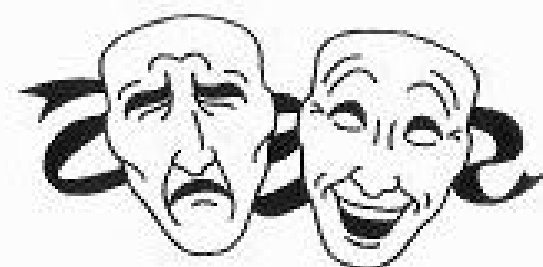


ANAPHORA

solo voice



MICHAEL EDWARD EDGERTON

PERFORMANCE NOTES

GENERAL

Anaphora explores vocal multiphonics within a nonlinear framework that influences production, gesture and form.

Technically, the work explores voiced-voiced, voiced-unvoiced, unvoiced-unvoiced, and three or more simultaneously produced multiphonic source components within the vocal tract. A note is made for elements 1, 2, 3, 5 and 9 (plus variants)! These are very special techniques that must be mastered in order to achieve an expressive balance between the elements of biological diversity and dramatic continuity. Most rare are the instances of *biphonation* produced by the vocal folds - this is one of the few areas left unexplored by composed music. These regions are found in #1, 3, 5 and 9 (plus variants). Particularly unique are the instances of the technique first identified in region 9 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 that will be especially mentioned is that found in technique #5. Although the notation does not very intuitively suggest the acoustic product, this 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, Paul Ward conducted a study of a teenage subject who 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. 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 suspected, 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 vocal 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.

Yes, yes, fine (yawn); but WHAT about the title? Oh yes. ummmmm.....

a-naph'-o-ra:

from Gk. *ana* "again" and *phero* "to bring or carry"

repetition of the same word or group of words at the beginning of successive clauses, sentences, or lines

The act of composition deals, in part, with the balance between repetition and novelty. In this unaccompanied solo that features a high degree of biological diversity, my central concern was to maintain a sense of coherence that would carry through the procedure of kaleidoscopic change. In addition to the technical musical issues, a subsidiary interest focused on the drama underlying unaccompanied solo performance. This was manifest through *Richard II* of Shakespeare. In the following passage, *John of Gaunt* in his anger presents a wealth of feeling and emotion for his beloved kingdom through constant variation. However, showing his concern for principles of composition and not merely dramatic performance, the author of *Richard II* utilizes this simple convention of repetition at phrase inception.

This royal throne of kings, this scepter'd isle,
 This earth of majesty, this seat of Mars,
 This other Eden, demi-paradise,
 This fortress built by Nature for herself
 Against infection and the hand of war,
 This happy breed of men, this little world,
 This precious stone set in the silver sea,
 Which serves it in the office of a wall,
 Or as (a) moat defensive to a house,
 Against the envy of less happier lands;
 This blessed plot, this earth, this realm, this England,
 This nurse, this teeming womb of royal kings (...)
 This land of such dear souls, this dear dear land,
 Dear for her reputation through the world,
 Is now less'd out -- I die pronouncing it --
 Like to a tenement or pelting farm.

John of Gaunt, *Richard II* (2.1.40-51; 57-60)

So a puzzle is presented. In a unaccompanied solo for voice with no text, can the observer find the relation between Shakespeare and here?

CUES TO SCORE

- *1 **extreme airflow WITH vocal fold pitch:** completely free and open tone; very aggressive; search for tone very high in range; the air **MUST** be emphasized in order to turn the stable fundamental frequency into a region of deterministic chaos; the result should be a complex multiphonic with unstable elements; the feeling should **NOT** be tight, but actually rather relaxing - **NO PUSHING REQUIRED!**
- *2 **fold tremolo:** rapid onsets and offsets similar to those found in classical music traditions of India, or rapid glottal stops or as the Baroque trillo.
- *3 **high oscillation WITH fold tremolo:** resembles a turkey; elements involve a high oscillation between two pitches (quite possibly one of the regions featuring a voiced asymmetric multiphonic) **WITH** rapid onsets and offsets (similar to those found in classical music traditions of India, or rapid glottal stops or as the Baroque trillo or as a yodel) at an extreme intensity at a very high pitch **WITH** nasal projection **WITH** high airflow; the oscillation interval of a tritone will help to flavour the tone; an irregular rate of oscillation will add to the expression; the vowels may change predictably or unpredictably; the oscillations may be thought of as flips up or down from either of the pitches.
MAIN MESSAGE: HIGH PITCH, RAPID GLOTTAL STOPS, NASAL PROJECTION, INTENSE PRODUCTION, RAPID FLIPS TO OR AWAY FROM CENTRAL PITCH
- *4 **vocal fold pitch WITH vocal fry:** one type of double source production, whose source characteristics resembles that of the well-known Tibetan chant.

