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for 17 instruments

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for 17 instruments

by

Matthew William Goodheart

A dissertation submitted in partial satisfaction of the
requirements for the degree of

Doctor of Philosophy

in

Music

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Ken Ueno, Chair
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Professor Edmund Campion

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Abstract
for 17 instruments
by
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Doctor of Philosophy in Music
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For 17 instruments is a musical composition for large mixed ensemble. The work explores microtonality through the use of multiple tuning systems based on instrumental acoustics, and audience-performer relationships through the use of immersive staging.

Instrumentation:

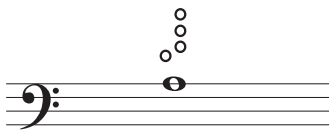
Flute, doubling alto
Bass clarinet
French Horn (straight mute)
F Tuba (straight mute) - tuned 31¢ flat
Vibraphone (5 soft mallets, 4 medium mallets, 2 bows)

3 first violins - 1st scordatura
3 second violins - 1st scordatura
3 viola - 1st scordatura
2 celli (mutes)
contrabass (mute)

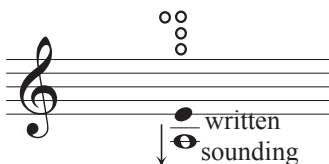
Tuning:

Brass:

Tune the open A (5th partial) of the Tuba



to the 7th partial A (concert) of the French Horn



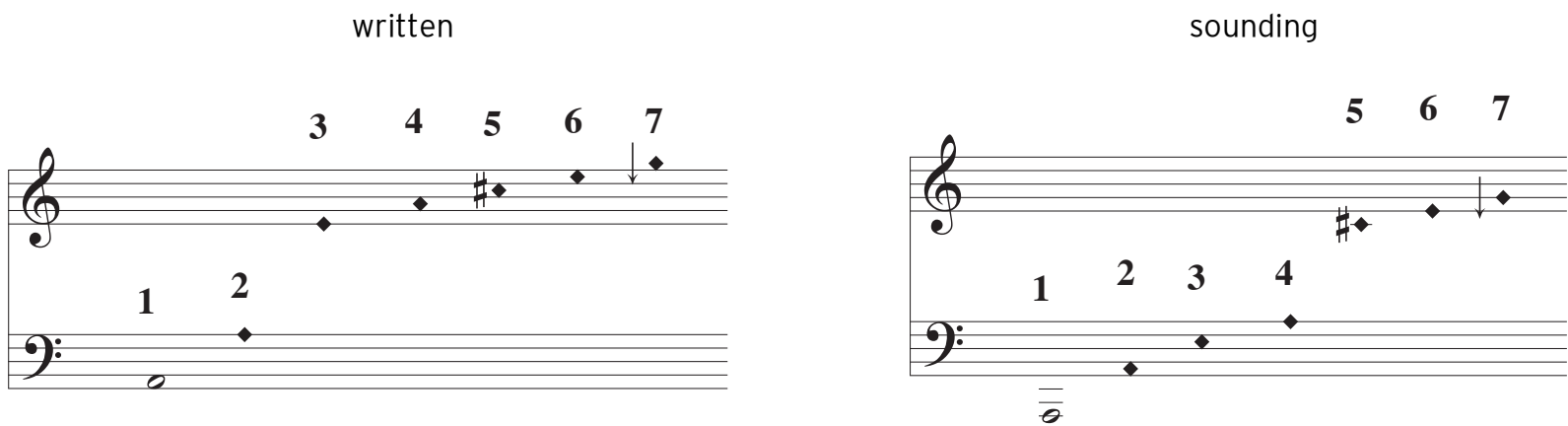
so that the Tuba will sound 31¢ flat (septimal comma).

Strings:

All string instruments should be tuned in pure 5ths (or 4ths in the contrabass), making no adjustments for equal temperament. For all string instruments, except Violins I - 1 and II - 1, and Viola 1, A = 440.

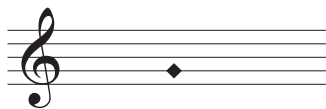
Violins I - 1 and II - 1, and Viola 1 are scordatura a septimal comma lower than usual, or approximately 31¢ flat, (about a 1/6th tone.) To achieve the proper tuning, match the first harmonic (second partial) of the G string of these instruments instrument to the 7th partial harmonic of the A string of the contrabass.

