

2006

HARMONIC INTONATION AND IMPLICATION (ANALYSES AND COMPOSITIONS): Harmonic perception and intonation in the reception and performance of alternative tuning systems in contemporary composition

SWOGER-RUSTON, JOHN PAUL

<http://hdl.handle.net/10026.1/2473>

<http://dx.doi.org/10.24382/4624>

University of Plymouth

All content in PEARL is protected by copyright law. Author manuscripts are made available in accordance with publisher policies. Please cite only the published version using the details provided on the item record or document. In the absence of an open licence (e.g. Creative Commons), permissions for further reuse of content should be sought from the publisher or author.

**HARMONIC INTONATION AND IMPLICATION (SCORES): Harmonic perception
and intonation in the reception and performance of alternative tuning systems
in contemporary composition.**

Volume 2 of 2

by

JOHN PAUL SWOGER-RUSTON

A thesis submitted to the University of Plymouth
in partial fulfilment for the degree of

DOCTOR OF PHILOSOPHY

Dartington College of Arts

Table of Contents

I drew a line in the sand and it goes from here to there.....	4
The Beaten Path.....	12
For Muted Piano.....	22
Track and Field.....	29
Eventide.....	38
The Crow, the Road, and the Ramble.....	48
Corrections and Amplifications.....	53
This Mnemonic Machine.....	85

I drew a line in the sand, and it goes from here to there...

for Black Hair Ensemble

(flute, clarinet, vibraphone, retuned piano, violin, cello)

Paul Swoger-Ruston

March 2002

I drew a line in the sand, and it goes from here to there...

Performance notes:

Microtonal inflections are in 'cents deviation' from equal temperament, located above the note. The ideal intonation for each pitch has been rounded to the nearest 15-cent interval.

+/- 15 cents is about 1/6th of a semi-tone and in most cases should not require any conscious adjustment: that is, the player is likely to gravitate towards this intonation given the harmonic context of the pitch.

+/- 30 cents is about 1/3rd of a semi-tone and requires the player to consciously adjust his or her intonation. In most cases, the inflected pitch is part of a 7/6 minor third or a 7/4 minor seventh. These intervals are quite distinctive: E3 to G3 on the retuned piano is an example of a 7/6; G3 to F4 is an example of a 7/4.

+/- 50 cents is a quarter-tone (half a semitone). In most cases the player will have to feel there way to the proper intonation. What is often required is not precisely a 1/4-tone but just a 'good' note that falls somewhere between two equal tempered notes.

Notes without microtonal inflections should be adjusted as is required in any standard notation: that is each sonority should be tuned as 'smoothly' as possible (with minimum 'roughness').

The piano is tuned according to the diagram below. All 'G's should match those of the vibraphone.

Vibrato should be kept to a minimum on all instruments.

Thank you, Paul Swoger-Ruston.

$\text{♩} = 50$

Flute

B♭ Clarinet

Vibraphone

Piano

Violin

Cello

mf

mf 9/8 5/4 11/8 3/2 7/4 9/8 9/5 12/7 3/2 9/7 6/5

9

Fl.

B♭ Cl.

Vib.

Pno.

Vln.

Vc.

p

pp

(I)

sui pont

sui pont

pp

8/5 11/10 6/5 7/5 8/5 11/10 11/8 11/7 11/8 11/8 11/6

18

Fl.

B♭ Cl.

Vib.

Pno.

Vln.

Vc.

10/9 7/6 11/8 4/3 5/3 10/9 *f* 5/3 10/7 5/4 5/3 *mf* 11/8 10/9

(II) *gliss.* -25 -50 0 (-50) 0

gliss. +50 0 (0)

27

Fl.

B♭ Cl.

Vib.

Pno.

Vln.

Vc.

7/6 11/8 4/3 11/8 11/7 11/8 11/8 11/10 11/7 12/7 8/7 9/7

w/ mute

w/ mute

37

Fl.

B♭ Cl.

Vib.

Pno.

Vln.

Vc.

10/7 12/7 3/2 9/7 6/5 9/8 9/5 3/2 7/4 11/8 7/5 7/5 8/5 6/5 8/5 8/7 10/9 5/3

mute off pizz. (-30) (+16) (-30) (-15) (-50) (-30) (-50)

mute off pizz. (-30)

43

Fl.

B♭ Cl.

Vib.

Pno.

Vln.

Vc.

10/7 5/4 10/9 10/7 11/7 12/7 9/7

-15 gliss. +50 -15 sul pont

-15 gliss. +50 -15

49

Fl.

B♭ Cl.

Vib.

Pno.

Vln.

Vc.

9/7 11/7 11/8 11/9 11/10 11/6 11/8 3/2 7/4 9/8 5/4 3/2 9/7 8/5 9/8

-50 -30

mute off -15 +50 0

57

Fl.

B♭ Cl.

Vib.

Pno.

Vln.

Vc.