- *5 **asymmetrical vocal fold production:** referred to above in the general notes; here it is desired that the left and right folds oscillate at different frequencies; if sufficient proficiency is acquired the performer may find complete contrapuntal control of motion, more than biphonic contour relationships, but rather control within perceptible scaleable pitch sequences articulated at will. This gesture can be lengthy - although notation may not intuitively represent this so well - take your time!
- *6 **salival WITH bidental stops:** position microphone to capture bidental stops which should dominate the texture.
- *7 **gargle WITH external fingertap with vocal fold pitch:** the gargle should begin first; then adding voice and external articulation - shift the water friction within cavity to manipulate coupling.
- *8 **air WITH vocal fry:** difficult to produce vocal fry with high airflow rates; begin with balance between two states; gesture may feature a high degree of transience.
- *9 **glottal whistle:** one of the very special techniques of this piece; folds should approximate, but not vibrate; allow the searching process to be part of the performance gesture; the search is for two elements: a. glottal whistle, or a whistle produced through folds, and b. biphonation; in our experiences, the glottal whistle and biphonic transients seem more reliable with ingressive airflow, but this may not be universal; different resonant characteristics may be required, for example utilizing a wide open aperture (widest /a/ possible), then shifting to a tightly closed aperture (as in the vowel /u/); torso tensioning and laryngeal placement may help, such as imagining lifting a very heavy weight (without added emphasis given to the larynx); try lying on the ground and lifting legs in the air with knees only slightly bent, with a strong torso, free larynx; airflow through the glottis is LOW. Repeat as necessary. This gesture should be lengthy.
- *10 **salival frications WITH external articulation - slap cheeks:** puff out cheeks like Dizzy Gillespie and slap them babys! Phrase this immediately at the end of the previous glottal whistle segment.
- *11 **pharyngeal frications WITH bilabial or linguadental whistles:** emphasize the pharyngeal frications - allow the whistles to become transient.
- *12 **uvular tremolo WITH vocal fold pitch (nasal placement):** self-explanatory.
- *13 **extreme air WITH vocal fold pitch:** try to keep intensity of pitch constant as airflow is decreased, then increased; the effect is one of amplitude growth, then reduction of F_0 and its higher partials.
- *14 **reinforced harmonics:** perhaps Khodeni style is best, with tongue moving from /a/ to /u/; identify harmonics 4 through 10.
- *15 **bilabial flutter WITH tongue flutter:** an oscillation between two types of multiphonics - right bilabial flutter with tongue flutter (front, mid or rear - OK) to a left bilabial flutter with right bilabial flutter.
- *16 **pharyngeal frication WITH vocal fold pitch:** self-explanatory - aperture beginning wide open /a/ to smaller /u/ opening.
- *17 **salival frication WITH bidental stops:** position microphone to allow percussive dental stops to be prominent.
- *18 **oral cavity frications WITH bilabial or linguadental whistles:** freely shift locations of oral cavity frications.
- *19 **articulated velopharyngeal port valving WITH voice:** voice contour following that of the previous whistle contour; o=open v-p port sends airflow through nasal cavity which results in nasal sound; +=closed v-p port sends airflow through oral cavity which results in non-nasalized sound.
- *20 **end of breath:** in Buddhist thought, absolute clarity is found in between the breaths; particularly after exhalation and before inhalation; here the performer is asked to sing past her/his normal duration and into the respiratory reserve; the notation is not representative; here the gesture includes beginning with a very low pitch, beyond the lowest secure tone; the duration is very long, past normal duration; the tone will break up erratically, stop oscillation, begin oscillation, feature registral breaks, short transient whistles, turn biphonic, creaky and fry-like - all with low airflow.
- *21 **salival frication WITH tongue trill:** squeeze salival frications out of the cavities found in the vestibule at regions c4 and c5; any tongue trill is ok.
- *22 **salival frication WITH lingua-alveolar frication:** squeeze salival frications out of the cavities found in the vestibule at regions c4 and c5; add frication.
- *23 **glottal pulses UPON vocal fold pitch:** similar to technique #2, but with far fewer stops; the glottal stops should be lightly produced; the sung line should be legato and dominant; the stops function as slight interruptions to the line.
- *24 **glottal pulses UPON vocal fold pitch WITH bilingual trills:** at the end of the previous phrase adding front and rear lingual trills.
- *25 **subglottal source WITH reinforced harmonics:** the only known source that SEEMS to be produced below the vocal folds, or at the lower edge of the folds; the result is a rough, growling sound; the mode of oscillation seems to involve loose and wide amplitude of vibration with turbulence at the lower edge of folds, perhaps a special vortex; add to this reinforced harmonics ad libitum.
- *26 **extreme airflow; initiating resonant pitch:** similar to opening gesture, though without the voice; the airflow should be so strong as to initiate the dominate resonant formant frequencies.
- *27 **extreme airflow WITH barely voiced production:** similar to opening gesture, adding a barely voiced production.
- *28 **extreme airflow WITH fully voiced production:** similar to opening gesture, but with rising pitch(es).
- *29 **as high as possible - then go even higher:** when going higher than highest secure tone, the tone has the possibility to become multiphonic.
- *30 **egressive nasal airflow WITH bidental frication:** self-explanatory.
- *31 **check emphasis of air and saliva WITH lip flutter:** again cheeks like Dizzy.

