

# ampèrian loops

## part I

for

bass flute  
half clarinet  
metal can  
piano  
violin  
viola  
cello  
8 solenoids

score

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*commissioned by MIMITABU  
with support from Swedish Arts Council*

dur: approx. 14 min

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## ABOUT THE PIECE

*ampèrian loops - part I* is written for seven instruments and eight solenoids.

A solenoid is an electromechanical device consisting of an inductive coil around a movable steel or iron slug. When the electromagnet is switched on, the slug goes out. The eight solenoids in this piece are attached to eight different objects (see below). Sounds are created when the solenoid slugs hit the objects. The solenoids are controlled with a computer via an Arduino (an open-source electronics prototyping platform).

A MIDI file in the computer is triggering the solenoids and the conductor has to follow a click track.

## SOLENOIDS

The solenoids are grouped in couples with a visual connection between their objects;

solenoid 1 and solenoid 5  
solenoid 2 and solenoid 6  
solenoid 3 and solenoid 7  
solenoid 4 and solenoid 8

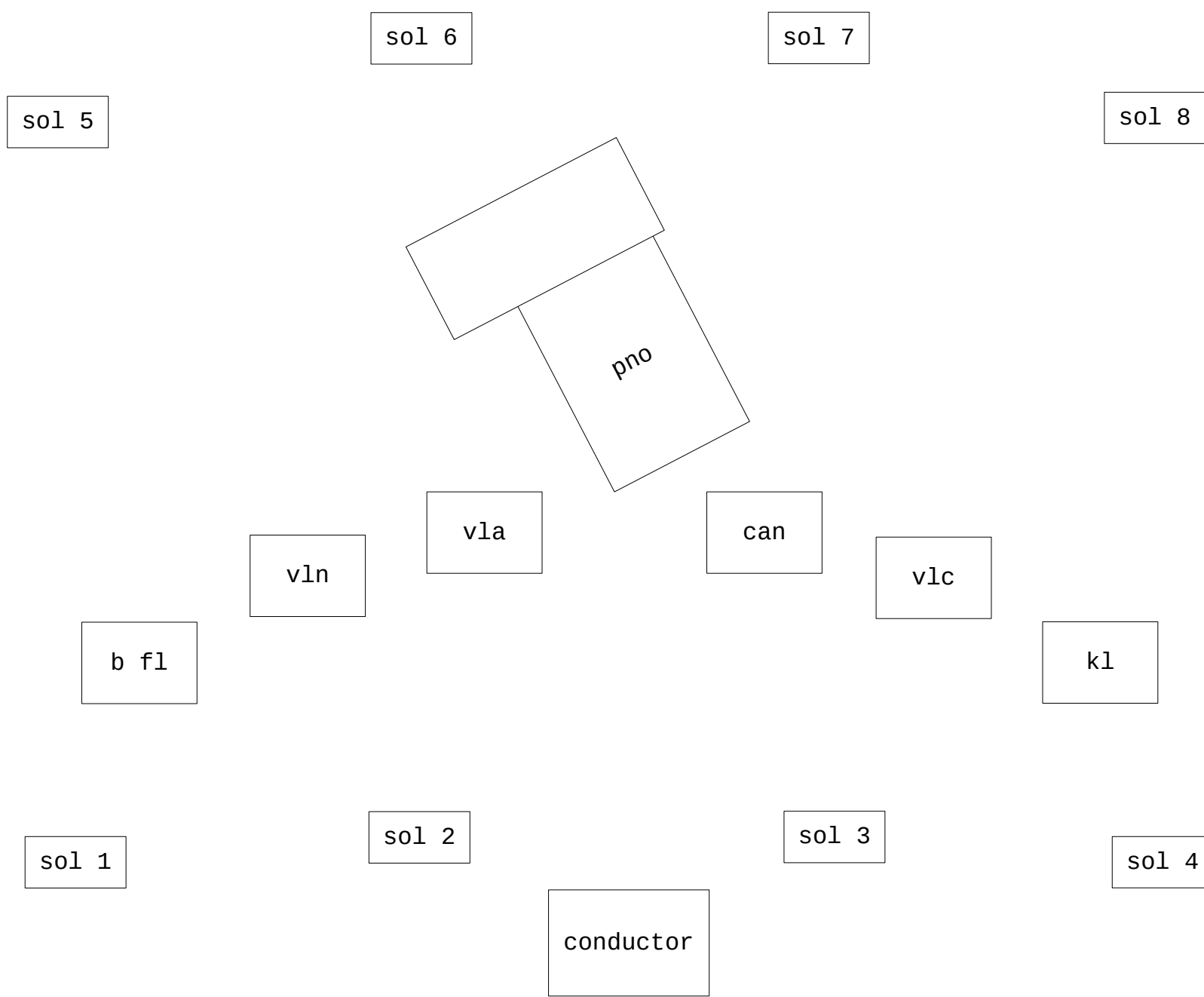
Solenoid 1-4 are placed in front of the ensemble, they have softer objects and should acoustically blend well with the softer dynamics of the ensemble.

