

The Singer's Library

Acoustic Insights

BY BRIAN MANTERNACH

A follow-up book by Professor of Music Kenneth W. Bozeman explores using kinesthesia and knowledge of acoustics to create more efficient singing within a voice studio.

With the 2013 release of *Practical Vocal Acoustics: Pedagogic Applications for Teachers and Singers*, author Kenneth W. Bozeman set out to make certain principles of voice science more accessible to the general voice community. He specifically wanted to determine how scientific insights best translated to the voice studio and he hoped to encourage open and honest collaborations between voice teachers and voice scientists.

Practical Vocal Acoustics is now a common text used in university vocal pedagogy courses. It is the subject of numerous discussion groups and pedagogy-based book clubs and many of its concepts were explored in a 2016 NATS chat led by the author (available at www.youtube.com/watch?v=v918jW1Nc0g).

As interest in acoustic pedagogy has grown over the years, Bozeman was encouraged to write a follow-up book that went even further in translating acoustic understanding into the kinesthetic and often subjective language of the voice studio. The result is the 2017 publication *Kinesthetic Voice Pedagogy: Motivating Acoustic Efficiency*.

In my conversation with the author, Bozeman discusses the value of acoustic pedagogy, explains how it impacts voice instruction, and touches on some kinesthetic tools that can improve singing.

In the foreword, Norman Spivey comments on your enthusiasm to continue learning and exploring voice pedagogy, saying you are as much a student

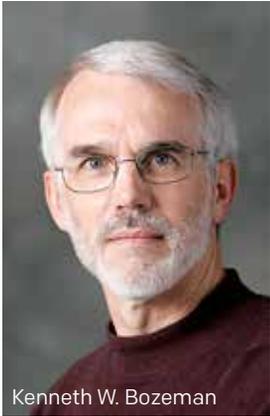
as a master. Is that what has allowed you to so fully understand the topic of vocal acoustics, which has otherwise flummoxed so many singers and voice teachers? Or has this topic always been something you could easily grasp?



Brian Manternach

I have had an interest in acoustics at least since reading Vennard [*Singing: The Mechanism and the Technique*] as an undergraduate. That interest was spiked a few times along the way before it really intensified. The first I remember was at a NATS convention in Minneapolis in 1983, at which I first heard a synthesized tenor voice “singing” an F major scale on /a/. Though the settings for formants and voice source spectral slope were not changed, the synthesized “voice” went through all of the color changes of a male passaggio that we had assumed were due to laryngeal registers. It struck me that those color changes were all acoustic in origin.

A second stimulus came six years later when, during a semester in which I was a visiting sabbatical replacement, I took lessons from Richard Miller. His descriptions of the *zona di passaggio* of male voices indicated that I would enter that transition zone on about D4 and exit it into my “head voice” at about G4. I think most teachers at the time assumed that transition was purely a laryngeal phenomenon and the same for all vowels. During that lesson an /e/ vowel “turned over” on D4.



Kenneth W. Bozeman

I was surprised and puzzled. I asked Richard, “What was that?!” He replied, “What was what?” Me: “What just happened on that /e/

vowel?” Richard: “Do it again.” I did. Richard: “It’s fine.” We went on without further comment, but I went back to the lab he was setting up there and, after some experimentation, realized that all of my vowels “turned over” in a parallel relationship to their first formant locations.

I was shocked that I had never read this anywhere. Only some time later did I realize it was an octave below the first formants, when the second harmonic of the pitch I was singing surpassed the first formant of the vowel I was singing. The surprising but inevitable conclusion of this is that voices don’t turn over on the same pitch for all vowels. I was hooked on voice acoustics after that.

You refer to *Kinesthetic Voice Pedagogy* as a “sequel” to *Practical Vocal Acoustics* and note that those who have read the first book will be in the best position to understand the contents of the second book. What are the primary elements covered in the first book that are most useful to know in order to fully appreciate *Kinesthetic Voice Pedagogy*?

Practical Vocal Acoustics lays out what I intend to be a very user-friendly foundation in the acoustics of the singing voice and explains the concept of acoustic registration. It begins to offer pedagogic implications and applications.

Kinesthetic Voice Pedagogy goes much further into how one might use this in

the studio, incorporating kinesthetic, body mapping explorations and greater detail. It also incorporates, from the discipline of psychoacoustics, my pedagogic application of the concept of absolute spectral tone color being developed by Ian Howell of New England Conservatory.

You write that, in your experience, “improved understanding of vocal acoustics and especially of acoustic registration can transform one’s problem-solving effectiveness in the studio as much as or more than any other single area.” How did you come to this conclusion?

While studio pedagogy encompasses other important areas besides vocal acoustics (such as breathing and laryngeal registration), my own effectiveness and efficiency as a teacher—both in diagnosing issues

and crafting solutions—has improved dramatically as I have begun to understand the implications of the internal acoustic landscape we inhabit.

I believe acoustic pedagogy to be the most productive path to vocal improvement, because it deals with things that we can most directly change—which also feed back on the vocal folds improving their efficiency.

Do you often see teachers addressing vocal inefficiencies in their students by focusing on non-acoustic elements of singing when a more thorough understanding of vocal acoustics could more effectively address the issues?