The partial (overtone) series for the A string of the contrabass is notated as follows (note that the open string is considered the “first partial”):



The seventh partial G is flat from equal temperament. With the bass sound this pitch, the affected violins and viola can match this note with the 2nd partial (octave G natural harmonic) of the G string.

violin/viola G string harmonic used to tune to bass

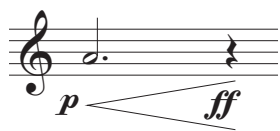


Once this string is tuned, the players can then tune the rest of their instruments in pure 5ths, using the G string as a starting point, so that the entire instrument ends up slightly flatter than normal.

Notations

All triplets are eighth note triplets, all quintuplets are sixteenth note quintuplets.

crescendi



A dynamic marking within the arms of the end of a hairpin crescendo indicates the ultimate loudness reached at the instant of release.



Unless otherwise indicated, the initial dynamic should be returned to at the end of a swell.

microtonal notations

♯ = 1/4 tone sharp

♯ = 3/4 tone sharp

♭ = 1/4 tone flat

With scordatura string instruments, quarter-tone notations indicate pitch deviations relative to the tuning of the instrument. A quarter-tone sharp notation on an instrument tuned 31¢ flat will sound approximately 19¢ sharp (a little less than an 1/8th tone) when compared to equal temperament.

Brass specific microtonality:

Microtonality in the brass instruments is indicated through the use of valve notations in conjunction with the approximate sounding pitch. No further adjustments are required.

♯ = 11th or 13th partial, approximately 1/4 tone sharp

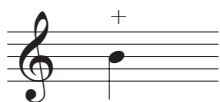
↓ = 7th partial, approx. 1/6 tone (31 ¢) flat

♯ = 11th or 13th partial, approximately 3/4 tone sharp

vibraphone

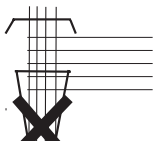


= leave pedal down until note naturally dies away.



= tone bar should be muted with finger when struck.

string notations



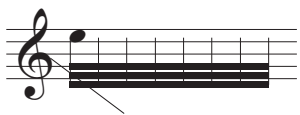
Muted bridge clef, indicating placement of the bow relative to the bridge and fingers. The X represents the performer's left hand muting the strings. The side of the hand should rest comfortably against the body of the instrument where the neck joins, with the fingers folding over onto the strings, angled about 45° toward the bridge. The notations at the top of the staff indicate the bow immediately next to the bridge, while notations at the bottom of the staff indicate the bow should touch the fingers of the left hand.



String clef, indicating strings behind the bridge, x notehead indicating pizzicato.



Body clef, indicating bowing on the body of the instrument in the indentation at the bottom of the upper bout and the corner. Violin and viola should bow on the right side of the instrument, bass should bow on the left side.



Used with pizzicato: play as fast as possible on the given note.



A very slow, relaxed ricochet bowing: a light drop of the bow onto the strings, with a slow draw allowing (mostly) the weight of the bow to bring it to rest. While the onset time is given, the duration is approximate. String numbers are indicated above. The use of the muted bridge clef indicates placement or movement of stroke between bridge and fingers.

Performance Instructions

Instruments should play without vibrato, except where indicated for the flute.

The vibraphone should be played without motor.

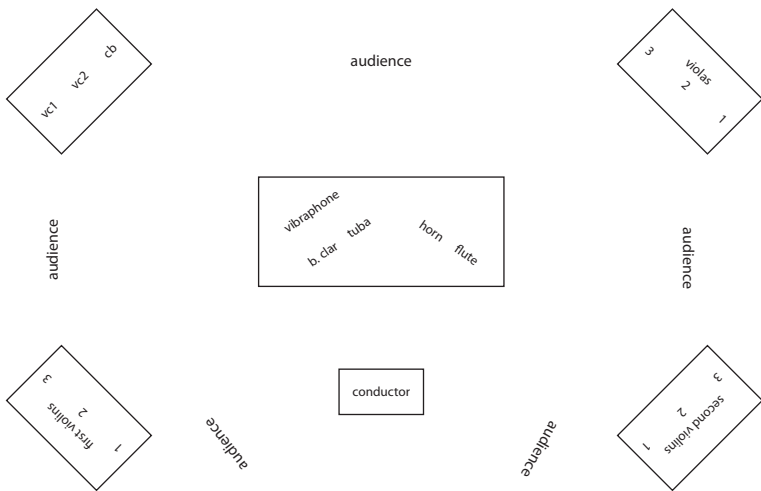
Due to the spatialization of the five ensembles, difficulty in executing rhythms between ensembles is expected.