Solenoid 5-8 are placed behind the ensemble, they have harder objects and should have a distinct sound (like strong accents of the soft solenoids).

Each solenoid has a LED attached which is synchronized with the solenoid hits (one hit=one light flash).

sol 1: metal plate (big)	sol 2: flower pot (plastic)	sol 3: box (cardboard)	sol 4: can (plastic)
sol 5: metal plate (small)	sol 6: flower pot (ceramic)	sol 7: box (wood)	sol 5: can (glass)

STAGING



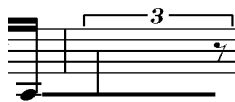
## INSTRUCTIONS

### general

dynamics are written in two different ways:

mp = sounding dynamic: mezzo piano. a great amount of action/power might be necessary to reach the written dynamic level.

"ff" = action dynamic: fortissimo. sounding result is probably much softer.



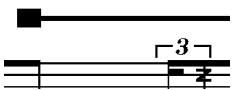
duration = sixteenth note + quarter note triplet



half tone flat, quarter tone flat, natural, quarter tone sharp, half tone sharp

### playing techniques

#### BASS FLUTE



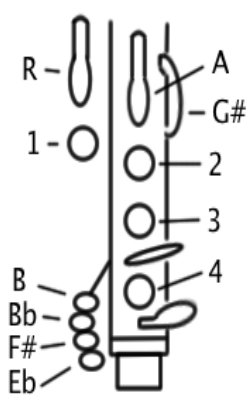
closed embouchure; cover embouchure hole completely with lips.



aeolian sounds; pitches mixed with much air sound. this is produced by placing the mouth further away from the embouchure than is usual. the pitches will be approx. a half tone sharper than usual.

the rest of the signs are explained as they appear.

#### HALF CLARINET



the upper half of the clarinet is used in this piece (mouthpiece, barrel and first joint). half clarinet is plugged in the end of first joint throughout the piece, by right hand finger or bottle cork. all tone holes are covered with fingers. a tablature notation (displayed to the left) shows which whole/key to open. when all holes of the half clarinet are closed it is not possible to blow through the instrument, when then one hole/key opens the air stream exits through only that hole/key. start and end each airstream very abruptly, by open and closing the hole/key.

the rest of the signs are explained as they appear.

#### METAL CAN

approx. measures: height 20 cm, diameter 12 cm

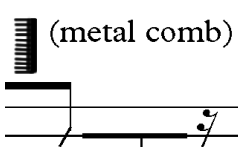
tools:

metal comb

threaded rod (length: 1 m)



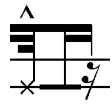
the player should be sitting and have the can placed up-side-down on a small table in front of him/her. the can should have a small edge at the bottom side. the can is used both as an instrument on which the musician plays, and like a sound box which amplifies sounds.



(metal comb)  
pull comb on edge of can, soft guero sound. (use finer side of comb ribs)  
approx. 45°-60° angle of comb.



play with finger on can bottom. very strong accent. press down finger after hitting to make a small gliss.



hit edge of can with backside of comb. very strong accent. hit and stay with comb on edge, a high pitched sound should resonate until you remove comb. approx. 45°-60° angle of comb.

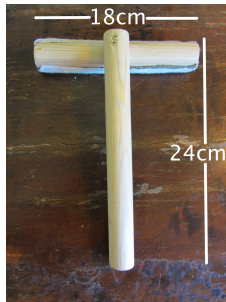


when using the threaded rod: place the upper part on your left shoulder and the lower part on the can bottom.

the rest of the signs are explained as they appear.

