

BOOK REVIEW

by NYSTA Treasurer and Board Member Brian Gill, DMA

Donald Gray Miller, ***Resonance in Singing—Voice Building through Acoustic Feedback*** (New Jersey: Inside View Press, 2008). \$70.00

Hang on to your formants (or at least tune them)! It is a thrilling ride! *Resonance in Singing – Voice Building through Acoustic Feedback* by Donald Gray Miller is a wonderful guide to the world of formant tuning/resonance strategies. The premise behind the book is that voice teachers/singers can use acoustic feedback as well as signals from an Electroglottograph (a device that measures connectivity at the vocal fold level) to aid in the developmental training of the voice. With a

program like VoceVista-Pro, a hardware/software program developed by Dr. Miller (included with the book), one can see how effectively the vocal tract, or filter, is resonating the information (harmonics) generated by the vibration of the vocal folds, or source.

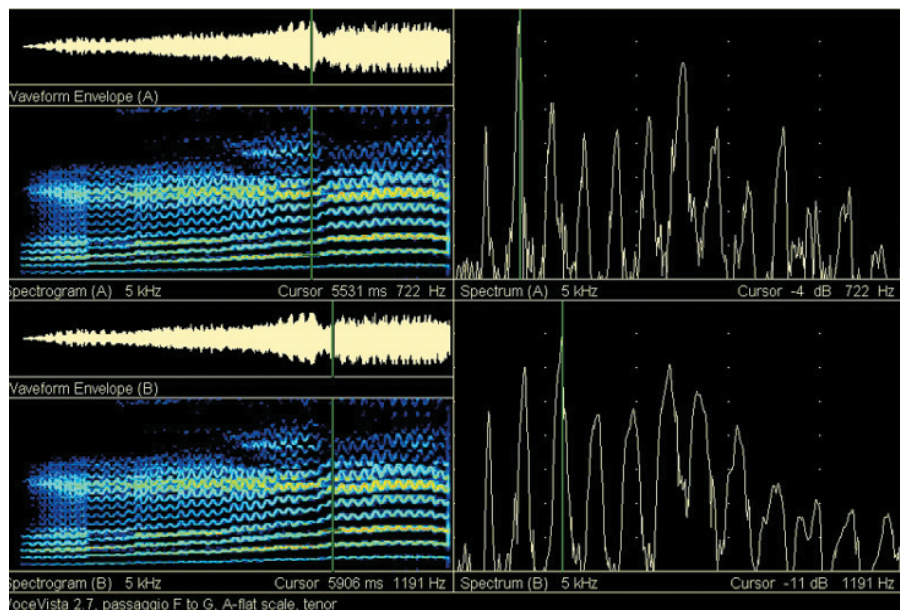
The book begins with an Introduction by Dr. Scott McCoy. He very aptly points out that “Science will never replace art in singing and teaching. But it can—and does—inform the art, enabling singers to perform with optimal beauty and vocal efficiency through a technique that is grounded in fact, rather than wishful thinking.” He continues by saying, “[Don Miller’s] work will help us all become better singers and teachers, while moving voice pedagogy toward full integration with scientific reality.”

In the Forward, Dr. Miller discusses how language is insufficient when it comes to describing sung sound. He says the goal of the book is “to illuminate some of the important phenomena that are now, thanks to generally available technology, open to objective description, and to bring these phenomena within the reach of a commonly shared language.” This is a very ambitious goal, but, with this book, Dr. Miller advances us well down the path of discovering this common language.

Resonance in Singing is only 130 pages long, including the Index in the back of the book, but it is filled from cover to cover with invaluable information regarding the singing voice. Due to the scientific nature of the information, some may find it taxing to read straight from beginning to end; therefore, Dr. Miller invites the readers to start wherever they wish, i.e., they may begin by exploring Voce-Vista-Pro, or by flipping through the chapters to start with the one that piques their interest most. I believe the information in this book, thanks to the glossary of terms and the highly intelligible commentary along the way, is accessible to most anyone. But, it wouldn’t hurt to brush up on some fundamentals of voice science, particularly in the area of acoustics, before tackling this book.