9/5 12/7 9/7 10/7 11/7 12/7 10/7 5/4 10/9 5/3 5/4 11/8 9/8

-50 0 +50 0 -50 0 +50 0 -50 0 +50 0

78

Fl.

78

B♭ Cl.

78

Vib.

78

Pno.

8/5 9/5 11/10 7/5 7/4 5/4 9/8 11/9 11/10 11/7 11/10 7/5 3/2 9/8

78

Vln.

pizz. (-30) (-30) +50 (-15) +50 (-15) (-30)

78

Vc.

pizz. -50

Detailed description of the musical score for measures 78-81:

- Flute (Fl.):** Measures 78-81 are empty staves.
- B♭ Clarinet (B♭ Cl.):** Measures 78-81 are empty staves.
- Vibraphone (Vib.):** Measures 78-81 are empty staves.
- Piano (Pno.):**
 - Measure 78: Chords 8/5, 9/5, 11/10.
 - Measure 79: Chords 7/5, 7/4, 5/4.
 - Measure 80: Chords 9/8, 11/9, 11/10.
 - Measure 81: Chords 11/7, 11/10, 7/5, 3/2, 9/8.
- Violin (Vln.):**
 - Measure 78: Empty staff.
 - Measure 79: Notes with performance instructions: pizz., (-30), (-30).
 - Measure 80: Notes with performance instructions: +50, (-15).
 - Measure 81: Notes with performance instructions: +50, (-15), (-30).
- Viola (Vc.):**
 - Measure 78: Empty staff.
 - Measure 79: Empty staff.
 - Measure 80: Notes with performance instructions: pizz., -50.
 - Measure 81: Empty staff.

The Beaten Path

for the Ning Ensemble

(flute, vibraphone, cello)

Paul Swoger-Ruston

March 2003

The Beaten Path

Duration: approximately 8 minutes


For Flute (doubling on piccolo), Vibraphone, and Cello


The dynamic throughout is quite and the texture fragile


In this piece we are gradually and delicately beating a path. No single event creates the path. Rather, many small and sometimes unnoticeable events combine to create the path.

Flute and Cello:

The notation involves the use of two types of microtonal inflection. The first uses standard quartertone notation. I've only used a subset of what might already be familiar:

 indicates a quartertone up or down from the equal tempered pitch

 indicates a semitone plus a quartertone up

 indicates a semitone plus a quartertone down

However, the quarter tones are intended only as approximate indicators of intonation. Typically, deviations should fall between 40 and 60 cents from equal temperament, but allow your ears to guide you to the most satisfying intonation (one that fuses best with the rest of the sonority)

Smaller intonation shifts are indicated by a small arrow above or below the notehead (\downarrow , \uparrow). These indicate inflections of approximately 20 to 40 cents from equal temperament. But again, allow your ears to be the judge. In no case has a quartertone accidental been combined with these smaller inflections.

Vibraphone:

The pedal is, for the most part, held down throughout. However, you may control excessive build-up through discretionary dampening (with hands or half pedalling).

At the beginning of sections B, C, and D (second last bar of piece) you may control the decay in the most subtle way appropriate (pedal or hand), but the decay must still feel natural as the flute and cello will be attempting to match the vibraphone's envelope.

In several spots, a small curved arrow indicates an upward bend. The duration and timing of this is entirely up to your technique and should be executed as makes the bend most prominent.

Good luck and thanks.

© Paul Swoger-Ruston March 2003

The Beaten Path

Paul Swoger-Ruston

$\text{♩} = 60$

Piccolo minimal vibrato throughout

FLUTE /
PICCOLO

Quiet throughout

(motor off)

VIBRAPHONE

Quiet throughout

pedal depressed throughout, unless otherwise indicated

minimal vibrato throughout (except where indicated)

CELLO

gliss.

Quiet throughout

L.v.

L.v. (throughout)

3

FL.

VIB.

VLC.

6

6

6

3

3

3

FL.

VIB.

VLC.

11

11

11

3

3

3

3

16

FL.

VIB.

VLC.

To Sul Pont. poco a poco

21

FL.

VIB.

VLC.

Muta in 'C' Flute

26

FL.

VIB.

VLC.

Flute

31

FL.

VIB.

VLC.

sing 'G' to end of section (breath as necessary)

Muta in Bow

sing 'G' to end of section

bend gradually

gliss.

with bow

(s.p.)

bend gradually

sing 'G' to end of section

36 Muta in Piccolo **B** Piccolo

FL.

VIB.

VLC.

(match decay of vibraphone)

dampen with hand

norm. *l.v.* norm. *s.p.*

(release harmonic)

41

FL.

VIB.

VLC.

release harmonic norm. *s.p.* norm. *s.p.*

III

46

FL.

VIB.

VLC.

norm. (E) (A) *s.p.* norm. *l.v.* *l.v.* $N < p$

51

FL.

VIB.

VLC.

$N < p$ III II *s.p.* norm.

56

FL.

VIB.

VLC.

s.p.

vibrato

61 *norm.*

FL.

VIB.

VLC.

norm.

L.v.

sf L.v.

