communicate with their students. He details the five steps in the vocal process: volition, respiration, phonation, resonance, and articulation, based upon research published by Sundberg.¹⁸⁷ Ware details the amount of neurological activity the act of singing requires and the various functions of the nervous system by referencing current neurological research. His discussion of how the brain processes music and how intentions convert into vocal tone culminates in a simplified visual representation of how the combined brain and nervous systems contribute to vocal sound production.¹⁸⁸ He introduces the concept of brain plasticity, a topic of study in its infancy in 1997,¹⁸⁹ and uses brain research findings to advocate for music training for the very young.

Ware concludes the chapter by stating the importance of speech-singing connections, the singer's awareness of their own speaking voice. He includes exercises for

¹⁸⁷ Ware, 54.

¹⁸⁸ Ware, 62.

¹⁸⁹ In 1997, neuroplasticity research was in its infancy. It was not until a 2004 *Nature* article that Draganski et. al. stated, "Our results contradict the traditionally held view that the anatomical structure of the adult human brain does not alter, except for changes in morphology caused by ageing or pathological conditions. Our findings indicate that learning-induced cortical plasticity is also reflected at a structural level." Bogdan Draganski, Christian Gaser, Volker Busch, Gerhard Schuierer, Ulrich Bogdahn, and Arne May, "Neuroplasticity: Changes in grey matter induced by training," in *Nature* 427 (2004), 311-312. These statements clearly show that the research on neuroplasticity Ware relies on was at the forefront of the neuroscience field.

the singing teachers to use when exploring the ideal natural pitch of the speaking voice, details exercises useful in improving speech, and then details vocal technique exercises to coordinate breath, phonation, and resonance. His first Study Review question for the chapter, “Discuss the role of voice science in singing and voice education,”¹⁹⁰ again brings to the fore the importance a basic understanding of voice science is to both the singing teacher and the student singer.

Following the outline set forth in *Dynamics of the Singing Voice*, Ware utilizes the central chapters of his text to detail the anatomy and physiology of the vocal systems. Chapters Five through Nine cover the physiological systems of respiration, phonation, registration, resonance, and articulation. Unlike Bunch’s text, Ware includes specific exercises demonstrating how to teach each concept under consideration. Most of these chapters include two to five pages of specific exercises appropriate to improving a singer’s control over the system under discussion. Ware delves deeply into the acoustics of sound itself, including an intensive discussion of formants and their use in singing. As a result, Chapter Eight, “Resonance: Optimizing Tone Quality,” is one of the largest in the book, at over twenty-five pages in length. This chapter also provides exercises throughout the chapter for the exploration of sound, rather than vocalises at the end of the chapter for the singer to practice.

Chapter Ten, “Coordination: Unifying the Vocal Process,” discusses how to bring the disparate aspects of the vocal system into one unit for effective communication. He brings to light new neurological research showing that very few people are actually tone-deaf

¹⁹⁰ Ware, 71.

and most are capable of producing accurate pitches.¹⁹¹ This helps to debunk the theory that many people can't sing and are tone-deaf. The tendency to sing flat or sharp in pitch is, instead, the result of one or more malfunctioning components of the vocal process.¹⁹² Ware enumerates several of the many differing elements that can cause a singer to have intonation problems, the least of which could be psychological vocal trauma or minimal exposure to music during childhood and the formative adolescent years.¹⁹³

Ware accentuates the concepts of vibrato, agility, sostenuto, and dynamic flexibility in his discussion and how a comprehensive understanding of these ideas is essential to the professional vocal performer in any genre. In his discussion of vibrato, Ware elucidates recent research findings that vibrato is not an external construct in vocalization but is, instead, integral to the dynamic function of the laryngeal system.¹⁹⁴ He reminds the singer that past pedagogues, including Miller and Vennard, have cautioned against vibrational causes extrinsic to the larynx,¹⁹⁵ most often the shaking tongue and jaw. Ware concludes the section with the caution to students against manipulating vibrato patterns and instead, to allow the natural vibrato pattern to concur with the creation of optimal conditions within the well-coordinated singing voice.¹⁹⁶ Vocalises for agility (learning how to create and sustain a trill), sostenuto (singing a skillful legato) and dynamic flexibility (both in terms of what is

¹⁹¹ Ware, 180.

¹⁹² Ware, 179.

¹⁹³ Ware, 180.

¹⁹⁴ Ware, 181.

¹⁹⁵ “Vennard says that a trembling jaw is usually considered a danger signal.” Ware, 181.

¹⁹⁶ Ware, 182.

commonly termed loud and soft and in articulatory ability of legato vs. staccato) are followed by several exercises for extending the functional range of the singing voice.