All of the chapters are well-organized and provide a wealth of knowledge to the reader. While scanning through the book at first, Chapter One, “Pavarotti: King of Second Formant Tuning,” jumped right out at me (after all, I am a tenor!). It pays tribute to one of the greatest singers of all time, the late, beloved Italian tenor, Luciano Pavarotti. Proclaimed “King of the high C’s,” there is something otherworldly about Pavarotti’s singing. Dr. Miller discusses in great detail one noteworthy aspect of Pavarotti’s voice: his consistent employment of a resonance strategy in the higher register of his voice that involves tuning the second formant of whatever vowel he is singing to either the third or fourth harmonic. This resonance strategy is usually present in his voice beginning around F4 or





VoceVista-Pro: tenor passaggio

F#4. While it is only one aspect of the “magic” produced by Pavarotti, its importance should not be overlooked. The split screen in the figure on Page 6 shows the two different spectra representative of this transition. The top of the screen shows how the second harmonic is being resonated by the first formant on the pitch F4; the bottom of the screen shows how the third harmonic is being resonated by the second formant once the singer reaches the pitch G4. For those worried whether they will be able to understand how to use VoceVista-Pro, Chapter 2, “The Signals of VoceVista,” discusses the many elements of the hardware/software program, including: the spectrogram, the power spectrum, the electroglottograph waveform, the audio waveform, the waveform envelope, the closed quotient (CQ), and the criterion level (CL).

Dr. Miller provides a clear discussion of harmonics and spectra and, in Chapter Three, includes an example of the harmonic series for the note G2; this example is well-chosen as it provides us with approximate frequencies for “reference notes” throughout most of the singing range of both the male and female voice. He goes on to discuss formants and vowel space, outlining the principles of vowel modification, including the rationale for why vowels need to be modified. Generally speaking, vowels need to be adjusted, or tuned, so that the formants (usually one of the two “vowel formants”) become more acoustically sensitive to the harmonics produced at the vocal fold level. A good example illustrating the necessity of formant tuning is seen when considering the compatibility of closed vowels and the pitches in the high range of the female voice. Since we know that while in head voice, in the upper range, a woman tracks the fundamental frequency with the first formant, we must conclude that it would be impossible to sing an [i] with its usual articulation. The [i] has

a first formant frequency in the vicinity of 300 to 400 Hz. For notes in the upper range of the female voice, the fundamental frequency is around 700 Hz and higher, which is well above that of the first formant of [i], rendering it acoustically incompatible. The only way to ensure proper resonance and ease of production, considering this acoustical mismatch, is to modify the vowel. A sensible modification might be to open the front of the mouth which will have the effect of raising the frequency of the first formant by narrowing the space in the pharynx. If that space is not altered and too much of the “pure vowel” is maintained, the acoustical mismatch will most likely result in: the pitch being flat, irregular vibrato or no vibrato, increased effort, strident tone, and in extreme cases, the cessation of phonation.

Finding one’s formant frequencies, Dr. Miller points out, can be achieved fairly simply by employing vocal fry, “a bubbling of air through closed vocal folds at a rate slow enough that the individual impulses are heard as separate ticks.” (There are informative definitions throughout the book!) While forming a vowel as if you were singing it, begin to employ the vocal fry. Using VoceVista-Pro, you will see a power spectrum that shows at least the first two formants, which will show up as peaks in the spectrum. One key to successfully employing this method is to make sure that the vocal tract posture is maintained as accurately as possible. The success can be verified by comparing the spectra of the sung vowel sound and the vocal fry “imitation.” With VoceVista-Pro one can overlay the two spectra to see exactly how the formants boost the signal of the harmonics that are located near them. If the peaks line up properly, we know the vocal tract posture was maintained. With practice this gets increasingly easier to do. Once you know your vowel formant frequencies you possess the numbers that will help you decide how

to modify your vowels.

Dr. Miller discusses many resonance strategies throughout the book, while addressing topics such as: registers in male and female voices, the male upper extension, and the female middle voice. Accompanying the book is a CD-ROM, which includes an invaluable multimedia player for all of the examples in the text. I found this element to be quite helpful as all of the examples are well-executed and clear. In addition, the CD-ROM provides the reader with the VoceVista-Pro Primer, which is a tutorial that acts as a supplement to the help file included with the program.

Resonance in Singing provides an example of how science can meet the voice studio in an exciting and highly applicable fashion. The ability to use VoceVista-Pro as a tool to enhance one’s teaching is now possible for all, thanks to this insightful, well-organized, multimedia presentation by Dr. Miller. I would encourage all readers to do their own investigation into all of the resonance strategies found in this book before drawing conclusions. Within these pages, one finds a foundation for intelligent, fact-based conversation regarding the sung sound. I consider this book to be a necessary and welcome addition to the libraries of anyone interested in having a deeper understanding of how the singing voice functions.

Dr. Brian Gill is Clinical Assistant Professor of Voice at New York University, where he teaches applied voice, diction and vocal pedagogy. Before coming to NYU, he served on the voice faculties of Pace University and Eastern Kentucky University. While working as a graduate assistant at the University of Kentucky, he taught applied voice, diction and assisted with the vocal pedagogy program. He is currently Treasurer of NYSTA and serves on the NYSTA Board of Directors. His full biography may be read in the September-October 2008 issue of *VOICEprints*.



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