L.v.

Muta in 'C' Flute

Flute

66

FL.

VIB.

VLC.

L.v.

s.p.

71

FL.

VIB.

VLC.

vibrato

L.v.

76

FL.

76

VIB.

76

VLC.

sf *l.v.* *release harmonic* *l.v.* *norm.*

81

FL.

81

VIB.

81

VLC.

s.p. *l.v.* *norm.* *s.p.*

86

FL.

86

VIB.

86

VLC.

(s.p.)

91

FL.

91

VIB.

91

VLC.

norm. *sf* *l.v.* *sf* *l.v.* *s.p.* *norm.*

96 **C**

FL. 96

VIB. 96

VLC. 96

s.p. *vibrato*

5 3 3

3

100

FL. 100

VIB. 100

VLC. 100

(s.p.)

3 3 5

3 5

104

FL. 104

VIB. 104

VLC. 104

(s.p.)

3 3 3 3 3

3 3 3 3

108

FL. 108

VIB. 108

VLC. 108

(s.p.)

3 3 3

3

112

FL.

VIB.

VLC.

norm.

sf

l.v.

IV

s.p.

116

FL.

VIB.

VLC.

norm.

s.p.

norm.

l.v.

120

FL.

VIB.

VLC.

s.p.

124

FL.

VIB.

VLC.

norm.

s.p.

norm.

IV

III

128

FL.

VIB.

VLC.

s.p. *norm.* *s.p.* *vibrato* *s.p.* *norm.*

L.v. *f* *L.v.*

132

FL.

VIB.

VLC.

s.p. *norm.* *IV* *III* *L.v.*

136

FL.

VIB.

VLC.

s.p. *L.v.*

match decay of vibraphone

damp with hand

match decay of vibraphone

For Muted Piano

Paul Swoger-Ruston
October 2002

For Muted Piano

Duration: approximately 10 - 12 minutes

For upright piano with practice pedal (Rhodes piano or untreated piano may substitute)

For Muted Piano uses the piano keyboard as a sort of virtual filter. In Section I, a single note functions in 12 different harmonic contexts to which are added upper partials based on the acoustical root of each interval. In Section II, an intuitively composed passage is harmonically altered through the application of a more selective virtual filter. This piece was originally intended for upright piano with practice pedal (where a felt damper is lowered between the hammers and strings), which suppresses the strength of upper partials while maintaining sustain, but if approached delicately it can work effectively on an untreated grand piano. Alternatively, a Rhodes piano with the treble attenuated may be used.

Many thanks, Paul Swoger-Ruston

For Muted Piano

Paul Swoger-Ruston

I

♩ = 55

PIANO

quiet throughout

5

10

15

5

20

25

30

35

II

♩ = 35

PIANO

41

45

49

53

57

61

65

69

73

77

81

85

89

Track and Field

for [rout]

(electric violin, 2 synthesisers, electric guitar, electric bass, contrabass)

Paul Swoger-Ruston

March 2003

Track and Field

Performance Notes:

In this piece a single tone (violin), which sweeps an entire octave, is harmonized such that it always sounds in-tune with an equal tempered bass line. Two synthesisers and an electric guitar (with slide and e-bow) use portamento to create an effect of a harmonic bed that continually shifts in and out of 'focus'. The two basses also compete and cooperate in a game of their own.

Violin:

The violin must attempt to maintain a steady glissando that covers an octave (with two breaks). An intonation guide is provided in cents-deviation, indicated above each notehead at the beginning and middle of each bar.

Synthesisers:

Use a monophonic and relatively simple tone programmed with a portamento rise time of 2 seconds.

Electric Guitar:

Using a metal **slide** and an **e-bow**, slide as smoothly as possible to and from each pitch, resting on the target pitch for the duration of beats 2 and 3. Intonational deviations of about 1/6th of a tone are indicated in cents-deviation above or below the notehead. Where no precise intonation is indicated, you may use your ears to guide you; typically, uninflected pitches will ideally fall between -16 and +16 cents.

Basses (electric and contra):

The basses work together to create a single part. For example, the electric bass may strike a note as the contrabass crescendos to extend the decay, while at other times the contra bass may glissando against the dying tone of the electric bass, creating some momentary beating.

The **electric bass** will require a **volume pedal** for crescendos

Track and Field

Paul Swoger-Ruston

A +8 0 -17 -33 -50 +33 +17

Violin

mf throughout ——— to end of section

Synth 1

p

Synth 2

p

Electric Guitar

with e-bow and slide

p throughout

Electric Bass

Contrabass

7 0 -17 -33 -50 +33 +17

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

f *mf* *sfz*

N *L.v.*

13 0 -17 -33 -50 +33 +17

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

mf *L.v.* *N* *mf* *p* *L.v.* *mf*

mp *N* *mf* *p* *N* *p* *L.v.* *N* *p*

19 0 -17 -33 -50 +33 +17

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

N *p* *mf* *N* *p* *L.v.* *L.v.* *nor.* *mf*

N *N* *p* *L.v.* *mf* *L.v.* *N*

with nail (pva) or pick (#) *nor.*

sul pont *nor.*

25 0 -17 -33 -50 +33 +17

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

with nail or pick

l.v.

mf

N

mf

p

mf

N

sfz

N

p

f

mf

B

31 0 1 -17 -33 -50

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

p

full volume

l.v.

sfz

l.v.

l.v.