Stage Set Up:

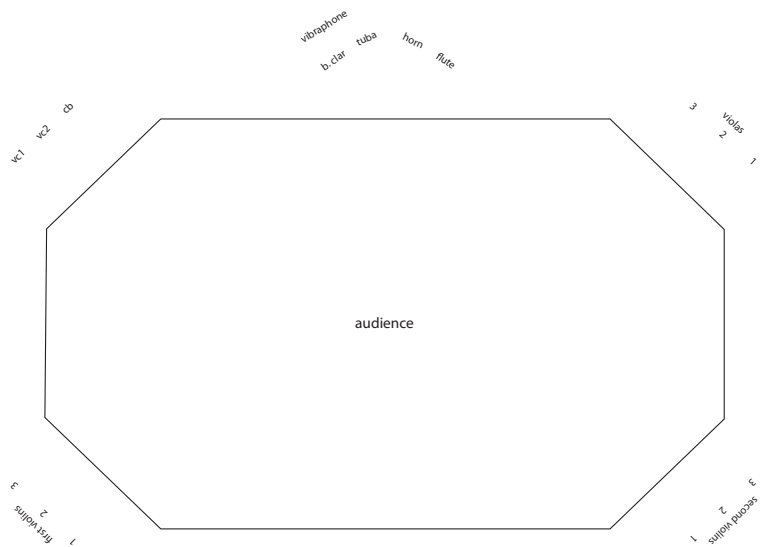
The instruments are set into 5 instrumental choirs to be placed antiphonally about the performance space. The groups are as follows, generally arranged from house left to right:

- first violins
- celli/contrabass
- flute/bass clarinet/French horn/tuba/vibraphone
- violas
- second violins

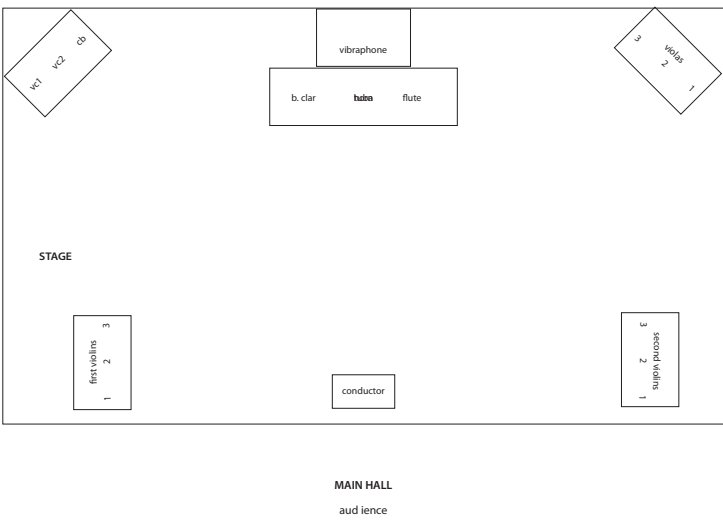
There is some flexibility in the arrangement of the instrumental choirs, depending upon performance considerations. The preferred performance environment enmeshes the audience within the larger ensemble - ideally with performers on raised platforms to enable coordination and enhance the performance aspect. This is the preferred performance environment.



A second possibility is to surround the audience with the ensembles. Placement of the conductor in this situation will depend on the specifics of the performance space in order to facilitate communication with the violin sections.



In situations where this is not possible, such as a traditional front-stage performance space, the violins should be placed as far left and right as possible.



Variations or hybrids between these arrangements are possible, but the left-to-right positioning of the ensembles must be maintained. Additionally, the above set-ups assume a conductor to coordinate the parts. Other variations, such as networked time displays, click tracks, video conduction, or other technological solutions are possible to allow other forms of staging.

Score is in C

for 17 instruments

matthew goodheart

(♩ = c. 80)

Flute

Bass Clarinet

Horn in F

F Tuba
(31♭ flat)

Vibraphone

without metrical accents

Violin 1-1
(31♭ flat)

Violin 1-2

Violin 1-3

Violin II-1
(31♭ flat)

Violin II-2

Violin II-3

Viola 1
(31♭ flat)

