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Training the Electronic (Microphone) Singer

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Musicians have accepted electronic guitars, electronic organs, and electronic pianos as legitimate instruments. When first introduced, they gained their acceptance by how well they replicated the sound of their acoustic siblings, but in time they were appreciated for their unique sounds, those that were not achievable with an acoustic instrument.

If we divide sound properties of musical instruments into those belonging to the sound source and those belonging to the resonator, it is generally easier to replace or augment the resonator with electronics. The resonator is designed to amplify and color the sound source. Amplification and filtering (coloring) are routine operations in electronics. Within the sound source, however, reside the more delicate control aspects, such as intonation, rhythm, harmonicity, and vibrato. Hence, instrument design is sometimes a hybrid between acoustic components and electronic components, as in the electric guitar.

For many years I bought into the notion that training the vocal instrument for amplified singing is not different from training for unamplified singing. I was convinced that the operatic sound is a style, just like folk, jazz, or pop are styles. Building vocal instruments first follows a common path, from which the stylistic differences peel off at the end, like the petals of a flower on a long stem.

I have begun to question that notion. Operatic sound production is not a style, but the inevitable outcome of acoustic requirements for unamplified singing in large halls. Here is a list of some of those acoustic requirements:

1. A dynamic range in sound pressure level of 20–30 dB over a 1–2 octaves pitch range so that dynamic levels of *pp*, *p*, *mp*, *mf*, *f*, and *ff* can be executed with noticeable differences over distances of 50 m or more.
2. A spectrum of harmonics that competes with an orchestra spectrum (100–4000 Hz), which leads to the *chiaro-oscuro* (bright-dark) combination in operatic voices. Brilliance alone sounds “tinny” lacking in warmth; darkness alone sounds dull and does not carry well over distances.
3. A frequency modulation of all the harmonics that allows resonances of the airway (vocal tract) to be excited in regular intervals for the benefit of rich timbre. A 5–6 Hz vibrato rate with ± one half semitone extent accomplishes that.
4. An exaggeration of consonants that are otherwise masked by the disproportionate length and loudness of vowels

None of the above are requirements for electronically amplified singing. Dynamic range can be produced with changes in mouth-microphone distance, and further with back-stage or studio amplification. Spectral balance is produced with electronic equalizers. Vibrato-like frequency modulation can also be produced electronically, but generally is not needed if resonances in the voice-electronic resonator system can be arbitrarily produced. Consonants can be more speech-like because close mouth-microphone distance picks up bursts, nasals emissions, hisses, and other nonvowel sounds.

So, what cannot easily be manufactured electronically in microphone-assisted singing? What requires training? Here are a few features:

1. Precise intonation—it is difficult to sort out and correct unintended pitch variations from intended ones, at least in real time. While automated pitch-correction programs have become incredibly sophisticated, their use often results in a somewhat un-natural tone fitting in heavily electronic genres.
2. A wide pitch range, not restricted by the lack of dynamic range.
3. Precision in rhythm and accent.
4. Control of frequency spectrum in terms of variable sound quality, including register, twang, belt, breathiness, subharmonics, roughness, gender equalization, and primal vocalization for emotion—all produced with an eye toward vocal endurance and longevity.

In very general terms, training the amplified singer focuses on a large inventory of predictable and controllable sounds at relatively low acoustic power, while training the unamplified singer focuses on the few combinations that maximize acoustic output power.