31 +50 (harmonic between 2nd and 3rd fret.)

49 +33 +17 0 -17 -33 -50

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

N *p* *w/ nail* *L.v.* *mp*

N *sfz* *N* *p* *N* *p*

55 +33 +17 0 -17 -33 -50

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

w/ nail *mf* *L.v.* *N* *mf* *w/ nail* *L.v.* *N* *mf*

N *p* *N* *mf* *sul pont* *sul pont*

C

61 +33 +17 0

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

61 -50 0

61 *N* \triangleleft *p* *mf* *l.v.*

61 *N* \triangleleft *p* *nor.* *sul pont* *s.p.* *l.v.*

67 -17 -33 -50 +33 +17

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

67 -50 0 -50 -50

67 *N* \triangleleft *mf* *N* \triangleleft *mp* *mf* *mp*

67 *mf* *l.v. s.p.* *nor.* *s.p.* *nor.* *mf*

73 0 -17 -33 -50 +33 +17

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

N *mf*

N *mf*

N *p*

L.v.

s.p.

nor.

79 0

Vln.

Syn. 1

Syn. 2

E.Gtr.

E.B.

Cb.

N *f*

+50

Eventide

for the Barton Workshop
(piano, vibraphone, violin, cello)

Paul Swoger-Ruston
March 2003

Eventide

Paul Swoger-Ruston

The piano generates harmonic sonorities that excite the sympathetic vibration of an simulated resonating body (vibraphone, violin, and cello).

Duration: approximately 4 minutes

For Piano, Vibraphone (with bow), Violin, and Cello

Note to Players:

Piano

This part is to sound somewhat clunky—quiet, stiff, and dynamically rather flat—but not entirely without feeling.

The sound should be cut off crisply before rests, with the full duration given to the last chord preceding the rest.

Vibraphone

Using a bow, each pitch should build up energy gradually and allowed to ring upon its release.

Violin and Cello

Each pitch enters silently and builds gradually to mp at about 2/3rds of the pitch's duration, and then returns to silence.

Intonation is indicated near each notehead in cents deviation from equal temperament. These inflections represent an ideal; it is not expected that this level of refinement is actually achievable, but is used to represent a 'class' of intonation towards which to strive. All uninflected notes are tuned to equal temperament.

An uninflected note may represent either the 9th, 17th, or 19th partial of a harmonic series based on the acoustical root of the corresponding chord in the piano part. Inflections of -12 cents represents the 15th partial, -31 cents represents the 7th partial, -49 cents the 11th partial (on some occasions indicated as +51 cents as an enharmonic equivalent), and +41 cents the 13th partial.

In general, vibrato should be used minimally.

Eventide

March 2003 / P. Swoger-Ruston

$\text{♩} = 65-75$

legato

Piano *mf* *cut off abruptly*

Vibraphone *with bow* *pedal depressed throughout* *mf* *simile throughout*

Violin *with mute* *-31* *pp* *simile throughout*

Cello *-31* *pp* *simile throughout*

6

Pno. A

6

Vib.

6

Vln. *-31* *(0)*

Vc. *-31*

11

Pno.

Vib.

Vln.

Vc.

-12

-12

-31

-12

(0)

-49

16

Pno.

Vib.

Vln.

Vc.

B

-12

(0)

-12

21

Pno.

Vib.

Vln.

Vc.

(0)

-12

26

C

Pno.

Vib.

Vln.

Vc.

-12

-49

-12

+41

+41

31

Pno.

Vib.

Vln.

Vc.

-49

-12

+41

+41

(0)

-49

(0)

36

Pno.

Vib.

Vln.

Vc.

D

(0)

-31

(0)

41

Pno.

Vib.

Vln.

Vc.

41

41

-12

(0)

E

46

Pno.

Vib.

Vln.

Vc.

46

46

-12

+41

+51

49

(0)

+41

[illegible]

The musical score for 'The Rose Tree' is presented in four staves. The Piano (Pno.) part is a grand staff with treble and bass clefs, featuring a complex harmonic texture with many chords and moving lines. The Vibraphone (Vib.) part is a single staff with a treble clef, playing a melodic line with sustained notes and some grace notes. The Violin (Vln.) part is a single staff with a treble clef, playing a melodic line with sustained notes and some grace notes. The Viola (Vc.) part is a single staff with a bass clef, playing a melodic line with sustained notes and some grace notes. The score includes measure numbers 56, 57, 58, 59, and 60. The key signature is one flat (B-flat major or D minor). The time signature is 4/4.

[illegible]

66

Pno.

Vib.

Vln.