- *32 **extreme airflow WITH vocal fold pitch:** like #1 but with the airflow intensity varying according to notated contour.
- *33 **vocal fold pitch WITH register breaks (nasal):** register flips should be intense, with the pitch of the grace note changing according to contour.
- *34 **egressive nasal frication WITH lingua-alveolar stops (tongue tip):** egressive nasal frications are combined with unlunged stops.
- *35 **ingressive nasal frication WITH lingua-alveolar stops (tongue blade):** ingressive nasal frications are combined with unlunged stops.
- *36 **bilabial buzz WITH pharyngeal frication:** the first buzz may occur central, left or right.
- *37 **bilabial buzz WITH pharyngeal frication WITH voice:** briefly adding voice to end of previous multiphonic.
- *38 **registral flips:** the flips should be emphasized.
- *39 **slight bilabial frication WITH bilabial or linguadental whistle:** a special technique that asks the lips to play a role in the production and to filter of the sound source; the whistle should dominate.
- *40 **slight bilabial frication WITH vocal fry:** increased airflow is needed to produce the bilabial frication, which adds degrees of difficulties to the production of the vocal fry - experiment with microphone placement in order to better capture the bilabial frication.
- *41 **egressive nasal airflow WITH transient bilabial or linguadental whistles:** the egressive nasal airflow should be prominent; the whistles should be secondary.
- *42 **salival frication WITH lip buzz:** self-explanatory.
- *43 **extreme airflow WITH vocal fold pitch WITH lip flutter:** as in #1 but adding a lip flutter.
- *44 **lip flutter and lip buzz WITH vocal fold pitch WITH lingua-facial, lingua-labial, lingua-vestibule, lingua-dental and lingua-alveolar:** for vocal fold pitches, follow contour of lines as indicated on staff that follow the pitch indications; the pitches should be slippery and sliding as in a constant portamento. The frications should be irregular and transient.
- *45 **egressive nasal frication WITH voiced pitch, as low as possible:** the mode of oscillation may feature asymmetries; the result should not be a secure tone.
- *46 **egressive nasal frication WITH ingressive and egressive bilabial buzz:** self-explanatory as indicated.
- *47 **egressive nasal frication WITH lingua-palatal(alveolar) frication:** self-explanatory as indicated.
- *48 **salival frication in cheek WITH tongue trill (any region):** self-explanatory as indicated.
- *49 **salival frication in cheek WITH voice:** self-explanatory as indicated.
- *50 **salival frication in cheek WITH voice WITH whistle:** whistle should be transient.
- *51 **whistle (bilabial or linguadental) WITH voice:** if using labial-dental whistle, opening the aperture laterally towards an /v/ will raise pitch.
- *52 **voice WITH lingua-labial approximations and frications:** don't rush this - take multiple breaths if necessary.
- *53 **egressive nasal frication WITH bilabial pops (or bilabial flutter):** here bilabial pops refers to a technique in which the lips are drawn in slightly and then pushed outward simultaneously with an unlunged egressive flow of air - multiple number of pops should result, somewhere between 4 and 6 for each gesture - similar to the sound a child will make to simulate the rotor of an airplane, minus the voice and lunged air.
- *54 **voice WITH lingua-palatal flutter:** self-explanatory as indicated.
- *55 **pharyngeal frication WITH lingua-labial, lingua-vestibule, lingua-dental, lingua-alveolar, and lingua-palatal frication:** self-explanatory as indicated.
- *56 **onset and offset of phonation emphasized:** a mode of exploration - search for a wide variety of manners through filter, air and tension manipulation.