Viola 2

Viola 3

Cello 1

Cello 2

double bass

8

vln I-1

mp

pp

f

pp

vln I - 2

f

pp

vln I-3

f

pp

8

Vln II-1

f

pp

Vln II-2

f

pp

Vln II-3

f

pp

8

Vla 1

ff

p

f

pp

Vla 2

p

mp

p

f

pp

Vla 3

pp

f

pp

8

Vc 1

pp

f

pp

Vc 2

pp

f

pp

16

vln I-1

vln I - 2

vln I-3

f

f

f

pp

16

Vln II-1

Vln II-2

Vln II-3

f

f

f

pp

pp

mp

pp

f

mp

16

Vla 1

Vla 2

Vla 3

f

f

f

pp

pp

pp

16

Vc 1

Vc 2

f

f

pp

pp

(♩ = c. 72)

24

vln I-1 *pp* *mf* *f* *pp* *p* *mf*

vln I-2 *mf* *f* *mp* *p* *mf*

vln I-3 *p* *mf* *f* *p*

Vln II-1 *mf* *f* *mp* *p*

Vln II-2 *f* *mf* *pp* *p*

Vln II-3 *mf* *f* *mf* *p* *p* *ff* *p*

Vla 1 *mf* *f* *mf* *p*

Vla 2 *mf* *f* *pp* *p*

Vla 3 *f* *pp* *p* *ff*

Vc 1 *f* *mp* *p*

Vc 2 *mf* *f* *p* *p* *mf*

41

Hn. *sfz* *mf* *sfz* *f*

Tuba *sfz* *mf* *sfz* *f*

vln I-1 *fp* *ff* *f* *mp* *f* *mp* *f* *fp* *ff* *f* *fp* *ff*

vln I-2 *fp* *f* *mf* *f* *fp* *ff* *f* *mp* *f* *fp* *ff* *f*

vln I-3 *ff* *f* *mp* *f* *fp* *ff* *f* *mp* *f* *fp* *ff* *f* *fp* *ff* *fp*

Vln II-1 *fp* *ff* *f* *fp* *ff* *f* *fp* *f* *mp* *f* *s.p.* *ord.*

Vln II-2 *fp* *ff* *f* *fp* *ff* *f* *mp* *f* *s.p.* *ord.*

Vln II-3 *ff* *fp* *f* *mp* *f* *f* *fp* *ff* *fp* *ff* *f* *mp* *f* *s.p.* *ord.*

Vla 1 *ff* *mp* *f* *fp* *ff* *f* *mp* *f* *f*

Vla 2 *mp* *f* *fp* *ff* *f* *mp* *f* *fp* *ff* *f*

Vla 3 *mp* *f* *f* *fp* *ff* *f* *mp* *f* *fp* *ff* *f* *fp*

Vc 1 arco *s.p.* *f* *ff* *mf* *ff*

Vc 2 arco *s.p.* *f* *ff* *mf* *ff*

cb *s.p.* *f* *ff* *mf* *ff*

56

Fl.

p *mf*

B. Cl.

Hn.

unstop

Tuba

remove mute

vln I-1

sfz

vln I - 2

sfz

vln I-3

sfz

Vln II-1

sfz

Vln II-2

sfz

Vln II-3

sfz

Vla 1

sf *sfz*

Vla 2

sfz *f* *sfz*

Vla 3

p *f* *sfz* *sfz*

Vc 1

ord. IV *p* *mf*

Vc 2

ord. I *p* *mf*

cb

ord. *mp* *mf*

B (♩ = c. 72)

64

Fl.

p *f* *pp* *f* *p* *mf* *p* *mf*

B. Cl.

p *f* *f* *p* *mf* *p* *mf*

Hn.

p *f* *p* *f* *p* *mf* *p* *mf* *p* *mf*

Tuba

p *f* *p* *f* *pp* *mf* *p* *mf* *p* *mf*

Vib.