The chapter concludes with a detailed section on the classification of the singing voice. Ware states that accurate voice typing “is most possible when the singing voice is fully coordinated and functioning efficiently.”¹⁹⁷ He delineates four primary factors in determining voice type as physical characteristics, timbre, tessitura and register transitions, and range.¹⁹⁸ Ware cautions against an automatic assumption by teachers of ideal voice and body-type matches, stating that occasionally a petite coloratura voice may be housed within a large-framed 35-year-old woman, creating a mismatch that may be of great detriment to a professional career.

Ware calls timbre (color or tone-quality characteristics) an often-reliable guide to voice classification, always provisional to the caveat that the voice under consideration is correctly and freely produced. He makes clear the scientific studies detailing the dependence of a singer’s timbre upon the amount of subglottic pressure increase as a response to rising frequencies. He also cautions that malfunctions of the voice can cause a manufactured timbre, resulting in misidentification of voice classification. Ware concludes his section on voice classification by stating that register transitions, where the vocal mechanism “changes gears,”¹⁹⁹ are reliable indicators of voice type at an early stage in vocal development, and the consideration of vocal range in voice classification is more reliable in the physically mature and technically stable singer. Ware brings his extended discussion of vocal coordination to a

¹⁹⁷ Ware, 188.

¹⁹⁸ Ware, 189.

¹⁹⁹ Ware, 190.

close with a brief overview of professional singing categories, as defined within operatic singing, and an examination of the “interrelatedness of the polaristic extremes of singing.”²⁰⁰

Ware’s eleventh chapter, “The Singer’s Instrument,” focuses on vocal hygiene and vocal pathology, a subject seemingly fundamental to modern texts of vocal pedagogy.²⁰¹ He discusses common irritants (smoke, allergens), aging and hormones, upper respiratory tract disorders, and three serious voice disorders (facial paralysis, chronic fatigue syndrome, and Lyme disease) that may not seem immediately relevant to teaching voice.²⁰² Congruent with many of the contemporaneous pedagogy texts discussed here, Ware details advice on what to expect when seeking medical assistance. He mentions an interdisciplinary team approach, now held as the standard of care,²⁰³ and enumerates types of treatment. The chapter concludes with a box listing bullets points of Do’s and Don’ts of Vocal Health that encapsulates information contained within the chapter.

²⁰⁰ Ware, 194-195. Ware brings out the holistic vs. mechanistic aspects of pedagogy and other seemingly diametric opposites that are integral to the voice pedagogy tradition, stating that both sides of the equation, for each aspect, is necessary in the creation of the complete singer.

²⁰¹ Historically, many vocal pedagogues included sections on vocal health, although many more did not. After Sataloff’s formal identification of the field of Vocal Arts Medicine in 1984, the inclusion of a chapter on vocal health seems to have become more compulsory. Voice Pedagogy references (aimed at the singing teacher rather than the research scientist) consulted for this research paper that include information on vocal health (at least a small section on the effects of maintaining mental and physical health) clearly indicate an increasing prevalence for expressing information on vocal hygiene and vocal health. Titles are listed in Appendix D.

²⁰² Ware, 216.

²⁰³ As recommended by a 2005 joint ASHA (American Speech-Language and Hearing Association), NATS, and VASTA (Voice and Speech Trainers Association), the interdisciplinary management team of singers and speakers with voice disorders will ideally consists of “a laryngologist, a speech-language pathologist, and a singing teacher, and/or speaking voice and speech trainer.” Karen Wicklund, *Singing Voice Rehabilitation: A Guide for the Voice Teacher and Speech Language Pathologist* (Clifton Park, NY: Cengage, 2010), 67.

Ware's final two chapters (twelve and thirteen) cover "Solo Vocal Performance" and "Teaching Singing." Chapter Twelve delves into repertoire choices, interpretive skills, and how to deal with various aspects of performing, including pursuit of a professional singing career. Ware separates the definitions of *literature*, *repertoire*, and *repertory*,²⁰⁴ giving them specific meaning for reference in solo vocal performance. He identifies Italy, Germany, Austria, England, France, and the United States as countries whose composers have most contributed to the significant classical vocal repertoire, but also notes that composers from many other countries are now embracing an "international style" of art music fashioned around the traditions of Western art music.²⁰⁵ He cautions both singer and teacher to choose repertoire based upon music that facilitates healthy vocalism and communicative artistry. The traditional classical repertoire, states Ware, aids singers in mastering the principles of singing.²⁰⁶

Ware lists several considerations of style (musical, personal and nationalistic) as criteria for selecting vocal repertoire. He also states that pedagogical objectives should guide repertoire selection.²⁰⁷ Repertoire should be evaluated according to musical and textual worth, singer and voice type compatibility, type of audience and music publication and

²⁰⁴ Ware, 226. *Literature*: composite body of written materials as classified by type and genre (e.g., art song, opera, oratorio). *Repertoire*: a specific collection of materials (musical selections, plays, anecdote) performed by an individual or groups of persons. *Repertory*: repertoire that can be drawn upon for performance; repertoire a singer performs fairly regularly can be classified as that singer's repertory.

²⁰⁵ Ware, 226.