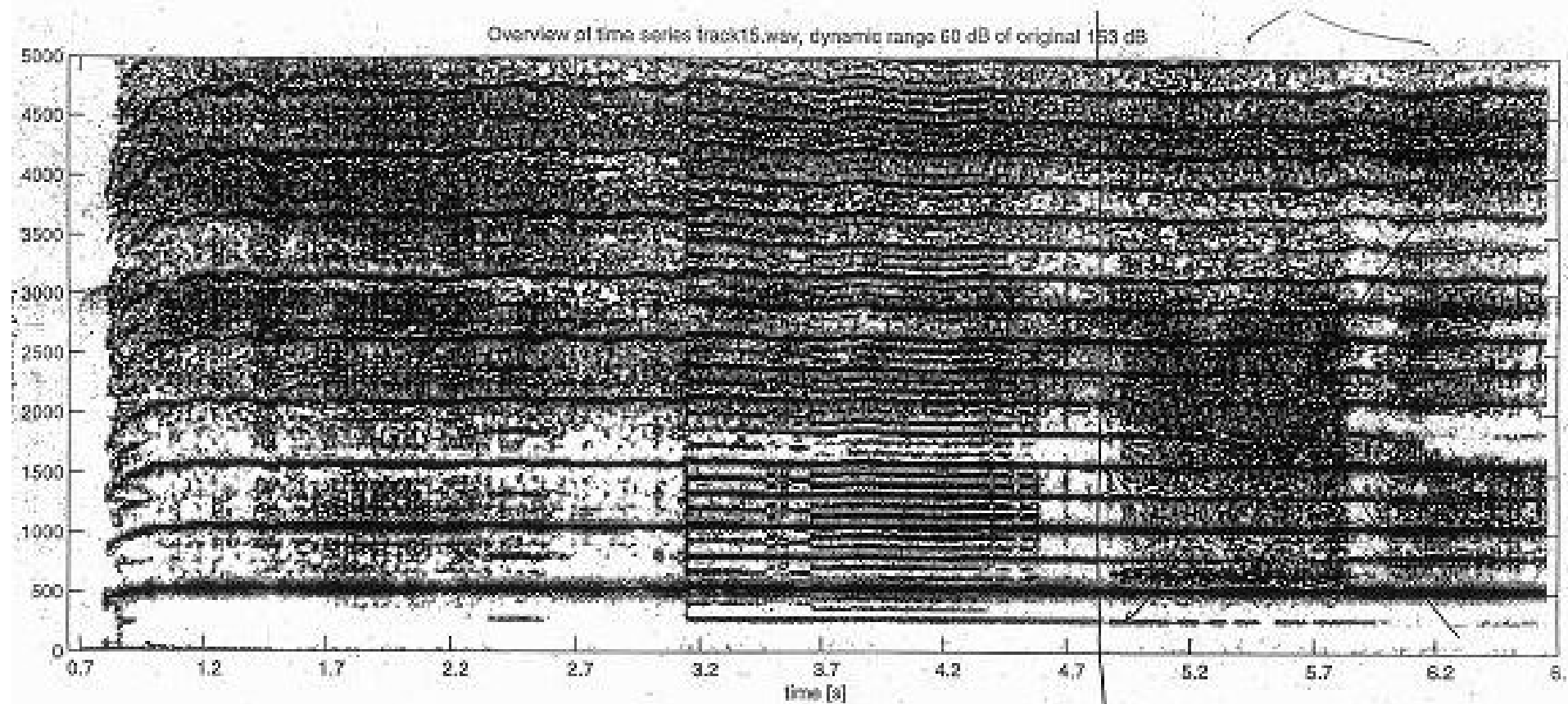
*see the following acoustic analyses presented as additional clues to finding the desired states - as always listening to recordings is the best tool for learning such unusual behaviors!!

A microphone should always be used - for the softest sonorities, a tight and close miking should be used; then for the very loudest sonorities, the performer might wish to hold the mic at belt level in order to keep it relatively isolated from the radiated sound product, so as not to overdrive the system.