soft mallets

ff

vln I-1

frequent, irregular, audible bow changes

ff *n* *ff*

vln I-2

frequent, irregular, audible bow changes

ff *n* *ff*

vln I-3

frequent, irregular, audible bow changes

ff *n* *ff*

Vln II-1

frequent, irregular, audible bow changes

ff *n* *ff*

Vln II-2

frequent, irregular, audible bow changes

ff *n* *ff*

Vln II-3

frequent, irregular, audible bow changes

ff

Vla 1

frequent, irregular, audible bow changes

ff

Vla 2

frequent, irregular, audible bow changes

ff *n*

Vla 3

frequent, irregular, audible bow changes

ff

Vc 1

frequent, irregular, audible bow changes

ff

Vc 2

frequent, irregular, audible bow changes

ff

cb

frequent, irregular, audible bow changes

ff

6

74

Fl. *p* *f* *p* *mf* *p* *f* *p* *f* *p* *mf* *p* *f*

B. Cl. *p* *mf* *p* *f* *p* *f* *p* *f* *p* *f* *p* *f*

Hn. *p* *mf* *p* *mf* *p* *f* *p* *f* *p* *f* *p* *mf*

Tuba *p* *mf* *p* *mf* *p* *f* *p* *f* *p* *f* *p* *mf*

Vib. *p* *mf* *p* *mf* *p* *f* *p* *f* *p* *f* *p* *mf*

vln I-1

vln I-2

vln I-3

Vln II-1 *n* *ff*

Vln II-2

Vln II-3 *pp* *ff*

Vla 1 *n* *ff* *n* *ff*

Vla 2 *ff* *n* *ff*

Vla 3 *n*

Vc 1 *n* *ff*

Vc 2 *n* *ff*

cb *n* *ff*

[illegible]

Fl. *pp* *mf* *pp* *mf* *ff* (♩ = c. 112)

B. Cl. *n* *n* *mf* *ff*

Hn. *n* *pp* *mf* *f*

Tuba *n* *pp* *mf* *f*

Vib. *mf* *ff* hard mallets

vln I-1 *pp* II III

vln I-2 *pp* II III

vln I-3

Vln II-1 *s.p.*

Vln II-2 *s.p.*

Vln II-3 *s.p.*

Vla 1 *100*

Vla 2 *3*

Vla 3 *5*

Vc 1 *100* con sord. *mp*

Vc 2 con sord. arco *mp* *3*

cb con sord. arco *mp* *5*

Fl. *106* *p* *mf* *p* *mf*
 B. Cl. *p* *mp* *mf* *mp* *mf*
 Hn. *p* *mf* *fp* *mf*
 Tuba *p* *mf* *fp* *mf*
 vln I-1 *3* *5* *3* *5* *3* *5*
 vln I-2 *3* *5* *3* *5* *3* *5*
 vln I-3 *II* *III* *pp* *3* *5* *3* *5*
 Vln II-1 *106* *II* *III* *pp* *3* *5* *3* *5*
 Vln II-2 *II* *III* *pp* *3* *5* *3* *5*
 Vln II-3 *II* *III* *pp* *3* *5* *3* *5*
 Vla 1 *106* ord. *mp*
 Vla 2 ord. *mp*
 Vla 3 ord. *mp*
 Vc 1 *106*
 Vc 2 *3*
 cb *5*

Musical score for measures 113-118. The score includes parts for Flute (Fl.), Bass Clarinet (B. Cl.), Horn (Hn.), Tuba, Violin I-1, Violin I-2, Violin I-3, Violin II-1, Violin II-2, Violin II-3, Viola 1, Viola 2, Viola 3, Violoncello 1 (Vc 1), Violoncello 2 (Vc 2), and Contrabass (cb).

Key musical features include:

- Fl. and B. Cl.:** Playing a melodic line with triplets, dynamics *p* and *f*, and crescendo/decrescendo markings.
- Hn. and Tuba:** Playing a melodic line with triplets, dynamics *fp* and *f*, and crescendo/decrescendo markings. The Tuba part includes a "remove mute" instruction.
- Violins and Violas:** Playing a complex melodic line with triplets, dynamics *pp*, and crescendo/decrescendo markings.
- Vc 1 and Vc 2:** Playing a complex melodic line with triplets, dynamics *f*, and crescendo/decrescendo markings.
- cb:** Playing a complex melodic line with triplets, dynamics *f*, and crescendo/decrescendo markings.

119

Fl.

pp

f

B. Cl.

pp

f

Hn.

p

f

Tuba

p

f

Vib.

medium mallets

f

vln I-1

5

vln I - 2

3

5

vln I-3

3

5

Vln II-1

5

3

5

Vln II-2

3

5

Vln II-3

3

5

3

Vla 1

5

Vla 2

5

3

5

3

Vla 3

I

II

5

5

3

pp

Vc 1

119

pizz.

let it ring →

f

Vc 2

3

3

3

3

3

3

3

3

pizz.

let it ring →

f

cb

5

5

5

5

5

5

5

5

pizz.

let it ring →

f

(♩ = c. 60)

[illegible]