²⁰⁶ Ware, 227.

²⁰⁷ "1) to motivate regular student practice, 2) to instill basic musicianship, 3) to build a systemic vocal technique, and 4) to inculcate a desire for expressive song communication." Ware, 228.

copyright laws. Choice of repertoire leads to learning and presentation considerations, and Ware outlines a systematic method to securely learn music. He then enumerates suggestions for designing a solo vocal recital, appropriate to the vocal skill level of the student.

An important consideration found throughout the literature is that of interpretation and expression, in order to fully communicate vocal music. Ware names song as a miniature drama, and lists several attributes needed for an ideal singer-actor. He states that technique, interpretation, and expression are all necessary components to artistry,²⁰⁸ as the performer is the mediator between the composition and the audience. To ameliorate a common confusion of terms, Ware defines *technique* as a left-brain, analytical activity, *interpretation* as the act of clarifying an art work's meaning, *expression* as the performance realization of an art work, and *artistry* as a right-brain, gestalt concept based on outcomes.²⁰⁹ Ware states that honest expression and a personal emotional connection to music are sometimes hard for the young singer to attain, so he suggests creating an alternative reality, to release the singer from personal behavioral responsibility.²¹⁰ Ware introduces Wesley Balk's (1923-2003) six skills of effective performers²¹¹ as an acting tool and identifies specific pedagogical techniques for application of these skills in the singing studio.

The chapter concludes with advice on coping with performance anxiety, stating that successful singers use positive forces to overcome inner conflicts. Some coping strategies Ware recommends are relaxation techniques (such as meditation, yoga, and biofeedback),

²⁰⁸ Ware, 234.

²⁰⁹ Ware, 234.

²¹⁰ Ware, 236.

²¹¹ Ware, 236-237.

cognitive therapy, Beta blockers (noted as controversial), and thorough preparation (as the best coping mechanism and proactive prevention). Ware emphasizes that developing into a dynamic performer is dependent upon the singer's internal state, and internal conflicts must be resolved so that singers are free to explore constructive performance possibilities.²¹²

Chapter Thirteen, "Teaching Singing," begins with a short history of vocal pedagogy. Ware states that mid-twentieth century had a "virtual explosion of vocal publications by many pedagogues,"²¹³ and points out that since then, most publications about voice have been produced by academicians, instead of non-academically affiliated teachers. Ware breaks pedagogy into three contrasting approaches to teaching singing, stating "these approaches are used by all teachers, regardless of tonal preference."²¹⁴ He terms these three approaches: 1) *holistic pedagogy*, involving mental imagery and an intuitive approach to learning, 2) *mechanistic pedagogy* is utilized by the teacher relying on scientific or realistic references, and 3) *eclectic pedagogy*, effectively integrating both holistic and mechanistic approaches.²¹⁵ Ware concludes his section on comparative pedagogies by referencing Miller's *National Schools of Singing*,²¹⁶ but cautions that pedagogies are not to be confused with national borders, and that while the Italian model seems to be the predominant tonal preference represented by the majority of world-class singers, content may still be taught holistically, mechanistically, or eclectically, regardless of particular approach.

²¹² Ware, 241.

²¹³ Ware, 252.

²¹⁴ Ware, 252.

²¹⁵ Ware, 253.

²¹⁶ Miller, *National Schools*.

In the concluding section of Chapter Thirteen, Ware discusses the “Foundations of Effective Teaching,”²¹⁷ in which he encourages prospective voice teachers to examine their motivations for teaching. He enumerates model voice teacher characteristics as falling into three groups of ideal qualifications in the areas of personal, musico-dramatic, and teaching. Voice teachers, according to Ware, must be able to play many specific roles, including those of 1) a technically secure and expressive *vocal artist*, 2) a *scholar* with the substantive background for singing and teaching, 3) an *instructor* with mastery of the educational process, 4) a *counselor* able to mentor students through the educational process, 5) an *administrator* managing time and talent, 6) a *colleague* collaborating with fellow professionals, 7) a *gatekeeper* maintaining high professional standards, and 8) an *exemplar* of a moral world citizen.²¹⁸

Ware speaks to the singer-student relationship and, like Bunch, enumerates the responsibilities of both teacher and student for a successful partnership. He calls the teacher-student relationship one based on intimacy where differences in personality, learning or teaching styles, socioeconomic and educational backgrounds, age, and gender may prove problematic. He encourages teachers to address both student professional goals and psycho-emotional needs, providing regular constructive feedback and providing healthy, clean and attractive environments for singing. He expects students to show respect for their teachers, while taking initiative in the learning process by stating personal goals and requesting help when needed.²¹⁹ Ware concludes the section with a caution for how a teacher/student relationship is dissolved, terminating in as positive a manner as possible, with open and

²¹⁷ Ware, 255.

²¹⁸ Ware, 256-257.