For the symbols in techniques 6, 11, 16, 17, 18, 21, 24, 34, 35, 36, 44, 47, 52, 54, 55 please see the lingua-palatal chart attached at the end of these notes.

references:

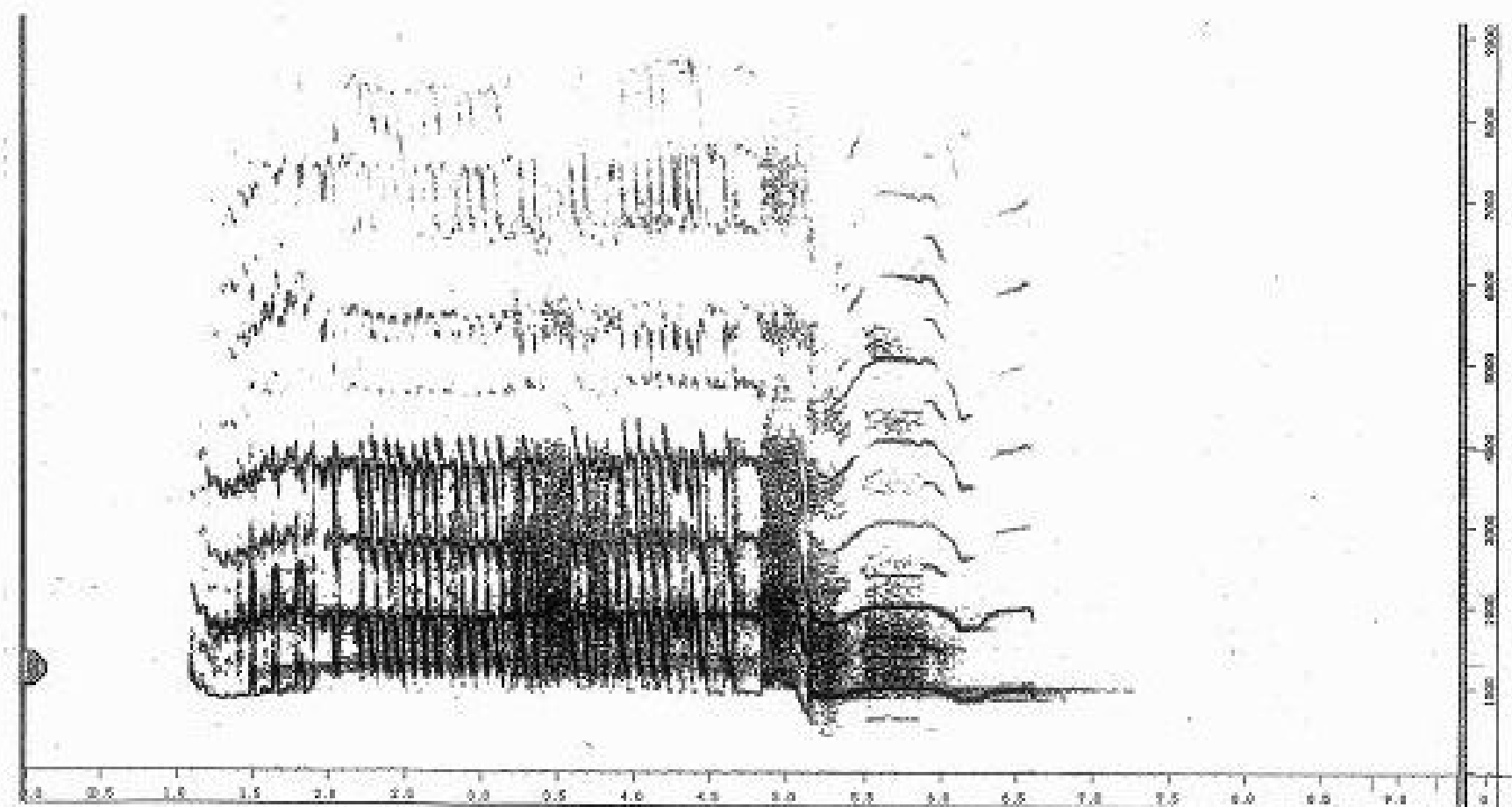
- Berry, D., Herzel, H. Bifurcations in Excised Larynx Experiments. *Journal of Voice*. 10:2 (1996) 129-138.
- Neubauer, J., Edgerton, M., and Herzel, H. Nonlinear Phenomena in Contemporary Vocal Music. in progress, 2001
- Ward, P., Sanders, J., Golman, R., and Moore, G. Diplophonia. *Annals of Otology, Rhinology, and Laryngology*. 78 (1969) 771-777.



