

Michael Edward Edgerton

## Anaphora

For soprano

Duration: ca. 20'

*Anaphora* is a study of 56 separate CLASSES of vocal multiphonics, lasting 20+ minutes. The work explores dynamical (nonlinear) systems applied directly to sound production and network theory as applied to composition. Most rare are the instances of biphonation produced by the vocal folds - this is one of the few areas left unexplored by composed music. Particularly unique are the instances of the technique identified as a whistle produced through the vocal folds - or glottal whistle. This is significantly different than the whistle register as identified by those of the western classical tradition. During this glottal whistle, the folds are approximated in such a way as to produce whistle-like sonorities that often feature multiple tones and which are often transient in nature. These are fascinating beasts which are simply beautiful to hear that often resemble animals or electronically produced tones. One other type of sonority calls for a special type of biphonation featuring asymmetrical vocal fold oscillation in which the left fold vibrates at a different frequency than the right. This may result in the production of two clearly identified pitches, that if combined with a sufficient degree of proficiency, the performer will have the ability to simultaneously produce two different melodies within clearly identified scalar formations.

This type of control is absolutely rare, and to my knowledge only one case of a performer featuring independent control of the left and right folds has been reported. In an exceptional case study, it was reported that a teenage subject had the ability to produce true biphonation featuring two independent frequencies. This subject achieved such behaviors through complete independent control of the left and right vocal folds. Captured on high speed photography and cinefluorography, the subject demonstrated the capacity to produce parallel, similar, oblique and contrary pitch movement at will, otherwise having a completely normal voice (Ward, et al 1969). Further, she had the proficiency to produce such behaviors within different musical scales and not simply as contour relationships (Neubauer, Edgerton, Herzel 2001).

As might be expected, some of these special biphonic sonorities are heavily weighted upon the parameters of production, and as such necessarily emphasizes the process of setting and searching the neuro-muscular framework, so that far more than classical western traditions, this process will necessarily involve preparation, failure and achievement. Therefore, in *Anaphora*, it is wholly desired that ALL of these elements of the searching process become part of the sonic landscape and MUST be included in performance.

Added to production and gesture are findings that the parameter space of real-world phenomena overlap. When applied to voice production, small instabilities in parameter space lead to bifurcations. During excised larynge experiments, Berry, et al. in 1996 found that asymmetric vocal fold adduction can lead to a bifurcation from normal phonation to oscillation of a single fold, such as is seen with unilateral vocal fold paralysis. This gives important information for those performers who wish to voluntarily produce extra-complex sonorities by indicating that the slight increase of adduction to one fold might be the critical parameter to emphasize. Likewise, in this

same study the researchers found that asymmetry of vocal fold elongation had a profound effect on the signal - although this was not visible. This suggests that not only geometrical properties be examined, but also the elastic properties perform a crucial role in the maintenance of the appropriate glottal signal. In total, these bifurcations induce qualitative changes from one vibratory pattern to another, and thus a corresponding radiated signal. In Anaphora, these bifurcations of production are intended to result in biphonic and irregular, transient, deterministic chaotic regimes.