²¹⁹ Ware, 259.

honest communication between both parties. Ware states that the voice teacher's "number one responsibility—to help students sing efficiently—requires expertise in 1) *recognizing symptoms*, 2) *determining causes*, and 3) *devising solutions*."²²⁰ Voice teachers must be able to comprehend a wide variety of vocal problems and tailor exercises to each individual's specific vocal needs.

Fundamentally, Ware's approach to vocal pedagogy as a scientifically based entity is the same as that of Meribeth Bunch's in *Dynamics of the Singing Voice*, yet, perhaps because of an increased acceptance of voice science into the realm of vocal pedagogy, the two have distinct differences. Bunch consistently brought the reader back to why scientific facts matter to singers, without putting the science into practice through specifically presented vocalises. Ware presents his significant amount of information in a direct way, with application of the scientific principles stated through exercises and study questions occurring regularly throughout the text. The difference in style between the two approaches is notable, as both give an intense amount of scientific knowledge to the reader; much of the specific scientific details in Bunch's text are included only in captions to figures and illustrations, while Ware includes his scientific details directly within the text.

In addition, Ware unequivocally approaches the new singing teacher with his use of specific and directed exercises. In this, he returns to those texts cited at the beginning of this paper, those by Wormhoudt and Alderson. Bunch discretely avoided the use of specific vocal exercises. She instead kept the focus on the teaching process by relating specific functional scientific knowledge about the human voice to the process of singing, while not explicitly stating how to apply that knowledge pedagogically, indicating that her book was

²²⁰ Ware, 263-264.

directed at the teaching professional who already knew how to apply knowledge to the creation of vocal exercises. Ware seems to focus his text on the student teacher who does not yet know how to create functional vocalises and on the experienced holistic teacher who searches to become more eclectic in their teaching style.

Chapter 7

APPLYING VOICE SCIENCE IN MODERN PEDAGOGY

The first step to applying science in studio is in understanding its import. The collective expertise available from the *Journal of Singing* is an invaluable tool in both keeping up with research and in applying that knowledge to the singing voice. Doscher states that without the knowledge and guidance of her voice-science driven teacher, Coffin, she would still be “singing from inside a cave and practicing voodoo in my teaching.”²²¹ She equated lack of scientific understanding with mysticism and spiritual belief systems and holds pedagogical methods based upon such lack of understanding to be inefficient at best, and possibly even harmful. In her 1994 text, Doscher covers the physiology of the singing mechanism and vocal acoustics, equating the teaching of singing to that of training elite athletes.²²² She admonishes teachers to have the same detailed understanding and knowledge of the physiological processes of singing as coaches do of their respective sports.

In his 1996 address to the NATS Conference, Dale Moore stated, “Ours is the only branch of music in which the teacher must assemble the instrument and then teach the student to play.”²²³ For safe and effective teaching it is mandatory that teachers have a thorough knowledge of the physiology of the instrument with which they work.

Throughout the history of vocal pedagogy, this need for knowledge was repeatedly stated,

²²¹ Barbara M. Doscher, *Functional Unity of the Singing Voice*, 2nd ed. (Methuchen, NJ: Scarecrow, 1994), x. Influential texts by her teacher include: Berton Coffin, *Overtones of Bel Canto* (Metuchen, NJ: Scarecrow, 1980); Berton Coffin, *Coffin’s Sounds of Singing: Principles and Applications of Vocal Techniques with Chromatic Vowel Chart*, 2nd ed. (Metuchen, NJ: Scarecrow, 1987).

²²² *Ibid.*, xiii.

²²³ Moore, 4.

but it was not until the end of the twentieth century that analytical data was available to either prove or debunk common vocal pedagogy practices. With increasingly detailed scientific information, the teacher can not only evaluate the sound emanating from the instrument, but also know how the parts of the instrument work together and, for first time, have a schematic of which parts were involved in the production of the sound.

Consistent terminology, however, remains a complicating factor.²²⁴ The scientific labels do not match the historical terms, those based more on how sound feels to the singer than physiological and acoustical principles behind sound (i.e. chest voice/head voice), proscribed by voice teaching. As Hollien, Brown, and Rudolf Weiss state in their 1999 *Journal of Singing* article,

Knowledge of science can serve to explain reality and may lead, in its turn, to the application of techniques which are sound and effective. Just as important, it can sometime highlight practices which are truly unsound and may...hinder good training.²²⁵

The concern is that whatever the pedagogical approach of the teacher, it be based upon sound scientific data. Even if the student singer does not understand the fundamentals of vocal acoustics and physiology, it is up to the teacher to know the information and appropriately apply it. Knowledge provides both efficiency of instruction and reduces the possibility of damage,²²⁶ in order to best maximize the vocal potential of a student.

²²⁴ Hollien, Brown, and Weiss, 18.

²²⁵ Ibid., 19.

²²⁶ Ibid., 19.