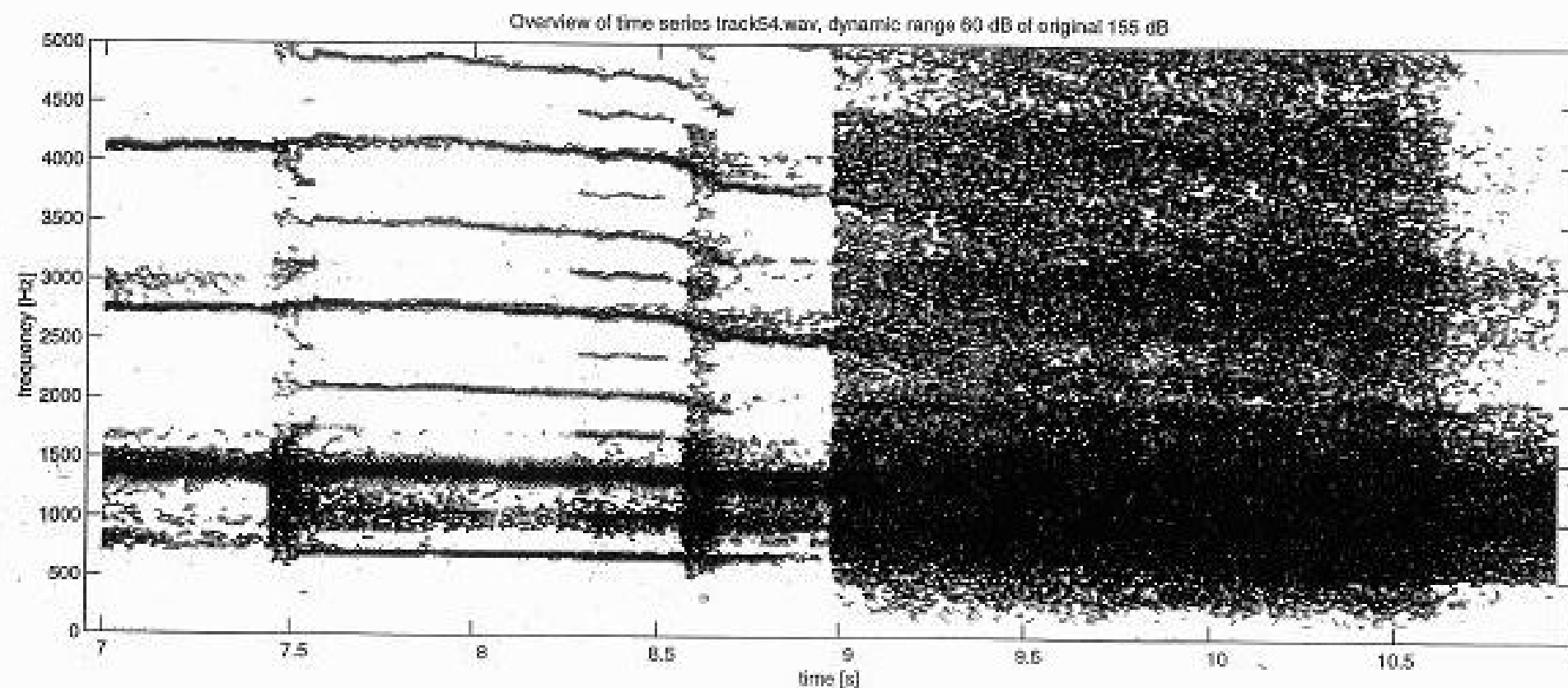
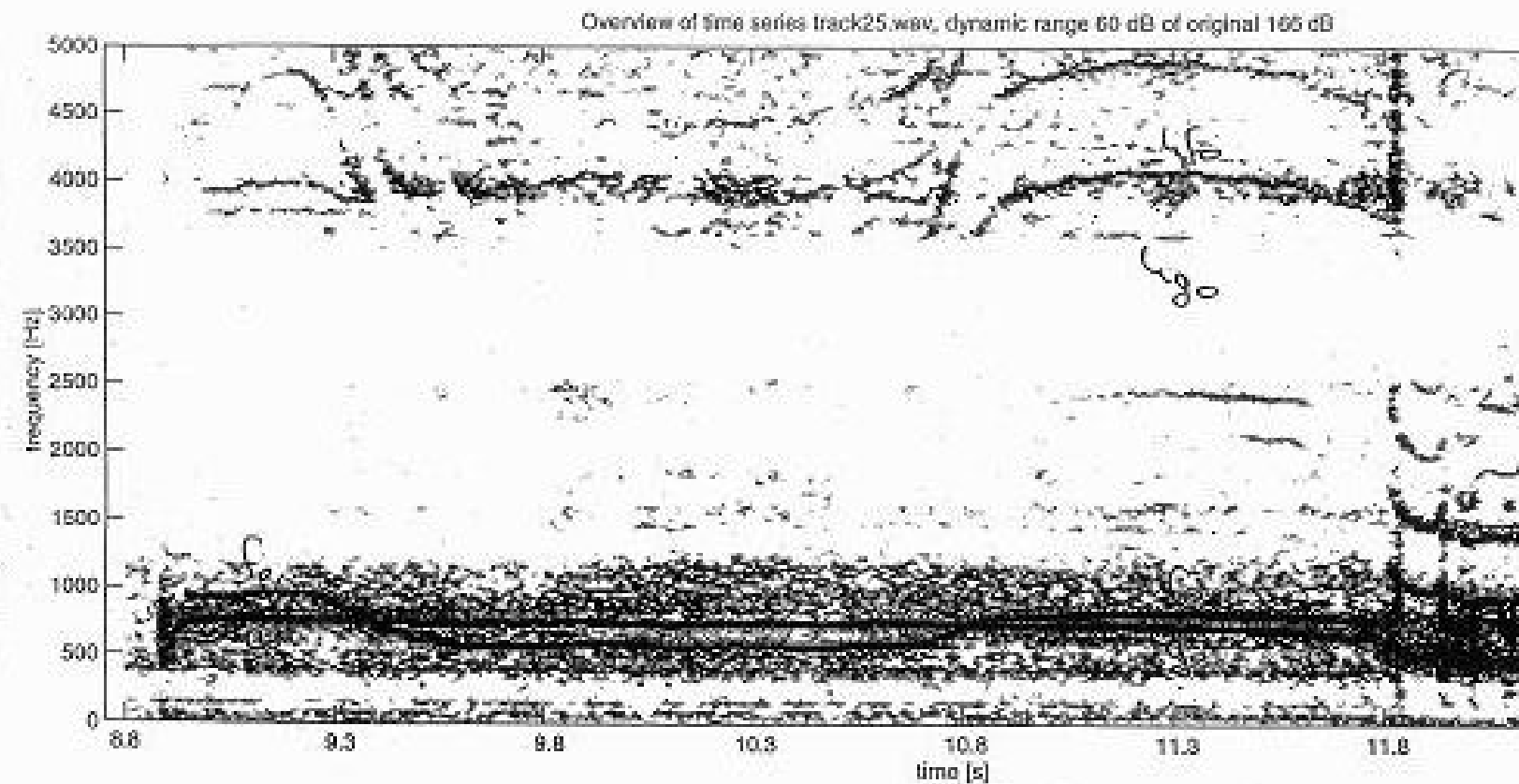
Subharmonics, as
indicated in *4