Fl. *n.v.* **E** *slow vib* *n.v.*
p mp

B. Cl. *n* *p pp mp*

Hn. *mp p mp pp mp pp mp*

Tuba *pp mp pp mp*

Vib. *mp*

vln I-1 *III* *p mp p*

vln I-2 *III II I II III* *p*

vln I-3 *III IV II I* *p*

Vln II-1 *II III II*

Vln II-2 *III III II III IV* *p*

Vln II-3 *III II I* *p*

Vla 1 *mp* *III I III III IV*

Vla 2 *mp* *II III III III IV III*

Vla 3 *III II II III* *p*

Vc 1 *III III IV II III II II* *p*

Vc 2 *II II III II III* *p*

cb *II III II*

This musical score page contains measures 171 through 178 for a string ensemble. The instruments are Violins I (Vln I-1, Vln I-2, Vln I-3), Violins II (Vln II-1, Vln II-2, Vln II-3), Violas (Vla 1, Vla 2, Vla 3), and Cellos/Double Basses (Vc 1, Vc 2, cb). The score is written in 4/4 time and includes various musical notations such as notes, rests, and dynamic markings. Fingerings are indicated by Roman numerals (I, II, III, IV) and bowings by numbers (1, 2, 3, 4, 5). The measures are grouped by bar lines, and the page number 171 is visible in the top left corner.

F (♩ = c. 100)

Flute

p soft mallets

p

vln I-1

p

vln I-2

p

vln I-3

Vln II-1

p

Vln II-2

p

Vln II-3

mf

p

p

Vla 1

p

Vla 2

p

Vla 3

p

Vc 1

Vc 2

mp

p

cb

189 (♩ = c. 90) (♩ = c. 100)

Fl.

Vib.

vln I - 1

vln I - 2

vln I - 3

Vln II - 1

Vln II - 2

Vln II - 3

Vla 1

Vla 2

Vla 3

ord.

s.p.

flaut.

p

3

5

G

Fl. *195* *3*

B. Cl. *n* *breath attack* *f* *p* *f* *3*

Hn. *n* *3* *f* *p* *f* *3*

Vib. *195* *bow* *soft mallets* *medium mallets* *mf* *3*

vln I-1 *195* *ord.* *f* *mf* *3*

vln I-2 *ord.* *f* *mf* *3*

vln I-3 *ord.* *f* *mf* *3*

Vln II-1 *195* *ord.* *f* *mf* *5* *3*

Vln II-2 *ord.* *f* *mf* *5* *3*

Vln II-3 *ord.* *f* *mf* *5* *3*

Vla 1 *195* *ord.* *f* *mf* *3*

Vla 2 *ord.* *f* *mf* *3*

Vla 3 *ord.* *f* *mf* *3*

Vc 1 *195* *arco* *f* *3*

Vc 2 *arco* *f* *3*

cb *arco* *f* *3*

210

Fl. *f*

B. Cl. *f*

Hn. *f*

Tuba *f*

Vib. *mf* *f* *mf*

vln I-1 *mf* *f*

vln I - 2 *mf* *f*

vln I-3 *mf* *f*

Vln II-1 *mf* *f*

Vln II-2 *mf* *f*

Vln II-3 *mf* *f*

Vla 1 *mf* *f* *mf*

Vla 2 *mf* *f* *mf*

Vla 3 *mf* *f* *mf*

Vc 1 *mf* *f* *mf*

Vc 2 *mf* *f* *mf*

cb *f*

[illegible]

[H] (♩ = c. 100)

227

Vib.

Vln II-1

Vln II-2

Vln II-3

8va pizz. pp

8va pizz. pp

8va pizz. pp



238

vln I-1

vln I-2

vln I-3

Vln II-1

Vln II-2

Vln II-3

8va pizz. pp

8va pizz. pp

8va pizz. pp

247

vln I-1

vln I - 2

vln I-3

Vln II-1

Vln II-2

Vln II-3

Vla 1

Vla 2

pizz.

p

pizz.

p



258

vln I-1

vln I - 2

vln I-3

Vln II-1

Vln II-2

Vln II-3

Vla 1

Vla 2

Vla 3

pizz.

p

1

(♩ = c. 80)

lip pizz.

slap tongue - very little pitch

tongue ram

tongue ram

soft mallets

p

p *mf* *p* *mf*

p *mf* *mp* *p* *mf*

p *ff* *p* *mf* *p*

(8^{va})

p *mp* *p*

(8^{va})

p *p*

(8^{va})

p *p* *mf* *ff*

pizz.

p

p *ff* *p*

pizz.

p *ff* *p* *ff* *p*

pizz.

p *ff* *ff* *p*

pizz.

p *mf* *p* *p*

arco

6

[illegible]