Vc.

sul pont norm.

sul pont

66

-12

(0)

II

+41

(0)

-12

71

Pno.

Vib.

Vln.

Vc.

norm.

sul pont

(0)

+41

-12

The Crow, the Road, and the Ramble

for members of Icebreaker

(Tenor Saxophone, Electric Guitar, Electric Piano, Cello)

Paul Swoger-Ruston

2004

The Crow, the Road, and the Ramble

Paul Swoger-Ruston

General Notes

Rhythm is not intended to be performed as precisely as the notation might imply.

Coincidental attacks need not be precisely simultaneous

Tenor Sax

Play all harmonics with an altered fingering, as part of a multiphonic, or as a harmonic

Harmonics should be based on sounding E or G fundamental (F# or A fingered)

Play as quietly as possible and round each long tone in and out (looking for threshold of

the onset of sound, unstable tone)

Guitar

Tuning: E -15 cents G D F -30 cents B -15 cents C# -50 cents

Tone: bridge pick-up, boosted mid range, mild overdrive - just enough that dyads distort

but single tones sound clean (looking for threshold of distortion)

It is intended that some notes will sound out stronger than others; use the 12th fret B

string harmonic as gauge for balance

Mild bends on stopped notes are always an option

Keyboard

Tone: warm Rhodes, no tremolo

Cello

Minimal vibrato except where indicated (can be exaggerated and uneven)

Ideal intonation will often be ambiguous or conflicting, adjust as you wish but adjust

gradually

The Crow, the Road, and the Ramble

Paul Swoger-Ruston

$\text{♩} = 100$

Tenor Sax. *as quiet as possible*

Electric Guitar

Electric Piano *mf*

Cello *mp*

T. Sax. *minimal tongue*

E. Gtr. *light attack*

Synth

Vc.

10

T. Sx.

E.Gt.

Synth

Vc.

vibrato

14 normal attack

T. Sx.

E.Gt.

Synth

Vc.

light attack

normal attack

light attack

sul pont

norm

18

T. Sx.

E.Gt.

Synth

Vc.

normal attack

light attack

sul pont

add vibrato

sul A

norm

22 *minimal tongue*

T. Sx.

22 *bend slightly* $\frac{1}{4}$ *normal attack* *light attack* $\frac{1}{4}$

E.Gtr.

22 11 12 12 $\frac{1}{4}$ 8 8 8 8 8 8 9 9 5 5 7

Synth.

22

Vc.

26

T. Sx.

26 *touch lightly*

E.Gtr.

26 7 5 7 5 7 5 0 5 7 5 0 12

Synth.

26

Vc.

sul pont I II *norm*

30 *minimal tongue*

T. Sx.

30 *light attack* $\frac{1}{4}$ $\frac{1}{4}$

E.Gtr.

30 7 5 7 5 4 4 4 7

Synth.

30

Vc.

sul pont *add vibrato*

CORRECTIONS AND AMPLIFICATIONS

For Zephyr Kwartet and Wiek Hijmans

Paul Swoger-Ruston

August 2004

Corrections and Amplifications

Performance Notes

GENERAL INSTRUCTIONS:

GUITAR:

Dynamics

- indicate the strength of attack rather than overall volume or relative balance
- with strong dynamics, it is okay if the open strings noticeably detune upon attack

Balance

- in general, the busiest sections are quietest and the less busy louder

Tone

- should be almost clean and bright but with a present bass (like a spaghetti western or surf guitar tone)

The guitar is tuned in the following scordatura. It is important that each pitch is played on the appropriate string (indicated in TAB).

Tuning: D G_d D E B_d E (see string instructions for microtonal notation)

p = pull off

h = hammer on

s = finger slide

STRINGS:

Balance:

While there is some dynamic indication in the score, and it is important that the strings are balanced with the guitar, it is not necessary to 'compete' with the volume of the guitar; The strings function either as a 'virtual resonator' or as a contrasting texture to the guitar.

Notation

- arrowheads change pitch by approximately 30 cents (indicated with 1/8th tone notation)
- standard quarter tones are also used

## = semitone + 1/4 tone sharp	♭ = 1/8 th tone flat
## = semitone + 1/8 th tone sharp	♭ = 1/4 tone flat
# = semitone sharp	♭ = 1/4 tone + 1/8 th tone flat
# = 1/4 tone + 1/8 th tone sharp	♭ = semitone flat
# = 1/4 tone sharp	♭ = semitone + 1/8 th tone flat
♯ = 1/8 th tone sharp	♭ = semitone + 1/4 tone flat
♮ = natural	

Hollow diamond harmonics are played as natural harmonics, but for solid diamonds no specific harmonic is intended, only the finger position; the note should not be fully stopped, just lightly touched.

Corrections and Amplifications

August 2004 / Paul Swoger-Ruston

Actual

Elec.Gtr.

Guitar

$\bullet = 80$

Violin I

Violin II

Viola

Cello

Act.

E.Gtr.

Gtr.

Vln. I

Vln. II

Vla.