Chapter 8

CONCLUSION: TIMES, THEY ARE A CHANGIN’

In the early 1980’s, many approaches to vocal pedagogy were scientifically based. These texts were much less overt about their scientific underpinnings than those published at the end of the twentieth century, likely for the most common of reasons—publishers and authors did not want to alienate their audience by over-utilizing unfamiliar or intimidating jargon. At that point in the process of integrating voice science with vocal pedagogy, teachers were often afraid that excess information about vocal function could make performances sterile and mechanical. Some pedagogy writings indicate that teachers were unaware of the basic mechanism of vocal function. Many teachers learned by rote and taught in the same manner their teacher taught,²²⁷ rather than by teaching with an analytically-based pedagogic purpose. Not all teachers understood that there can be a fundamental difference between a warm-up and a vocalise.²²⁸ A warm-up gets the voice moving in preparation for work, much the way an athlete warms up his muscles before commencing precision drills. A vocalise addresses specific technical issues in vocal production. Before the 1980’s, scientific evidence of vocal function was available but was not integrated into studio teaching, as evidenced by pedagogic writings of the time.

During the 1980’s and 1990’s, articles in publications such as *Journal of Singing*,²²⁹ and the dedication of pedagogues such as Vennard, Coffin, Brown, Miller, Doscher, Bunch, Ware, and Reid slowly integrated voice teaching and voice science into the emerging

²²⁷ Bunch, 1982, 2.

²²⁸ See Appendix B: Definitions.

²²⁹ In its various incarnations as *The Bulletin*, *The NATS Bulletin*, *The NATS Journal*, and finally *Journal of Singing*.

discipline that is current voice pedagogy. Open discussion of scientific knowledge and how it applies to the voice enhanced the adoption of modern voice pedagogy that includes the application of scientific principles.

During the final decades of the twentieth century, researchers also made great scientific strides. Voice formally became a medical subspecialty of otolaryngology in mid-1980.²³⁰ Drs. Titze and Sataloff, along with countless others, aligned themselves with teachers of singing and undertook research of specific interest to singers, the elite athletes of voice users,²³¹ and both doctors contribute regular articles to the *Journal of Singing* in their role as associate editors. The Voice Foundation established the *Journal of Voice*²³² in 1987, and in 1989 Dr. Sataloff, both a medical doctor and a doctor of musical arts in voice, took over as Chairman of the Voice Foundation.²³³ Dr. Titze helped to establish the National Center for Voice and Speech (NCVS) in 1990.²³⁴ Both NCVS and the Voice Foundation have voice science research and collaboration with singing teachers and other voice professionals as core to their mission statements.

²³⁰ Robert T. Sataloff, "Introduction," in *Professional Voice: The Science and Art of Clinical Care*, 2nd ed., ed. Robert T. Sataloff (San Diego: Singular, 1997), 5.

²³¹ Bunch (1982), 111, Ware, 34, and Doscher (1994), xiii, called singers elite athletes whose training is on par with that of Olympic participants.

²³² Published by Elsevier Science.

²³³ The Voice Foundation, "The Voice Foundation: About Us," https://www.voicefoundation.org/index.php?option=com_content&view=article&id=220&Itemid=29 (accessed January 13, 2013).

²³⁴ University of Utah, "National Center for Voice and Speech: Mission Statement," http://www.ncvs.org/about_mission.html (accessed April 7, 2012). Also, see Appendix B: Definitions.

NATS biennial National Conferences present scientifically based sessions. The Voice Foundation's annual symposia, 'Care of the Professional Voice,' facilitate meetings between science professionals and music professionals. NCVS holds an annual Summer Vocology Institute (SVI) as an intensive way to train individuals in the science and practice of voice habilitation.²³⁵ The New York Singing Teacher's Association (NYSTA)²³⁶ offers a five-course series of online and on-demand courses, with presentation of NYSTA's Distinguished Voice Professional Certificate of Completion upon successful completion.²³⁷ This openness of discussion between teachers and scientists creates teacher willingness to include scientific information in daily teaching. Led by singers and singing scientists, these organizations have done much to disseminate scientific knowledge and promote its integration into everyday vocal pedagogy.

The result of this accommodation, as stated by Dale Moore in his 1996 address to the NATS Conference, was that

there is now less mythology and folk lore than there was twenty-five years ago. I now seldom get a student who has been told the diaphragm does things which are physiologically impossible or that there are resonance cavities where they simply do not exist.²³⁸

²³⁵ University of Utah, "National Center for Voice and Speech: Summer Vocology Institute," http://ncvs.org/svi_infous.html (accessed January 20, 2013).

²³⁶ See Appendix B: Definitions.

²³⁷ The "Oren L. Brown Professional Development Program," or PDP Course, is presented by NYSTA in cooperation with Westminster Choir College. The New York Singing Teachers' Association, Inc., "PDP Courses and Webinars," <http://www.nysta.org/pdplandingpage.html> (accessed January 20, 2013). Course offerings are Vocal Anatomy and Physiology, Voice Acoustics and Resonance, Vocal Health for Voice Professionals, Singer's Developmental Repertoire, and Comparative Voice Pedagogy.