### PIANO

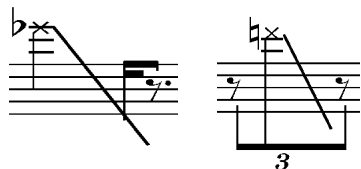
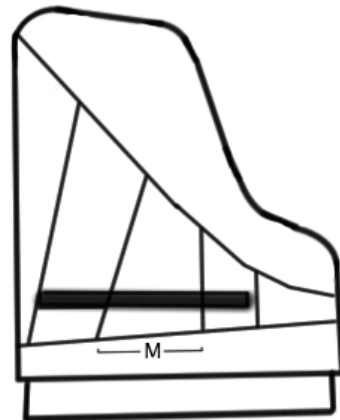
#### handheld damper



two wooden round rods ( $\varnothing = 2-3$  cm) connected. cover the upper part of damper with felt (not too thick).



(mid register)



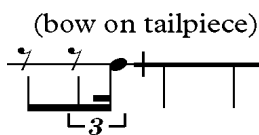
toneless gliss. (black keys, white keys); movie fingers (sometimes plastic card) over the keys without pressing them down. Sounding result should be a soft guero sound.

the rest of the signs are explained as they appear.

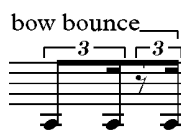
### STRINGS



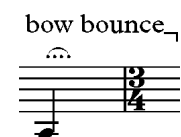
damp string by touching it gently without pressing it. one finger touching the string on written pitch and at least two other fingers damping behind it.



find a low, unstable pitch.



bow bounce; let the tip of the bow bounce on the string to create soft bounce sounds. do not move the bow horizontally.



drop the bow to make several short bounces. the bounces should last the full written duration.

the rest of the signs are explained as they appear.

# Ampèrian loops part I

Johan Svensson

**3/4** ♩ = 72 (closed embouchure)

**4/8**

Bass Flute (flz.) (air sound) (key clicks) (tongue ram) (mf) (pp) (mf) (pp)

Violin (bow on tailpiece) (stop bow movement abruptly) (p)

Viola (p)

Piano (f) (toneless gliss. (black keys)) (INSIDE PIANO) (tuning pegs) (finger nails) (move finger nails over tuning pegs in circular motion) (palm) (rub strings in a circular motion with palm) (f)

Metal can (pull on edge of can, soft guero sound) (metal comb) (finger) (pp) (f) (pp) (f) (pp)

Cello (damp bow bounce) (pp) (mf) (pp)

Half clarinet (\*\*) (right hand) (left hand) (air sound with small amount of low pitch) (open 4th finger) (close 4th finger) (sempre simile) (ppp)

**4/8** ♩ = 120

**5/8**

**4/8**

**3/4** ♩ = 72

B. Fl. (5) (open) (f) (mf) (pp)

Vln. (damp legno (tratto)) (pp) (3 (battuto)) (mf) (P)

Vla. (damp flaut. (stop movement abruptly)) (pp) (damp flaut.) (mp)

Pno. (ON KEYS) (f) (scratch string with plastic card) (pp) (stop bow movement abruptly) (ff) (INSIDE PIANO) (finger nails) (f) (palm) (f)

Can. (stop comb movement abruptly) (pp) (finger) (3) (f) (pp)

Vc. (stop bow movement abruptly) (pp) (mf) (pp)

Cl. (breath in) (A key) (ff) (ppp)

\*) hit strings with left hand to make a percussive sound

\*\*) half clarinet is plugged in the end of first joint throughout the piece, by right hand finger or bottle cork. all tone holes covered with fingers, tablature shows which hole/key to open.

10

B. Fl. *mf pp* *mf pp* *mf pp* *mf pp*

Vln. damp legno *pp*

Vla. (tratto) *mp pp* *mp pp* *mp pp* *mp pp*

pno INSIDE PIANO HANDHELD DAMPER (damp strings with handheld damper) ON KEYS *pp* ON KEYS *pp* INSIDE PIANO *pp*

Can *f pp* *f pp* *f pp*

Vc. *mf* *pp* *mf* *pp* *mf* *pp*

Cl. (flz.)

14

B. Fl. *pp* *mf* *pp* *mf*

Vln. damp legno *pp* *p* *ppp*

Vla. damp legno *pp* *mp* *pp* *mp*

Pno. *f* ON KEYS (silently pressed) Sostenuto *p* (hit strings with handheld damper, will make the open strings resonate)

Can. damp (damp can with thumb) (hit with backside) *pp* *f* *pp* *ff*

Vc. damp bow bounce *pp* *mf* *pp*

Cl. *ppp*

*♩ = 63*

\*) hit and stay with comb on can edge, a high pitched sound should resonate until you remove comb.





