BEGIN MY FIRST ARTICLE AS Associate Editor of Journal of Singing for “Voice Pedagogy” with a disclaimer: I do not teach belting or other contemporary commercial singing techniques. In addition, I do not teach straight tone singing, jazz, world music, extended vocal techniques, or classical literature in languages I don’t speak or understand. I have nothing against any of these genres; indeed, I enjoy listening to them and greatly admire the singers and teachers who have mastered them.

My musical background, both as a pedagogue and performer, is firmly rooted in the Western, classical traditions of the seventeenth through twenty-first centuries. With one small exception, pursuit of this music has occupied my entire professional life. Several years ago, I stepped outside my safety zone to sing “Pinball Wizard” from the rock opera Tommy, accompanied by a genuine rock band, as the finale to a recital for the 25th anniversary gala of a regional opera company—their “Silver Ball.” In spite of my stunning (or was it stunned) rendition, the band did not offer me a gig as their new lead singer, which I took as a sign to stay within my self-designated musical boundaries.

Over the past decade, my teaching has evolved to include courses and workshops in the science of voice pedagogy. Students range from aspiring young singers, voice teachers, voice coaches, and stars of the Metropolitan Opera and Broadway, to speech language pathologists and nonprofessionals who just want to know more about the human voice. Objective study of physiology and acoustics is applied to the subjective aesthetic of vocal artistry to help demythologize singing. Our goal is not to understand what vocal techniques are effective, but rather why they are successful. Given the diverse wealth of experience students bring to these classes, it is not surprising they want to know more about belting. Predictable questions are raised and potential misconceptions revealed:

- Can belting really be taught?
- Does belting damage the voice?
- Is belting the same as chest voice?
- Does belting require the larynx to be held in an elevated position?
- Is classical vocal training the best way to learn to belt?

My general response to these questions has been a resounding “I don’t know! You’ll have to speak with the experts and do further research on your own.” After taking this tack for a number of years, I decided it was time to explore the issue more directly. Fortunately, I live only a short drive from one of the most successful teachers of belting in the world, Robert Edwin,
who most graciously invited me into his studio to study a group of his belters. Based on preliminary observations of music theater majors at Westminster Choir College of Rider University, I sought additional information in three areas:

1. Can closed quotient measures (the ratio of time the glottis is closed during each cycle of vibration) help define registration events in belting?
2. Does the larynx always rise during belting?
3. What measurable acoustic differences exist between belting and classical models of voice production?

**METHODOLOGY**

Twelve female singers participated in this study, which occurred on the evening of May 19, 2006. Participants ranged in age from 17 to 38 years (average 20.5 years), and had studied singing for 1.5 to 14 years (average 6 years). All were in good health and were reliably able to belt at least to the pitch F₅. Glottal closure patterns related to voice registration were assessed with Voce Vista Professional software from signals generated by an electroglottograph (EGG) model EG2-PC, manufactured by Glottal Enterprises. In addition to acquiring the EGG signal, the EG2-PC tracks laryngeal elevation during phonation. Acoustic measures were acquired using a professional quality headset condenser microphone manufactured by Countryman, processed through Voce Vista Professional and Multi-Speech from Kay-Pentax.

Each participant sang the following tasks:

- B-flat major ascending scale in full belt, ending on B₄.
- F major ascending scale in full belt, ending on F₅.
- F major ascending scale in belt/mix, ending on F₅.
- F major ascending scale in head voice, ending on F₅.
- Ascending/descending interval, A₄ to E₅, all belt and belt/head combinations.

**OBJECTIVE OBSERVATIONS AND MEASURES: CLOSED QUOTIENT**

Based on previous measures taken in the Westminster Voice Laboratory, supported by Donald Miller's observations, I expected belting to have a relatively high closed quotient. Closed quotient (CQ) can be indirectly and noninvasively measured with an electroglot-
OBJECTIVE OBSERVATIONS AND MEASURES: LARYNGEAL HEIGHT

EGG transducers are placed on the neck, secured with a Velcro band, adjacent to the larynx while the test subject is at rest (not vocalizing). Within a relatively narrow range, laryngeal elevation and/or depression during phonation is displayed by a series of lights on the face of the EGG instrument; if laryngeal movement exceeds this range, EGG signal is lost and CQ measurement becomes impossible.