²³⁸ Moore, 4.

At the dawn of the fifth century of formalized vocal pedagogy, teachers became highly equipped to address vocal issues with efficiency and precision. Because of the dramatic increase in both scientific knowledge of voice function and the availability of accurate information, newly expert teachers now address each student's vocal issues with sound functional analyses and compassionate instructional approaches, facilitating student-teacher relationships and maximizing student potential.

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APPENDIX A

A BRIEF INTRODUCTION TO PERSONAGES REFERENCED THROUGHOUT
THIS WORK

- RICHARD ALDERSON (?) – Alderson taught at Northwestern University. He was a professional singer, voice teacher, and choral director.
- D. RALPH APPELMAN (1908-1993) – Active at Indiana University School of Music, Appelman created x-rays of the pharyngeal shapes of vowels.
- WESLEY BALK (1923-2003) – Artistic Director of the Minnesota Opera for almost twenty years, Balk taught his acting methods of a fluid style of opera performance as a professor of theater arts at the University of Minnesota from 1970-1995. He is known for teaching performers to sing, act and move at the same time.
- FRIEDRICH BRODNITZ (1899-1995) – After arriving in the United States in 1937 as a refugee from Nazi Germany, Brodnitz opened one of the first United States private practices in otolaryngology, specializing in voice disorders, in Manhattan, 1942. He was also head of a clinic for voice disorders at Mt. Sinai, 1942-1964.
- OREN BROWN (1909-2004) – Professor of voice at Mannes College of Music during the late 1940s and voice faculty at the Juilliard School from 1972-1991, it was not until the end of his career that Brown published his seminal work, *Discover Your Voice*.
- THOMAS CLEVELAND – Cleveland wrote a regular column in the *NATS Journal* from 1988-1996 titled, “Voice Pedagogy in the Twenty-First Century. He is director of vocology at Vanderbilt’s Bill Wilkerson Center.
- BERTON COFFIN (1910-1987) – Student of William Vennard, Coffin wrote extensively on the affect vowel choice has on vocal production, especially in the area of vowel formants. He founded the one of the first Voice Pedagogy departments in the United States at the University of Colorado, Boulder. He was President of NATS 1968-1970.
- RAYMOND H. COLTON (b. 1942) – Active in the Voice Foundation, Colton is at the Department of Communication Sciences and Disorders at the Upstate Medical Center of Syracuse University.
- MERIBETH BUNCH DAYME (b. 1938) – Ms. Dayme currently resides in Geneva, Switzerland, teaching CoreSinging™ (a series of teacher certification courses designed to help the teacher support students as they accept and enjoy their own sounds). She is also the author of *The Singing Book*, with NATS Master Teacher Cynthia Vaughn.
- BARBARA DOSCHER (1922-1995) – Another student of Vennard, Doscher continued Coffin’s work in voice teaching and voice pedagogy at University of Colorado, Boulder.
- ROBERT EDWIN (b. 1946) – Active in both NATS and the Voice Foundation, Edwin has been a strong proponent for expanding the scope of vocal pedagogy to include

genres now termed Contemporary Commercial Music (including rock/pop, Broadway and children's pedagogy)

SHIRLEE EMMONS (1923-2010) – Student of Bernard Coffin, Ms. Emmons taught in New York City. Her significant publications include *The Art of the Song Recital* and *Power Performance for Singers* (with sports psychologist Alma Thomas) on the mental aspects of singing.

JO ESTILL (1921-2010) – Singer, voice specialist and voice researcher, she is best known for her development of “Estill Voice Training.” Estill worked with Colton and was active in the Voice Foundation.

MANUEL GARCIA, JR. (1805-1906) – Also known as Garcia II. Credited for the invention of the laryngoscope, with which doctors were able to look down a patient's throat and see the vocal folds in action for the first time. He presented his instrument to the Royal Society in London in 1855.

MINORU HIRANO (b. 1932) – Scientific researcher, professor in the Department of Otolaryngology—Head and Neck Surgery, Kurume University, Kurume, Japan, Hirano has made significant contributions to understanding the physiological structure of the vocal folds and the vibratory actions of the larynx.

HARRY HOLLIEN (b. 1926) – Active member of the Voice Foundation, Dr. Hollien is best known for his work in Forensic Voice Identification. He is a professor at the University of Florida.

JOHN LARGE – Active in NATS and professor at University of Southern California and the Institute of Laryngology and Voice Disorders, Large's volume *Contributions of Voice Research to Singing* was one of the first volumes published for NATS teachers that compiled scientific research on the voice into one accessible place.

VAN L. LAWRENCE (d. 1990) – Houston-based laryngologist, the Van L. Lawrence Fellowship is offered annually by the Voice Foundation and the NATS Foundation to honor voice pedagogy research by a NATS member. Lawrence wrote the “Laryngoscope” column of the *NATS Bulletin* from 1981-1990 and was an Associate Editor of the *Journal of Voice*.