4 28

4/4 3/4 2/4 3/4 3/8

B. Fl. (aeolian sounds) *ppp* *p* *pp* *p*

Vln. damp legno *p*

Vla. damp legno *f* II, III (\*)

Pno. *f* gliss. on strings with finger (mid register) *pp* (scratch string with plastic card) *ff*

Can. (threaded rod on metal can) *ff* *pp* *ff* (scratch rod over threads) *p*

Vc. damp *ppp* *pp* *f* II, III *pp* *f* II, III *pp* *f* II, III *pp* *f* II, III

Cl. *f* *pp* *f* *pp* *f* *pp* *f*

33

3/8 4/8 3/8 4/8 3/8

B. Fl. (slap) *mf* *p*

Vln. damp flaut. III *mp* *p*

Vla. damp legno III *p* *mp* *p*

Pno. *f* *ff* *p*

Can. (scratch in thread direction, like a string player playing with bow, to get a high, squeaking sound) *f* *p*

Vc. damp bow bounce *p* *mf* *p* damp bow bounce

Cl. *p* *ff* *p* *p*

\*) move bow from ord. pos. all the way to the dampening hand. do not play in the ordinary direction with the bow.

3/8 4/4 5/4 7/16 3/8 4/8

(open embouchure air sound, senza flz.)

B. Fl. *ppp* *p*

Vln. *ppp sub.* *p* damp legno III

Vla. (bow on tailpiece) *p*

Pno. finger nails *f* *f*

Can. (slow circular movements with rod on can) *ppp* *p*

Vc. *p* damp bow bounce

Cl. *ppp* *p*

5/16 5/8 2/4 4/8 2/4

B. Fl. *mf* *p* *mf* *p*

Vln. III *mp* *p* *mp* *p*

Vla. III (battuto) *mp* *p* *mf* *p*

Pno. *ff* *p* *ff* *p*

Can. *f* *p* *f* *p*

Vc. *mf* *p* *mf* *p* damp bow bounce

Cl. *ff* *p* *ff* *p*



4  
8

3  
8

5  
8

3  
8

3 B  
4 ♩ = 78

7

B. Fl. *f* *p* *pp*

Vln. *mp* *pp*

Vla. *mf* *p* *f*

Pno. *ff*

Can. *f*

Vc. *mf* *f*

Cl. *ff* *ff*

damp flaut.

damp legno

bow pos. bridge nut

IV II, III

(air sound)

2  
4

4  
4

3  
4

♩ = 63

B. Fl. *p* *pp* *p* *mp* *ppp* *ppp* *p*

Vln. *pp* *p* *pp* *ppp*

Vla. *p* *f* *p* *f* *pp*

Pno. *f* *p* *pp*

Can. *ff* *pp* *ff*

Vc. *f* *f* *pp* *ppp* *ppp*

Cl. *p* *pp*

INSIDE PIANO HANDHELD DAMPER

(finger) *p* *pp*

Sostenuto

damp flaut.

damp legno

bow pos. bridge nut

IV 3 II, III 3 IV 3 3

8va

8va

II, III (gliss. from highest possible position)

damp

V 5 V 5 V 5



83 **3/4** **2/4** **3/4** **4/4** 9

(open embouchure, key clicks)

B. Fl. *mf* *pp* *mf* damp *pp* *p*

bow bounce

Vln. *p* *mp* *p*

damp legno (not damped!) (battuto)

Vla. *mp* *mp* *pp* *p* *pp*

pno *pp* *p*

(scratch in thread direction, like a string player playing with bow, to get a high, squeaking sound)

Can *f* *mp* *f* *ppp*

("down bow") ("up bow") (finger) rod

behind bridge

Vc. *mp* *p*

II IV sempre

Cl. *ff* *ppp*

(gliss with finger)

**4/4** **3/4** **4/4**

88 **C**  $\text{♩} = 63$  (open embouchure) (slap)

