Duo for Cajon & Computer

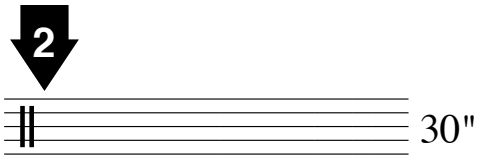
by Cort Lippe

2011

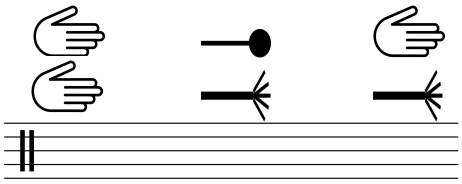
Written for Patti Cudd

Commissioned by Patti Cudd and premiered in Bangkok, Thailand, 2011

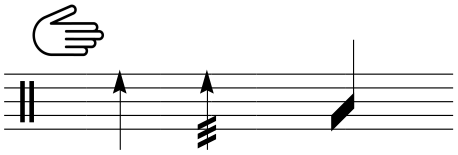
Performance Directions



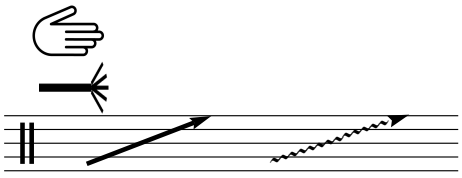
computer event indicator:
duration of event is shown at the end of each event.
(event 1 has a duration of 5 seconds, events 2-12 have durations of 30", and events 13-25 have event durations of 20").



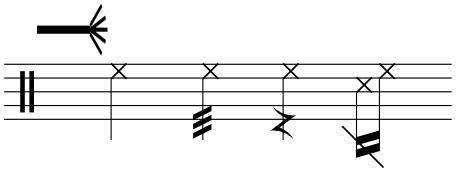
playing style:
2 hands;
1 superball mallet and 1 scraper;
1 hand and 1 scraper.
(use a medium sized superball mallet with a "tenor voice" range, and the scraper should be some sort of thick plastic "rake style" brush since a wire brush does not make much sound on a cajon surface--see details on following page).



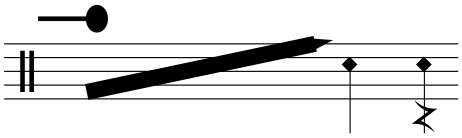
using fingertips/nails and hands:
tap; tap tremolando.
deadstroke with hand



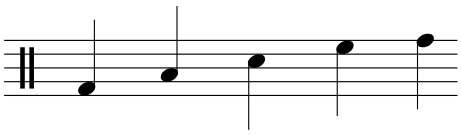
using scraper or hand/fingers:
non-tremolando scrape;
tremolando scrape.
(proportional duration, generally following the direction indicated along the playing surface).
(a texturized film should be applied to the cajon--see details on following page)



using scraper:
strike;
regular scraping tremolando;
irregular scraping tremolando (without moving directionally);
grace slash indicates approximate rhythm/duration.



using superball mallet:
rub along surface (proportional duration);
strike percussively with superball mallet;
strike and let rebound tremolo-like.



timbre indications:
dark, medium, bright, brighter, and "edge" (use approximately 5 different locations on the surface to obtain different colors or timbres: low middle for the dark "sweet spot" of maximum resonance, upper middle for the medium timbre, nearer the top for bright and brighter timbres, and the top edge for the "edge" timbre).

Scraper
Typical wire brushes are not recommended for the cajon. Something more like a scraper, somewhat sturdy and rake-like, is recommended. Be sure to use a scraper that will not harm the playing surface of the cajon. The sound of the scraping should be as loud as the sound of fingernails scraping on texturized film (see below). Feel free to experiment with various scraper/brush products made specifically for percussion. The company **Vic Firth** makes a good bamboo stick/brush called **Bams**, which works very well. A **hairbrush** can work quite well in place of a percussion scraper. A mutiple-bristled hairbrush with a comfortable handle and plastic (or nylon) bristles with beads on the tips of each bristle produces a very good result and will not harm the instrument. Using the scraper (or hairbrush) on the texturized film produces the best results.