Certainly. Acoustic pedagogy doesn’t replace any of the other good things we’ve always done—and, besides, all singing teachers are doing some form of acoustic pedagogy, whether we think

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Book Review

When I picked up Kenneth W. Bozeman's first book, *Practical Vocal Acoustics: Pedagogic Applications for Teachers and Singers*, I had high hopes. Having been frustrated in previous attempts to fully understand the application of formants, harmonics, and other elements of acoustic pedagogy to singing, I was encouraged by friends and colleagues who felt Bozeman's book was the first that explained the topics in a way that made them accessible and approachable.

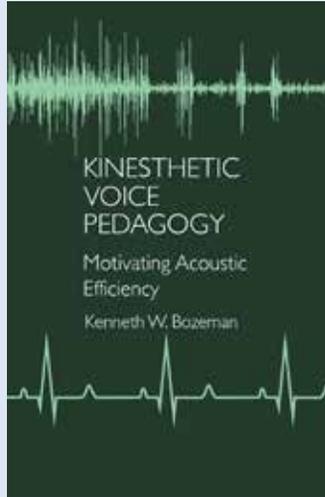
While I had a similar experience with the book and was finally able to bring a better working knowledge of vocal acoustics to my singing and teaching, the subject remains challenging as I find myself frequently reviewing the information to make sure I am applying it effectively. Therefore, for me, *Kinesthetic Voice Pedagogy: Motivating Acoustic Efficiency* is the necessary follow-up to Bozeman's first book. It is here that some of the more notable concepts are put to use in ways that I find to be most immediately transferable to the voice studio.

Its short length (just 87 pages, including appendixes, references, and endnotes) ensures that only the most essential information is included, while frequent repetition of key points reminds readers of subjects previously discussed and how they relate to the later topics.

Voice science continues to define and inform modern voice instruction. Science-based information on various elements of singing is exponentially more available now than it was even half a generation ago. As we further explore the connection between the science and art of singing and seek to incorporate new information in useful ways, books like *Kinesthetic Vocal Pedagogy* play a greater role than ever.

While Bozeman's first book made him a pioneer in this effort, his newest book is an equally significant resource in furthering the cause of fact-based studio instruction.

—Brian Manternach



of it as such or not. But really knowing where things happen, why they happen there and how, gives a clear factual basis for diagnosis and subsequent, creative, motivating strategies.

You emphasize that while acoustic feedback and analysis technology is in constant use in your voice studio, it does not dominate the lessons or become the central focus of your teaching. How do you find this technology is best used in the studio setting?

I use real-time spectrography constantly as my playback device. It gives a linear picture along with the sound and offers several things that are easily apparent for discussing the sounds just made. Among those are the continuousness and regularity of vibrancy, consistency of legato, and the overall balance of ring and depth. But I really don't use it for the main tasks of acoustic registration, which are format tuning, vowel migration, and vowel modification. I am convinced that, if you really understand acoustic pedagogy, you can teach it without technology.

One of the key ideas explored in the book is the idea of false kinesthesia, meaning there are times when our sensory awareness may be misleading. What are some of the most misleading senses related to singing?



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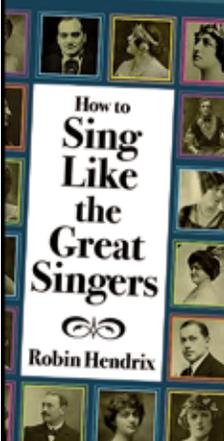
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“Kinesthetic Voice Pedagogy goes much further into how one might use this in the studio, incorporating kinesthetic, body mapping explorations and greater detail.”

The sense of the shape of the throat, specifically of its relative openness, is notoriously false, such as the sense of the location of the back throat wall, which is always actually in front of the ears.

Another crucial matter is our sense of vowel quality across range. Though we should always attempt to be intelligible and seem to be producing “pure” vowels, vowel migration across range is inevitable, and active vowel modification is necessary in certain circumstances to be fully resonant. Understanding and allowing necessary passive vowel migrations across range and realizing that they sound less modified to the listener than to the singer are two other necessary corrections of misleading sensory feedback.

You advocate using an “affect” to inspire singing, such as a smile, mischief, pleasure with oneself, suppressed laugh, or strong empathy. Is this primarily to distract the singer and prevent micromanaging

the muscles involved or is there more at play?

We are deeply programmed from birth to coordinate breath with voice to express feeling. We should use that. If intelligently managed, it is the quickest route to efficient coordination. This is similar to Janice Chapman’s primal sound (*Singing and Teaching Singing*). So whenever I can accomplish an identified physical or acoustic goal via an affective motivation, I do that.

I use light affect usually and am not looking for an overly emotional response, but both respiration and pre-phonatory tuning (how you set up the vocal tract and vocal folds just before phonation) are best “tuned” by the impulse to communicate, the impulse to say something.

Obviously, in a book on kinesthesia, there is much discussion of sensation. How do you balance promoting certain generally perceived sensations as kinesthetic reference points while still allowing for the

individuality of each singer and the fact that we don’t all feel the same things in the same way?

Many sensations of good singing are common enough to be useful but may not be universal. I always ask the singer, “How did that feel?” I do that both to make sure it felt really good physically, but also to learn their particular sensory response. The student’s version of the experience is almost always the one to go with, as long as the external product is good.

Brian Manternach is on the voice faculty of the University of Utah’s Department of Theatre. In addition to his contributions to Classical Singer, he is an associate editor of the Journal of Singing. An active singer, he holds a doctor of music degree from the Indiana University Jacobs School of Music. Visit www.brianmanternach.com for more information or contact him at bmantern@gmail.com. ©

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