B. Fl. *mp* *pp* *mf* *pp*

(gliss. from highest possible position)

damp

Vln. *pp* *mf* *pp*

II, III (l.h. pizz.) 5+

II, III damp legno

Vla. *f* *pp* *mp* *pp*

bow pos. bridge nut

(make a "gliss." with finger nails on tuning pegs in upward direction) finger nails

pno (stay with damper on strings after hit to damp sound, sempre) *f*

Can (scratch rod in thread direction) *mp* *ppp*

rod

behind bridge

Vc. *pp* *p* *pp* *pp*

damp II, III IV

bow bounce (not damped!) bow bounce

Cl. *f* *ppp*







B. Fl. *mf*

Vln. (pizz.) *mf* sul pont. arco *pppp*

Vla. damp legno *mp* sul pont. arco *pppp*

pno *pp* *f*

Can rod *p* *pp* *pp* *p* *pp*

Vc. *mf* bow bounce *p*

Cl. (breath out) *ff*

3 4 D  
4 4

B. Fl. *mf* *mp*

Vln. pizz. *mf* arco damp II, III *pp*

Vla. damp legno *mp* damp legno II, III damp legno bridge bow pos. nut *f*

pno *pp*

Can (pull on edge of can) *pp*

Vc. *mf* damp II, III *pp*

Cl. *f* *pp*

113

B. Fl. *mf* *p*

Vln. *pizz.* *mf* *#*

Vla. *damp legno* *mp* *pp*

pno *pp* *f* (toneless gliss. on black keys)

Can *mp*

Vc. *behind bridge* *pp* *IV* *5* *5* *5* *damp legno* *pp*

Cl. *5* *3* *5* *5* *3* *5* *7* *7* *ff*

4  
4

3  
4

116

B. Fl.

Vln. *arco sul pont.* *pppp* *p*

Vla. *sul pont.* *arco* *pppp* *p*

pno *INSIDE PIANO* *f* *pp* *ON KEYS*

Can *rod* *(pull on edge of can)* *pp* *p* *pp* *pp* *3* *sim.*

Vc. *IV* *I sul pont.* *pppp* *IV* *5* *p*

Cl. *6* *3* *5* *3* *3* *3* *5* *3* *3* *3*

2  
4

3  
4

4  
4

14

120

B. Fl. *ppp*

Vln.

Vla. plastic card (on white keys)

Pno. *p* (plastic card) *p*

Can. *pp*

Vc. damp legno IV damp legno IV damp legno IV damp legno IV damp legno IV damp legno IV

Cl. *pp*

3  
4

4  
4

124

B. Fl. *mf* *p* *p* *p* *p*

Vln. damp flaut. III 3 IV sul pont. *mp* *p* *pp* *pppp*

Vla. damp legno bow pos. bridge nut sul pont. *mp* *p* *f* *pppp*

Pno. INSIDE PIANO ON KEYS INSIDE PIANO *p* *p* *f*

Can. (finger) *f* rod *pp* (pull on edge of can) *p* rod sim. *pp*

Vc. I sul pont. *pp* *pppp sub.* II damp III legno *p*

Cl. (pitch) *pp* *ff*

4  
4

2  
4

4  
4

2  
4

129

B. Fl. *ppp*

Vln. *p*

Vla. *p*

pno *pp*

Can *pp*, *p*, *pp*, *mp*, *p*, *pp*, *mp*

Vc. *pp*

Cl. *pp*, *mp*

(plastic card)  
(white keys)

rod

behind bridge

damp legno III IV

2  
4

3  
4

2  
4

5  
4

3  
4

133

B. Fl. *mf*

Vln. *mp*

Vla. *mp*

Pno. *pp*

Can *pp*, *mp*

Vc. *pp*

Cl. *pp*, *mp*

damp flaut. III

damp legno

rod

sim.

behind bridge

damp legno

3  
4

4  
4

138

B. Fl. *p*

Vln. sul pont. *pppp*

Vla. sul pont. *pppp*

pno fingernails *f*

Can. rod sim. *pp*

Vc. sul pont. *pppp*

Cl. *pp*

142

B. Fl. *mp*

Vln. II, III damp *pp*

Vla. II, III damp legno *pp*

pno *p*

Can. (finger) *f*

Vc. II, III damp *pp*

Cl. *f*

flaut. damp sul pont. *mp*

legno damp *mp*

ON KEYS *p*

rod *pp*

bridge nut *f*

(pitch) *pp*

3 4 4 3

3/4 4/4 3/4  
 145 17

B. Fl.

Vln.

Vla.

Pno.

Can.

Vc.

Cl.

3/4 **E** 4/4 3/4  
 149 = 68

B. Fl.

Vln.