High Oscillation with
Fold Tremolo, as
indicated in *3



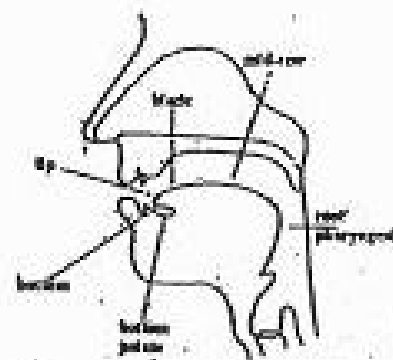
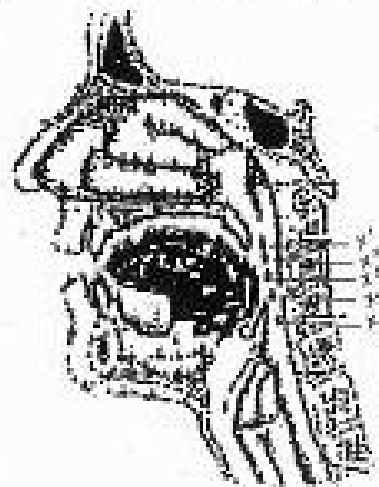
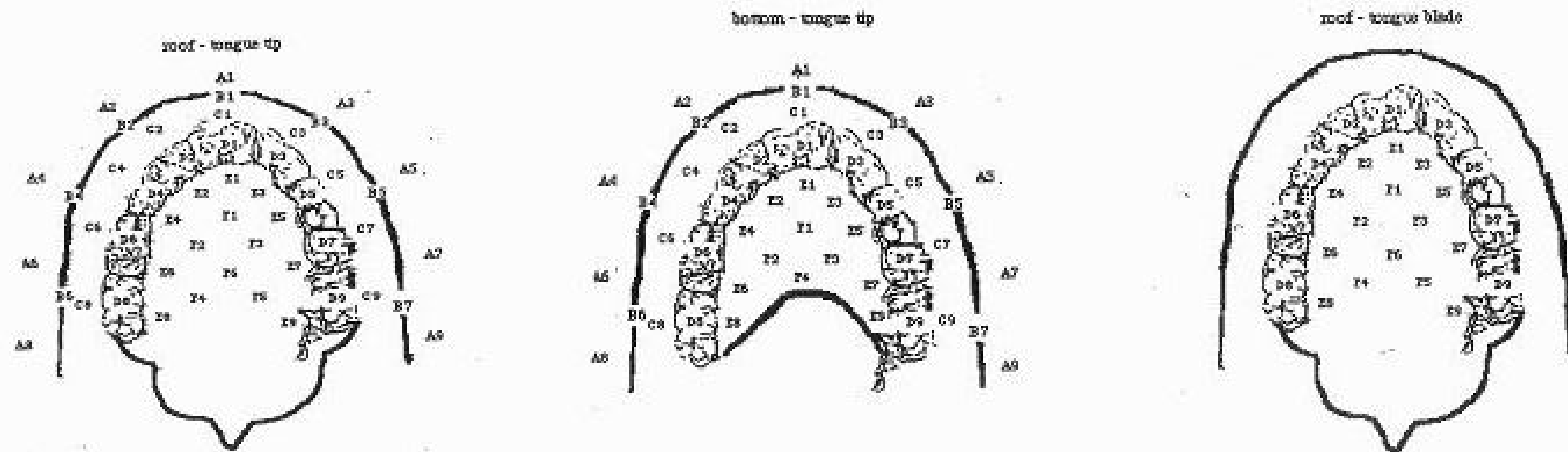
Biphonation as
indicated in *5,9