In our testing, a reliable EGG signal was maintained at all times with all test subjects, indicating a relatively stable laryngeal position with little or no elevation above the resting point. Based on this observation, it is clear that belting does not require laryngeal elevation.

OBJECTIVE OBSERVATIONS AND MEASURES: ACOUSTIC SPECTRUM

The acoustic spectrum of classical singing is dominated by clear formant zones, including the well known singer’s formant that is used to project the voice over the sound of an orchestra. Acoustic energy outside these formant zones is strongly attenuated; little energy is generally found above 4 kHz (the upper extreme of the singer’s formant region). The acoustic spectrum of belting is broader with formant regions that are less clearly defined. Figure 2 presents a spectrogram of one test subject alternately belting and singing in head voice. In belt, strong harmonics are found through 10 kHz; in head voice, harmonics above 4 kHz are relatively weak. It is interesting to note that the first two harmonics are actually stronger in head voice than in belting.

Subjectively, the timbre of belting is often described as bright, twangy, and brassy with horizontal vowel sounds modeled after speech (as opposed to the tall, round vowels preferred in the classical model). Acoustic
measures demonstrate this brightness through increased energy in high frequency harmonics. The source of this brightness could not be reliably determined by the instrumentation used in this study. I would speculate on three possibilities:

1. Narrowing of the pharynx through gentle contraction of the constrictor muscles. In classical singing, the throat is relaxed to its maximum circumference to produce a warmly resonant sound. A narrowed pharynx should produce a brighter, brassier sound akin to the difference in timbre between a trumpet (small bore) and flugelhorn (wider bore).

2. Shortened vocal tract through spreading the lips in a horizontal vowel position or slight elevation of the larynx. Short resonators amplify higher frequencies than long resonators, as in the example of a piccolo versus a flute.

3. High closed quotients help produce a glottal buzz with increased amplitude in high harmonics.²

SUBJECTIVE OBSERVATIONS

Almost all of my preconceptions of belting were false. In my naivety, I assumed that belting was nothing more than “bottom-up” voice production that pushed the heavy mechanism (or the glottal configuration of chest voice) beyond its natural upper boundary. I expected the voices to be fat on the bottom, becoming progressively thinner, more pinched and shouted as pitch ascended in a registration model opposite the classical tonal ideal (slender bottom, opulent top). Instead, I heard one singer after another produce a scale that was light and slender on the bottom, increasing in energy and becoming more speech-like through the middle, and ending in a clear, strong, open top. The voices displayed uniform timbre with no apparent vocal seams or register changes.

I had expected belting to be extremely loud; it was not. As Mr. Edwin explained, belters need not project their voices like classical singers, who must employ self-amplification through the singer’s formant. In contrast, contemporary belting relies almost exclusively on electronic amplification; as a result, belters are able to sing relatively lightly with little need to apply excess vocal force.

I had also expected to see obvious physical signs of vocal distress. Once again, I was wrong. Clenched jaws, wobbling tongues, tight neck muscles, heaving chests, and elevated larynges were not to be found. I now understand these physical manifestations only are found in incorrect belting, just as they only are found in incorrect classical singing.

CONCLUSIONS

Recent articles in the Journal of Singing have addressed the importance of tonal ideals and imaging in singing (see Volume 63, Numbers 1 & 4 for works by Margaret Cusack and Rudolf Piernay). Studying—and teaching—singing might be compared in this regard to a long journey: If the destination is unknown, how do you determine you have arrived? Prior to the study outlined in this article, I had neither a valid tonal concept of contemporary belting nor a correct understanding of the physical processes involved in its production. I still don’t know how to teach someone to belt, but at least I can better appreciate the final product. Perhaps I’ve taken my first steps on the journey to become a more diversified teacher.

NOTES


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