Vc.

Act. 1

E.Gtr.

Gtr.

Vln. I

Vln. II

Vla.

Vc.

Act. 11 12 13 14

E.Gtr. 11 12 13 14

Gtr. 11 12 13 14

Vln. I 11 12 13 14

Vln. II 11 12 13 14

Vla. 11 12 13 14

Vc. 11 12 13 14

Act. 22

E.Gtr. 22

Gtr. 22

Vln. I 22

Vln. II 22

Vla. 22

Vc. 22

Act. 26

E.Gtr. 26

Gtr. 26

Vln. I 26

Vln. II 26

Vla. 26

Vc. 26

Act. 51

E.Gtr. 51

Gtr. 51

Vln. I 51

Vln. II 51

Vla. 51

Vc. 51

Act. 56

E.Gtr. 56

Gtr. 56

Vln. I 56

Vln. II 56

Vla. 56

Vc. 56

tritando
on the tip

allow full decay

Act. 68

E.Gtr. 68

Gtr. 68

Vln. I 68

Vln. II 68

Vla. 68

Vc. 68

ff

Act. 71

E.Gtr. 71

Gtr. 71

Vln. I 71

Vln. II 71

Vla. 71

Vc. 71

p

Act. 74

E.Gtr. 74

Gtr. 74

Vln. I 74

Vln. II 74

Vla. 74

Vc. 74

(indistinct harmonics)

Act. 80

E.Gtr. 80

Gtr. 80

mp

t

Vln. I 80

Vln. II 80

Vla. 80

Vc. 80

2

Act. Ln, 87: *h*.

Gtr.

Vln. I pp.

Vla. pp.

Act. Ln.

Gtr. pp.

Vln. II pp.

Vc.

65

Act. 96

E.Gtr. 98

Gtr. 98

Vln. I 98

Vln. II 98

Vla. 98

Vc. 98

Act. 102

E.Gtr. 102

Gtr. 102

Vln. I 102

Vln. II 102

Vla. 102

Vc. 102

Act. 106

E.Gtr. 106

Gtr. 106

Vln. I 106

Vln. II 106

Vla. 106

Vc. 106

Act. 110

E.Gtr. 110

Gtr. 110

Slow and Freely

P

L.v.

Vln. I 110

Vln. II 110

Vla. 110

Vc. 110

Act. 115

E.Gtr. 115

Gtr. 115

Vln. I 115

Vln. II 115

Vla. 115

Vc. 115

Act. 122

E.Gtr. 122

Gtr. 122

Vln. I 122

Vln. II 122

Vla. 122

Vc. 122

Act. 127

E.Gtr. 127

Gtr. 127

Vln. I 127 IV

Vln. II 127 IV

Vla. 127

Vc. 127

Act. 130

E.Gtr. 130

Gtr. 130

Vln. I 130

Vln. II 130

Vla. 130 III

Vc. 130

134

Act.

E.Gtr.

Gtr.

Vln. I

Vln. II

Vla.

Vc.

138

Act.

E.Gtr.

Gtr.

Vln. I

Vln. II

Vla.

Vc.

Act. 142

E.Gtr. 142

Gtr. 142

Vln. I 142

Vln. II 142

Vla. 142

Vc. 142

Act. 146

E.Gtr. 146

Gtr. 146

Vln. I 146

Vln. II 146

Vla. 146

Vc. 146

bass figure: quad-irregular (except where noted)

149

Act.

E.Gtr.

Gtr.

Vln. I

Vln. II

Vla.

Vc.

153

Act.

E.Gtr.

Gtr.

Vln. I

Vln. II

Vla.

Vc.

Act. 158

E.Gtr. 158

Gtr. 158

Vln. I 158

Vln. II 158

Vla. 158

Vc. 158

Act. 163

E.Gtr. 163

Gtr. 163

Vln. I 163

Vln. II 163

Vla. 163

Vc. 163

Act. 168

E.Gtr. 168

Gtr. 168

Vln. I 168

Vln. II 168

Vla. 168

Vc. 168

Act. 173

E.Gtr. 173

Gtr. 173

Vln. I 173

Vln. II 173

Vla. 173

Vc. 173

Act. 178

E.Gtr. 178

Gtr. 178

10 9 8

p *lv.* -----

9 5 5 0 9 5 0

0

FREELY

Vln. I 178

Vln. II 178

Vla. 178

Vc. 178

Act. 183

E.Gtr. 183

Gtr. 183

9 5 5 0 9 5 0

7 5 5 0 7 5 0

Vln. I 183

Vln. II 183

Vla. 183

Vc. 183

7 7 +50

(-30)

Act. 198

E.Gtr. 198

Gtr. 198

Vln. I 198

Vln. II 198

Vla. 198

Vc. 198

Act. 204

E.Gtr. 204

Gtr. 204

Vln. I 204

Vln. II 204

Vla. 204

Vc. 204

Act. 1, measures 210-214. The score includes parts for Act. (voice), E.Gtr. (electric guitar), Gtr. (guitar), Vln. I (violin I), Vln. II (violin II), Vla. (viola), and Vc. (cello). The guitar parts feature complex chordal textures and fingerings. The string parts are mostly silent, with some initial activity in the first measure.