Texturized Film or Other Possibilities
In order to produce scraping and brush-like sounds with the fingers, hands, and scrapers, a texturized film or other substance should be used. It can be applied, removed, and reused on the playing surface of a cajon. The percussion accessory company **Remo** used to make a highly recommended product: The **Remo Texture Target**. It works well and will not harm the playing surface of the cajon. (In addition, a superball mallet rubbed on the texture sounds quite good.) Unfortunately, the **Remo Texture Target** is not manufactured anymore. Other options include: one side of adhesive Velcro or a very light-grained sandpaper. Velcro works well and is not abrasive like sandpaper. (A superball mallet might not work as well with Velcro or sandpaper, but certain superball-like mallets work well directly on the wood surface of the cajon.) I welcome any other ideas or suggestions that players may have.

Microphone, Microphone Placement Details, and Amplification
An SM57 (Shure percussion microphone) is a dependable dynamic microphone for sending the sound into the computer, via the analog-to-digital convertor, and for amplification. But a **higher quality cardioid** microphone can also be used, possibly with some roll-off of the low frequencies. An optimal location for the microphone(s), is about 3-5 inches from the CORNER of the cajon, pointed at one of the corners to the side where the sound-hole is found. The microphone should be pointing at the corner itself and not at the sound-hole. The microphone should NOT be put too near the sound-hole since this will probably result in too much bass boom. Also, if the microphone is put too far from the sound-hole, for instance, on the opposite side of the cajon, the sound will lack any bass whatsoever. In other words, based on taste, place the microphone in such a way that the bass does not have too much boom, but is still strong enough to be heard clearly. (Strive for an amplified sonic image that gives the impression you are listening to the cajon from 5-10 feet away, without having the low resonant frequency of the instrument dominate the timbre when playing nearer the edge.)

Mixer and Audio Interface Details
In the patch, the direct sound of the input to the computer can be amplified and reverberated if desired. This can be used in rehearsals, and also in concerts where the technical set-up is minimal, by patching the cajon microphone directly into the audio interface input. Otherwise, if amplification and/or reverb is desired, and the technical set-up allows, it is recommended that either a SECOND microphone be set-up and not sent directly to the computer, but patched directly into the mixer (this can be another SM57, or a microphone with similar/better amplification qualities for the instrument), or, preferably, using **one** microphone, go directly to the mixer and then out a pre-fader auxiliary send to the input of the audio interface. The advantage of a second microphone (or a single microphone going directly to the mixer first) is that the level of the microphone can be controlled as part of the final mix from the mixing board in the hall as an independent factor. (The amplification in the patch cannot be changed in real-time with the same flexibility). If reverb of the direct sound in the patch is not used, a reverb at the mixer can also be used (if reverb is desired). In sum, there are three ways to run the piece: **(1)** a simplified and convenient method of amplifying and reverberating the cajon directly in the patch, **(2)** the preferred and traditional method of amplifying and reverberating the cajon directly at the mixer where someone controls the final mix during performance, and **(3)** some combination of (1) and (2) using two microphones.

Electronic Part
All details for running the Max/MSP patch are in the **"READ ME FIRST"** subpatcher found on the front panel of the patch.

Cajon "Tuning"
Since cajon lutherie is not highly standardized, the cajon can be "tuned" to the patch, so that the patch detects timbral differences properly. All details for tuning the cajon are found on the front panel of the Max/MSP patch in the **"read-tuning"** subpatcher in the tuning section of the patch at the bottom right side. Tuning may be needed in order to achieve a good range of ***p***, ***mp***, ***mf***, and ***f***, which are the four dynamics that the computer detects. Likewise, the four timbres: *dark*, *medium*, *bright*, and *edge* may need to be tuned via the patch. Do not expect the "tuning" to give perfect results all the time. Just strive for a majority of correct responses from the computer statistically speaking, as predicted based on the intended input,