Vla.

Pno.

Can.

Vc.

Cl.

\*) freeze suddenly and do not move at all during the whole duration

3  
4

18 152

B. Fl. *f p*

Vln. damp flaut. *mf p*

Vla. damp legno *f p*

Pno. *p* *f* *pp*

Can. *f p* *f p* *sim.*

Vc. behind bridge *p* *f* *mp* *f p* *mp*

Cl. *pp* *ff* *pp* *mp* *ff* *pp* *mp*

4  
4

155

B. Fl. *f p*

Vln. damp flaut. *mf p*

Vla. damp legno *f p*

Pno. *f* *pp*

Can. *f p*

Vc. behind bridge *p* *mp* *p* *f* *mp*

Cl. *pp* *mp* *pp* *ff*







4/4 5/4 3/4 4/4

172

B. Fl. FREEZE *p* damp flaut.

Vln. FREEZE *p* damp flaut.

Vla. FREEZE *p* damp legno

Pno. FREEZE *pp*

Can. FREEZE *p*

Vc. FREEZE *mp* behind bridge *p*

Cl. FREEZE *mp* *pp* *mp* *pp*

4/4 F 3/4

175

B. Fl. *f* *p* *mp* *mp* *f* *p* *f* *p*

Vln. *mf* *p* *mf* *pp* *mf* *p* *pp* *mf* *p*

Vla. *f* *p* *pp* *f* *p* *pp* *f* *p*

Pno. *f* *pp* *f* *pp* *f* *pp*

Can. *f* *p* *f* *p* *f* *p*

Vc. *f* *mp* *f* *pp* *f* *pp* *f* *mp*

Cl. *ff* *pp* *f* *mp* *f* *ff* *mp*

INSIDE PIANO ON KEYS

rod (finger) rod (finger)

II, III damp II, III damp

behind bridge

22 178

B. Fl. *f* *mp* *p* damp flaut.

Vln. *mf* *pp* damp legno

Vla. *f* *pp* damp legno

Pno. INSIDE PIANO *p* *f* *pp*

Can. *f* *p* rod (finger)

Vc. behind bridge *p* *f* *pp* *mp*

Cl. *pp* *ff* *f* *ff* *mp*

FREEZE

181

B. Fl. *f* *p* *f* *f*

Vln. *mf* *p* *mf* *mf*

Vla. *f* *p* *f* *f*

Pno. ON KEYS *p* *f* *pp* *f*

Can. *f* *p* *f* *f*

Vc. behind bridge *f* *mp* *p* *f* *f*

Cl. *ff* *mp* *pp* *ff* *ff* *ff*

FREEZE

2  
4

1  
4

3  
4

184

B. Fl. FREEZE *f* *f* FREEZE

Vln. FREEZE *mf* *mf* FREEZE

Vla. FREEZE *f* *f* FREEZE

Pno. FREEZE *pp* FREEZE

Can. FREEZE *f* *p* FREEZE

Vc. FREEZE *f* *f* FREEZE

Cl. FREEZE *ff* *ff* FREEZE

3  
4 rit.

4  
4

188

B. Fl. *f* *p* *f* *f* *f* *f*

Vln. *mf* damp flaut. *p* pizz. *mf* *f* *f* *f*

Vla. *f* damp legno *p* *f* *f* *f* *f* *f*

Pno. *f* *pp* *f* *f* *f* *f*

Can. *f* *p* *f* *f* *f* *f*

Vc. *f* *mp* *f* *f* *f* *f* *f* *f* *f* *f* *f*

Cl. *ff* *mp* *ff* *f* *f* *f* *f* *f* *f* *f*

5  
4

3  
4  $\text{♩} = 50$

4  
4

24 192

B. Fl.

Vln.

Vla.

Pno.

Can.

Vc.

Cl.

5  
4

G  
 $\text{♩} = 72$

4  
4

197

B. Fl.

Vln.

Vla.

Pno.

Can.

Vc.

Cl.

arco  
damp  
flaut.

damp  
legno

INSIDE PIANO

(finger)

200

B. Fl. *f* *p*

Vln. *pp* *mp*

Vla. *f* *pp* *mp*

pno *p* *ff*

Can *pp* *f*

Vc. *pp*

Cl. *pp*

Annotations: sul pont., damp flaut., bridge nut, bow pos., ON KEYS, rod, arco, I sul pont., finger nails.