[illegible]

Act. 220

E.Gtr. 220

Gtr. 220

Act. 220: Treble clef, key signature of two sharps (F# and C#). Notes: [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter).

E.Gtr. 220: Treble clef, key signature of two sharps. Notes: [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter).

Gtr. 220: Bass clef, key signature of two sharps. Notes: [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter).

Vln. I 220

Vln. II 220

Vla. 220

Vc. 220

Vln. I 220: Treble clef, key signature of two sharps. Notes: [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter).

Vln. II 220: Treble clef, key signature of two sharps. Notes: [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter).

Vla. 220: Bass clef, key signature of two sharps. Notes: [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter).

Vc. 220: Bass clef, key signature of two sharps. Notes: [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter).

Act. 226

E.Gtr. 226

Gtr. 226

Act. 226: Treble clef, key signature of two sharps. Notes: [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter).

E.Gtr. 226: Treble clef, key signature of two sharps. Notes: [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter).

Gtr. 226: Bass clef, key signature of two sharps. Notes: [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter).

Vln. I 226

Vln. II 226

Vla. 226

Vc. 226

Vln. I 226: Treble clef, key signature of two sharps. Notes: [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter).

Vln. II 226: Treble clef, key signature of two sharps. Notes: [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter), [F#4, C#5] (quarter).

Vla. 226: Bass clef, key signature of two sharps. Notes: [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter).

Vc. 226: Bass clef, key signature of two sharps. Notes: [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter), [F#3, C#4] (quarter).

244

Act.

E.Gtr.

Gtr.

Vln. I

Vln. II

Vla.

Vc.

$\text{♩} = 120$

mf

0 12 11 12 0 11 12 0 10 9 10 9 10

250

Act.

E.Gtr.

Gtr.

Vln. I

Vln. II

Vla.

Vc.

8 0 8 0 6 0 6 7 0 7 0 0 0 0 6 6 4 5 5 3 6 3 0

Act. 255

E.Gtr. 255

Gtr. 255

$\text{♩} = 80$

L.v. ----- to end of section

Vln. I 255

Vln. II 255

Vla. 255

Vc. 255

Act. 260

E.Gtr. 260

Gtr. 260

Vln. I 260

Vln. II 260

Vla. 260

Vc. 260

Act. 260

E.Gtr. 265

Gtr. 265

Vln. I 265

Vln. II 265

Vla. 265

Vc. 265

Act. 271

E.Gtr. 271

Gtr. 271

Vln. I 271

Vln. II 271

Vla. 271

Vc. 271

THIS MNEMONIC MACHINE
(electric guitar solo)
For Wiek Hijmans

Paul Swoger-Ruston

May 2005

THIS MNEMONIC MACHINE

FOR WIEK HIJMANS

Performance Notes

This piece uses a standard electric guitar tuned with the open strings in just intonation, and a delay pedal that is used as a resonator sympathetic to the tuning of the guitar.

REQUIREMENTS: (see 'Set-up' for more details)

electric guitar, guitar amplifier, capo (spring style), delay unit (must be capable of 16ms delay time), volume pedal

And one of the following two combinations:

microphone and monitor/speaker **OR** signal splitter and combiner, and overdrive pedal

NOTATION:

The guitar is notated in three different ways. The top staff represents the resultant pitches, the middle staff as played, and the bottom staff in TAB notation. The precise use of the indicated string and fret is crucial, and therefore alternate fingerings may not be used.

The top staff uses a standard quartertone notation augmented with arrows to indicate smaller deviations of about 30 cents. Deviations less than 30 cents from equal temperament have not been indicated.

The ~ symbol is used to indicate small embellishments utilizing a Bigsby, or other whammy-bar device, or by bending the neck of the guitar. These embellishments should not be too extreme, less than a semitone in magnitude, but the contour and complexity of the embellishment is entirely up to the performer.

Pull-offs and hammer-ons are indicated with a slur. Finger slides are indicated with a glissando marking (straight line) and a slur.

OTHER PERFORMANCE INSTRUCTIONS:

- In general, all notes should be left to ring when possible to do so

GUITAR TUNING:

Open strings:	E	A	C#	G	B	E
Cents from A ^(=440Hz) :	+23	+21	+7	-10	+25	+71
With capo:	F#	B ^(125Hz)	D#	A ^b	B	E ^b
Harmonic of B ^(=31.25Hz) :	3	4	5	7	9	11

It is possible to tune the guitar by ear once the capo is in place (see below). Each pitch, or its octave, will be reinforced by the resonance of the delay pedal and will therefore be loudest when in tune. The resultant chord is based on a B=31.25Hz (+21cents from equal temperament) harmonic series.