HANS VON LEDEN (b. 1918) – Established, with G. Paul Moore, the first formal, academically based, interdisciplinary voice clinic in the United States at Northwestern University in 1954. He ended his career at the Institute of Laryngology and Voice Disorders, Los Angeles, CA.

LILLI LEHMAN (1848-1929) – Acknowledged diva of the stage, soprano Lilli Lehman wrote her text *How to Sing* utilizing anatomical charts and trying to apply science to voice pedagogy. Many of her directions come from the resulting sensation of resonance, rather than the physiologic function of the voice.

MATHILDE MARCHESI (1821-1913) – Reknowned voice teacher, her method books of vocalises are still in print today and utilized by many vocal professionals.

JAMES McKINNEY (1921-1998) – McKinney was NATS President 1997-1998. He was dean emeritus of Southwestern Baptist Theological Seminary's school of church music and distinguished professor of voice.

RICHARD MILLER (1926-2009) – Founder/director of the Otto B. Schoepfle Vocal Arts Center (OBSVAC) and professor of voice at Oberlin College for forty-two years, Miller brought the science of pedagogy to the voice teacher via his regular column *Sotto Voce* in the *Journal of Singing*, from 1980-1995. He was also editor of *The NATS Bulletin* 1980-1987. Miller gave regular workshops around the country on the acoustic measurement of vocal production, providing visual and auditory feedback to the singer.

DALE MOORE (b.1932) – President of NATS from 1988-1991, Moore is professor emeritus of the Eastman School of Music and a Senior Lecturer of Voice at the Indiana University Jacobs School of Music.

G. PAUL MOORE (1907-2008) – To honor his early contributions to the organization of the Voice Foundation, the annual G. Paul Moore Lecture at the Voice Symposium was created in 1981. He was Professor of Speech at the University of Florida and is noted for his contributions to the fields of audiology and speech-language pathology.

THEOPHIL OTTO (b. 1940) – Music librarian at Indiana University, Otto wrote the column "Checklist of Recent Research" in the *Journal of Research in Singing* from 1982-1993.

CORNELIUS REID (1911-2008) – Prominent voice teacher in New York City, Reid wrote extensively on applying science to voice pedagogy, often espousing ideas contrary to contemporary scientific understanding. He tried, in his 1983 *Dictionary of Vocal Terminology: An Analysis* create a consistent and comprehensive terminology for the vocal studio.

WILLIAM SHAKESPEARE (1849-1931) – Student of Carl Reinecke and Francesco Lamperti, he was professor of singing at the Royal Academy of Music in London and published several treatises on vocal pedagogy.

DOUGLAS STANLEY (1898?-1977) – Voice teacher who published many treatises on the necessity of scientific understanding in voice pedagogy from 1932 to his death. He espoused external manipulation of the larynx, which he later renounced.

INGO TITZE (b. 1941) – Prominent voice researcher and Executive Director of NCVS, currently located at the University of Utah in Salt Lake City, Dr. Titze is an active member of both NATS and the Voice Foundation and regularly presents to both organizations. He is a singing teacher and University of Iowa Foundation Distinguished Professor of Speech Science and Voice.

WILLIAM VENNARD (1909-1971) – Founding member of NATS and long-time faculty member at University of Southern California, Vennard was the teacher and inspiration for many of those quoted here, including Meribeth Bunch, Barbara Doscher, and Pearl Shinn Wormhoudt. His book, *Singing: The Mechanism and the Technic* was one of the first to clearly lay out the science in relation to vocal production. He was President of NATS 1964-1966.

CLIFTON WARE (b. 1937) – Author of a popular class voice textbook and teacher for over fifty years, Ware is professor emeritus of the University of Minnesota-Twin Cities, where he taught for thirty-seven years.

KENNETH WESTERMAN (1889-1955) – Westerman taught vocal music in the public schools of Adrian and Alpina, Michigan. He also conducted the University of Michigan Choral Union and Men's Glee Club. He was a charter member of NATS, forming their first voice science committee. His daughter, Jean Westerman Gregg was NATS President, 1994-1997.

PEARL SHINN WORMHOUDT (b. 1915) – Student of Vennard, Wormhoudt is professor emerita of William Penn University. Her 2002 book *With a Song in my Psyche* addresses the mental aspects of teaching singing.

APPENDIX B
DEFINITION OF TERMS

JOURNAL OF SINGING (JOS) – The official publication of NATS. Previously titled *The Bulletin* (1944-1965), *The NATS Bulletin* (1966-1985) and *The NATS Journal* (1985-1995), it is currently titled *Journal of Singing* (JOS).

JOURNAL OF VOICE – The official publication of the Voice Foundation.

THE NATIONAL ASSOCIATION OF TEACHERS OF SINGING (NATS) – Founded in 1944 and the major North American professional association for teachers of singing, NATS is open to voice professionals world-wide.