204

B. Fl.

Vln. *mp* *p* *pp*

Vla. *mp* *p* *f* *ppp*

pno *p* *ff*

Can *f* *pp*

Vc. *pp* *p*

Cl. *pp*

Annotations: damp flaut., sul pont., damp legno, bow pos., bridge nut, III, finger nails, rod, damp legno.

● (coloring effect)





3  
4

2  
4

215

B. Fl. *ppp* *pppp* *ppp*

Vln. *ppp* *pppp* *ppp*

Vla. *ppp* *pppp* *ppp*

pno

Can. *p* *pp*

Vc. *p* *pppp* *p*

Cl. *p* *pppp* *p*

legno *ppp* *pppp* *ppp*

sul pont.

bow pos. bridge nut

rod

damp legno

1  
4

3  
4

4 H  
4

2  
4

220

B. Fl. *mp* *p* *f* *mp*

Vln. *pp* *mp* *pp*

Vla. *pp* *pp* *mp* *pp*

pno *p* *pp* *p*

Can. *mp*

Vc. *pp* *p* *pp*

Cl. *f* *f*

II, III damp

damp flaut.

legno

behind bridge

rod

damp

2  
4

4  
4

28 225

B. Fl. *p*

Vln. *p*

Vla. *ppp*

pno

finger nails  
"f"  
INSIDE PIANO  
HANDHELD DAMPER  
ON KEYS  
Sostenuto

rod *ppp*

Can *p*  
(pull on edge of can)

Vc. *p* *ppp* *p* *ppp*

Cl. *ff* *pp* *pp*

229

B. Fl.

Vln.

Vla.

pno

Can

Vc. *p* *ppp* *p* *ppp*

Cl.

232

B. Fl. (pitch) *ppp* *p*

Vln.

Vla. 3

pno 5 sim.

Can 3

Vc. damp legno *p* *ppp* *ppp*

Cl. *pp* 3

235

B. Fl. *ppp* *p* 3

Vln.

Vla. 3

pno 5 sim.

Can 3

Vc. *ppp* damp legno *p* 3

Cl. 3

**3** **4**

30 **4** **I** **5** **2** **4** **5**  
**4** **4** **4** **4** **8**  
 238 **sim.**

B. Fl. *p* *p* **FREEZE** *p*

Vln. *p* sul pont **FREEZE** sul pont *p*

Vla. ord. pos. IV legno *p* **FREEZE** legno *p*

Pno. ON KEYS *f* **FREEZE** *f*  
 INSIDE PIANO *p* **FREEZE** *p*

Can. *p* **FREEZE** *p*

Vc. bow bounce *p* **FREEZE** bow bounce *p*

Cl. low *pp* **FREEZE** *pp*

**5** **3** **4** **5**  
**8** **4** **4** **8**

242 **FREEZE** *p* **FREEZE**

B. Fl. *p*

Vln. *mp* *p* **FREEZE** sul pont *p* **FREEZE**

Vla. *mp* *p* **FREEZE** legno *p* **FREEZE**

Pno. *ff* *p* **FREEZE** *f* **FREEZE**

Can. *f* *p* **FREEZE** *p* **FREEZE**

Vc. bow bounce *p* **FREEZE** bow bounce *p* **FREEZE**

Cl. low *ff* *pp* **FREEZE** *pp* **FREEZE**

5  
8

4  
4

5  
4

2  
4

4x

246

B. Fl. *p*

Vln. *p* sul pont.

Vla. *mp* damp legno 3 legno.

Pno. *ff* *f*

Can.

Vc. *mf* *p* bow bounce.

Cl. *pp*



2  
4

3  
4

4  
4 K

♩ = 72

B. Fl. FREEZE *mp* 10 5

Vln. FREEZE *pp* II, III damp

Vla. FREEZE *pp* II, III damp

Pno. FREEZE *p*

Can. FREEZE

Vc. FREEZE *pp* II, III damp 3

Cl. FREEZE *f* 5 3 3



4  
4

3  
4

4  
4

261

B. Fl. *pppp*

Vln.

Vla.

pno *pp* *sim.* 5

Can

Vc. *(arco)* *p*

Cl. 3

266

B. Fl. 3

Vln. 45"-60"

Vla. 45"-60"

pno 45"-60" (repeat beats in same tempo whole fermata) 5

Can 45"-60"

Vc. 45"-60" 3 *p* 3

Cl. 4 45"-60"