- Without a capo, the guitar may also be tuned by ear provided an accurate open A+21 cents is established. 1) Tune the fifth fret harmonic on the sixth (E) string to the seventh fret harmonic on the fifth (A) string
2) Tune the fifth fret harmonic on the fourth (C#) string to the fourth fret harmonic on the fifth (A) string
3) Tune the fifth fret harmonic on the third (G) string to the seventh harmonic found near midway between the third and fourth frets of the fifth (A) string
4) Tune the open second (B) string to the seventh fret of the sixth (E) string
5) Tune the first string by creating equal beating when play with F and F# on the second (B) string

Capo:

- Place capo at second fret across strings 6, 5, 4, and 3 only (leaving 2 and 1 open)
- Make sure the capo is as close to the second fret as possible and leaving room to stop the second string at the second fret (see bar 21 for example).

SET-UP:**Signal-flow**

There are a number of options regarding the set-up of the signal flow, two of which are presented here. However, the signal flow could most likely be programmed in a sophisticated multi-effects unit, thus simplifying the set-up a great deal (in which case, maintaining the stereo set-up is not necessary). The following are listed in order of preference (from most preferred to least):

1) stereo

guitar - - > amp (mild overdrive) - >

|
V - - - - > volume pedal - - - > delay unit - - - > speaker/monitor - >

- The guitar amp and speaker may be placed spaced left-right, behind the guitarist, at a maximum of about 6 feet apart for a small to moderately sized room.
- The amp should be just slightly 'dirty'. This provides a richer spectrum for the signal as it goes to the delay unit, thus creating a stronger and richer resonance effect.

2) split

guitar - - > overdrive pedal (mild) - - - - - > amp (clean)

|
V - - - - > volume pedal - - - > delay unit - - -

SETTINGS:**delay unit settings:**

Delay = 16 milliseconds

Feedback > 90 % and < 100%

- This creates a sympathetic resonance which is strongest for any pitches corresponding to a B harmonic series.
- It is important that the delay not overwhelm the texture. You will need to experiment with the volume of the delay chain and with the feedback setting to control the resonance effect.

volume pedal:

- The maximum volume pedal position should be about equal in amplitude to the unaffected guitar sound. But the delay chain will also have the original guitar sound in its signal, so the overall effect should be that the natural guitar sound is slightly louder than the resonance.
- The minimum volume pedal position should be such that the resonance is barely audible, but still present.

This Mnemonic Machine for Wiek Hijmans

Paul Swoger-Ruston

A (section lasts approximately 2:00 min)

Actual

each bar lasts 10 to 15 seconds
tap with nails on capo or part of guitar that elicits the most harmonics

Electric Guitar

pp

TAB

B (approx. 2:30 min)

E.Gtr.

rubato

mp

(Bigsby)

E.Gtr.

(to end of section)

lv

18

E.Gtr.

18

18

22

E.Gtr.

22

22

26

E.Gtr.

26

26

30

E.Gtr.

30

30

48

E.Gtr.

48

48

48

f *mf* *p* *mf*

51

E.Gtr.

51

51

51

Lv *Lv*

55

E.Gtr.

55

55

55

p *f* *p*

58

E.Gtr.

58

58

58

f *p* *f*

61

E.Gtr.

p

mf

64

E.Gtr.

ff

mf

allow resonance and notes to ring but no silence between sections

67

E.Gtr.

lv

increase delay chain volume gradually over all repeats

♩ = 88

69

E.Gtr.

mf

Volume Pedal Min. Max.

x 8

$\bullet = 104$

70

E.Gtr.

x 4

$\bullet = 104$

72

E.Gtr.

x 2

slightly faster $\bullet = 108$

76

E.Gtr.

x 2

$\bullet = 116$

80

E.Gtr.

x 2

slightly faster ♩ = 120

84

E.Gtr.

x 4

86 ♩ = 108

E.Gtr.

x 4

♩ = 120 *rallentando to* ♩ = 90 *by end of second time*

88

E.Gtr.

x 2

♩ = 90 *rallentando to* ♩ = 45 *by start of third time*

92

E.Gtr.

x 3

full rest before next section

96 $\text{♩} = 180$

repeat each three-note cell zero to six times

E.Gtr.

96

96

96

15 13 0 15 12 0 15 11 0 14 11 0 13 11 0 13 10 0 13 9 0 12 9 0

104

E.Gtr.

104

104

104

11 9 0 11 8 0 11 7 0 10 7 0 9 7 0 9 6 0 9 5 0 8 5 0

112

E.Gtr.

mf

112

112

112

7 5 0 7 4 0 7 3 0 6 3 0 5 3 0 11 9 0 11 8 0 11 7 0

120

E.Gtr.

120

120

120

10 7 0 9 7 0 9 6 0 9 5 0 8 5 0 7 5 0 7 4 0 7 3 0

This copy of the thesis has been supplied on condition that anyone who consults it is understood to recognise that its copyright rests with its author and that no quotation from the thesis and no information derived from it may be published without the author's prior consent.