Deterministic chaos as
indicated in *1



lingua-palatal chart



- = tip
- = blade
- ⊗ = mid/roof
- ⊗ = root/pharyngeal
- ▭ = back touching bottom palate

appassionato!

ANAPHORA

tempo a piacere
rubato

erschütterung

$\text{♩} = 72$

$\text{♩} = 80$

#1

air

f nasal

ad lib repeats as necessary

Extremely nasal

#2 fold tremolo

#3 high oscillation with fold tremolo

Extremely nasal high oscillation with fold tremolo

nasundo

salina

mp

full

mp

#4

#5

bilabial stops

$\text{♩} = 36$

#7

mp

gargle

grazioso

finger tip

chuck

mp

#8

air

f

(intensity follows contour)

voice

nasal fry

misterioso

espressivo

$\text{♩} = 36$ accel. ---

#9

glottal whistle

#10

f

salina

subito

#11

pharyngeal fricatives

bilabial or triglottal whistles

ANAPHORA

Section 1: Cori feram
 ♩ = 92
 *12: vocal tremolo
 *13: [musical notation]
 *14: vocal line with notes and rests, including a "long" note.
 *15: [musical notation]

Section 2: spiritoso
 ♩ = 40
 *15: vocal line with notes and rests.
 *16: vocal line with notes and rests, including a "long" note.
 *17: vocal line with notes and rests, including a "long" note.

Section 3: Tranquillo
 ♩ = 80
 *17: vocal line with notes and rests, including a "long" note.
 *18: vocal line with notes and rests, including a "long" note.

Section 4: orack 4ccung
 *16: vocal line with notes and rests, including a "long" note.

Section 5: flüchtig
 *19: vocal line with notes and rests, including a "long" note.
 *20: vocal line with notes and rests, including a "long" note.

Section 6: door
 *19: vocal line with notes and rests, including a "long" note.
 *20: vocal line with notes and rests, including a "long" note.

Section 7: religioso
 ♩ = 66
 *21: vocal line with notes and rests, including a "long" note.
 *22: vocal line with notes and rests, including a "long" note.

Section 8: affectuoso
 *24: vocal line with notes and rests, including a "long" note.
 *25: vocal line with notes and rests, including a "long" note.

Section 9: global pulses and lib
 *23: vocal line with notes and rests, including a "long" note.

Section 10: ad lib R.H.
 *25: vocal line with notes and rests, including a "long" note.

appassionato
♩ = 46

*26
harsh - extreme airless initiation
resonant pitch

*17

*18

(ad lib sequence)
barely raised
full raised
as high as possible
*29 even higher!

ANAPHORA *scherzando*
nasal friction

*30

chuck
lips

*31

nasal friction

bi-dental friction

robato, con spirito

*32

intensity follows contour

*33

ad lib register tips as
desired - breaks as needed

exaggerated nasal friction
animato
irregular nasal friction
bbl buzz
con fuoco

*34

*35

*36

*37

*38

irregular free oscillation

slowly
dolce
slight friction
morendo
*40

bbl or zygote
vibrato
vocal fry

*39

$\text{♩} = 70$ contabile

ANAPHORA $\text{♩} = 46$ staccato

oral - pharyngeal frictions

serioso

appassionato



*99

*16

Long

onset, offset
(p → f)



Very honest, bitter,
air, tension



repeat as desired

7.