NATIONAL CENTER FOR VOICE AND SPEECH (NCVS) – Formally organized in 1990, the National Center for Voice and Speech conducts research, educates vocologists, disseminates information about voice and speech, and provides referral services in order to help people around the world enjoy healthy and effective vocal communications. With administrative offices located at the University of Utah, NCVS holds an annual Summer Vocology Institute to educate vocologists in speech science, vocal pedagogy, medicine, and theater training.

THE NATS BULLETIN – The official publication of NATS from 1966-1985. Previously titled *The Bulletin* (1944-1965) and subsequently *The NATS Journal* (1985-1995), it is currently titled *Journal of Singing*.

THE NATS JOURNAL – The official publication of NATS from 1985-1995. Previously titled *The Bulletin* (1944-1965) and *The NATS Bulletin* (1966-1985), it is currently titled *Journal of Singing*.

THE NEW YORK SINGING TEACHERS ASSOCIATION, INC. (NYSTA) – Founded in 1906 and centered in New York City, NYSTA is open to singing teachers and voice professionals world-wide. NYSTA currently offers an online curriculum devoted to increasing knowledge of vocal pedagogy in voice professionals, the Oren L. Brown Professional Development Program.

SINGERS – Vocal performers at any level

STUDENTS – Students of singing at any level

STUDIO/VOICE STUDIO – Both the physical location where voice students are taught and a term used to indicate the group of students taught by a specific teacher. Students are often referred to as members of a certain teacher's "studio."

STUDIO CLASS – Teachers often hold regular informal performance meetings for their students. This is commonly referred to as "studio" or "studio class."

SYSTEMS OF THE VOICE/VOICE SYSTEM(S) – The respiratory and phonatory (laryngeal and articulatory) systems of the body that work together for efficient vocal production.

TEACHERS – Teachers of singing, voice teachers, voice instructors

VOCAL/VOICE PEDAGOGY – The study of the art and science of singing voice instruction. Also used to define how and what the teacher communicates with the student in the studio.

VOCALISE – A vocal exercise given to the student by the teacher with a specific pedagogic purpose and technical goal for execution.

VOCAL WARM-UP – A vocal exercise used to get the systems of the voice moving in a coordinated manner so that specific technique/vocalises may be successfully executed. The vocal warm-up is analogous to stretching before exercising any given set of muscles.

VOCALOGY – The study and practice of voice habilitation.

VOICE FOUNDATION – Founded in 1969 by Wilbur James Gould, M.D and chaired by Robert T. Sataloff, M.D., D.M.A., F.A.C.S since 1989, the foundation brings together physicians, scientists, speech-language pathologists, performers, and teachers to share their knowledge and expertise in the care of the professional voice user. The mission of the Foundation is to enhance knowledge, care and training of the voice through educational programs and publications for voice care professionals, the public and professional voice users, and through supporting and funding research.

VOICE PROFESSIONAL – Any person who works professionally with the voice on a regular basis, including laryngologists, voice scientists, physicists, computer scientists, speech-language pathologists, singing teachers, acting teachers, voice coaches, singers, actors, and other professionals.

VOICE SYMPOSIUM – Annual international conference sponsored by the Voice Foundation sub-titled ‘Care of the Professional Voice.’ It is a venue for physicians, scientists, speech-language pathologists, performers, and teachers to share their knowledge and expertise in the care of the professional voice user.

APPENDIX C

CHRONOLOGICAL LIST OF SOME MAJOR PEDAGOGY WRITINGS PRIOR TO

ca. 1855

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APPENDIX D
A SELECTED CHRONOLOGICAL LIST OF VOCAL PEDAGOGY TITLES WHICH
INCLUDE SECTIONS ON VOCAL HEALTH

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BIOGRAPHICAL SKETCH

Mezzo-Soprano Rachel Velarde began her music career at Indiana University in the Indiana University Children's Choir, under the direction of Mary Goetze and Jean Sinor, and the Indiana University Young Pianists Program. After receiving her B.A. in Music from Smith College, Velarde earned two Master of Music degrees (Vocal Performance and Vocal Pedagogy) at Arizona State University. After a 2008 performance tour of Italy, Velarde continues to perform regularly around Arizona, including with the Phoenix Symphony. Velarde was a finalist in the 2009 Giulio Gari Foundation International Vocal Competition and first place Arizona winner in the 2008 NATSAA competition (National Association of Teachers of Singing Artist Awards). She was awarded the 2010 NATS (National Association of Teachers of Singing) Independent Teacher Fellowship for attendance to the 51st National Conference. In June 2012, she was awarded honorable mention for the Van L. Lawrence Fellowship in Vocal Pedagogy Research from the Voice Foundation and the NATS Foundation. Velarde will be presenting her paper entitled "Vocal Pedagogy at the End of the Twentieth Century: Revealing the Hidden' Instrument" at the 2013 Voice Foundation.