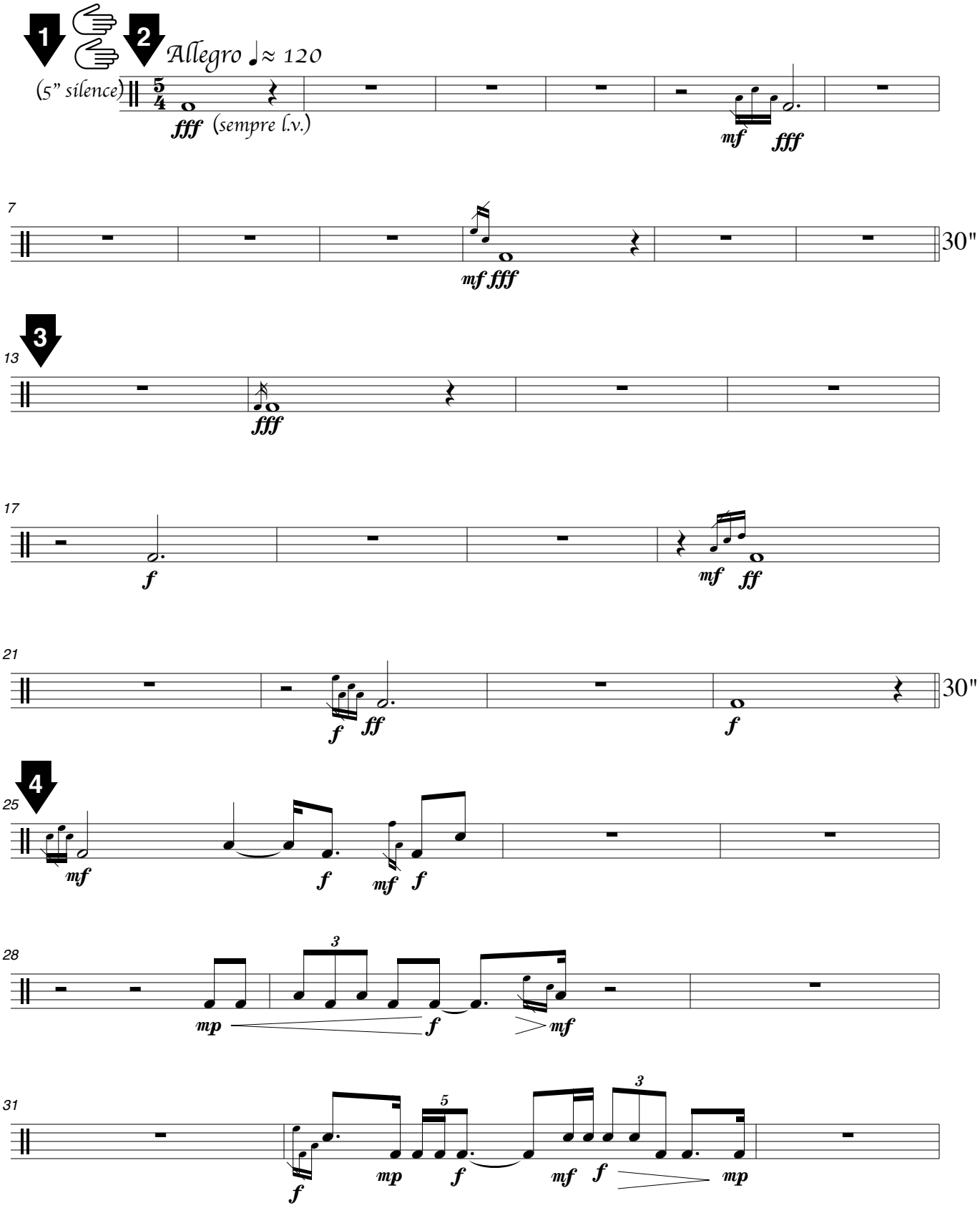
Cort Lippe

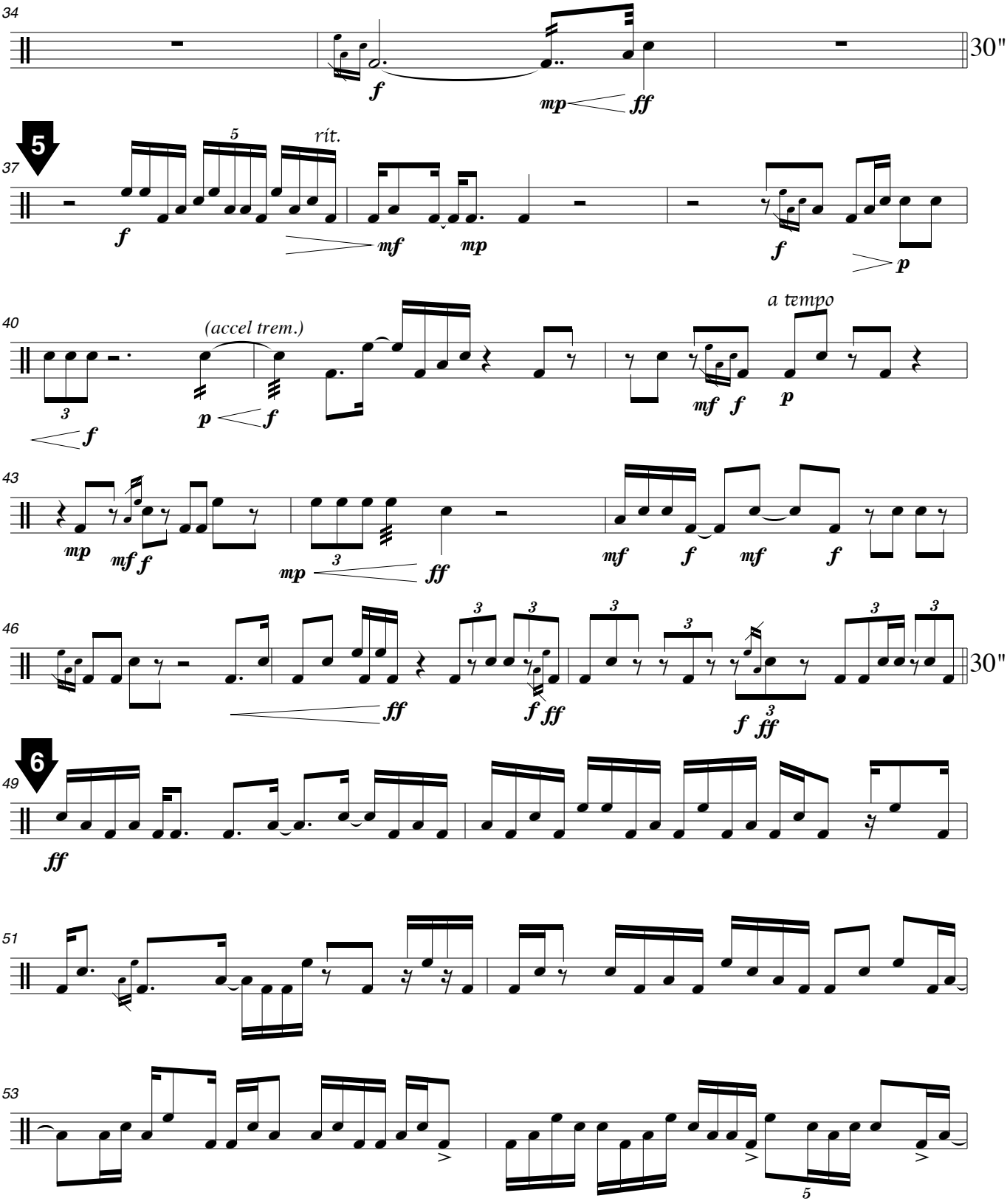
Program Notes

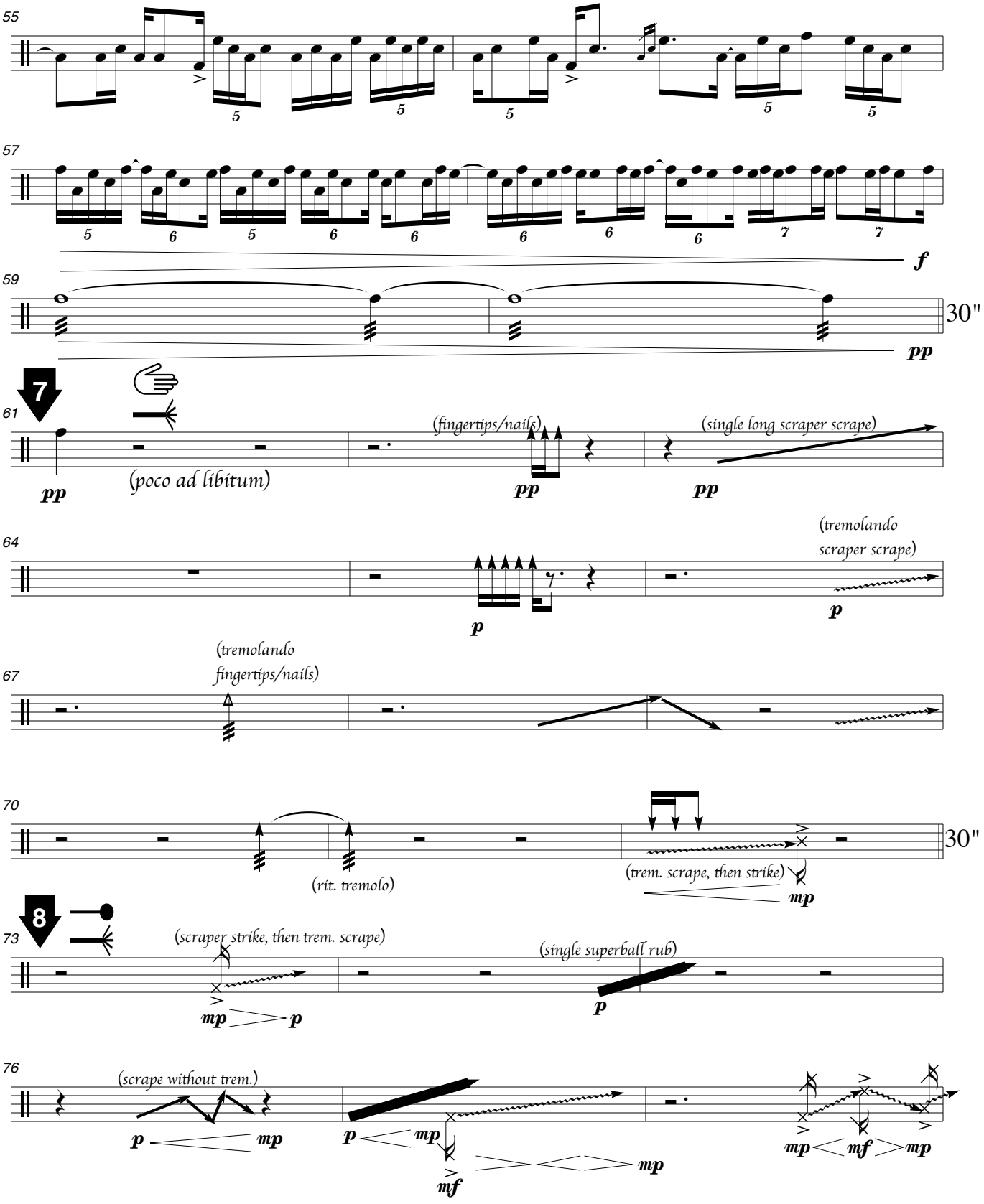
Duo for Cajon and Computer (2011) was commissioned by the percussionist Patti Cudd for a tour of Korea and Thailand in May of 2011. The electronic part was created at the Hiller Computer Music Studios of the University at Buffalo, New York, using the software Max/MSP. Technically, the computer tracks parameters of the performance using Miller Puckette's analysis object *bonk~*, which reports attacks, loudness, and brightness (timbre), along with details about relative loudness across the frequency range in 11 independent frequency bands. This allows for larger scale rhythmic and phrase tracking, playing style tracking (including strike type and strike location), and micro-level frequency band tracking of individual strikes, and is used to continuously influence and manipulate the computer sound output by directly affecting digital synthesis and compositional algorithms in real-time. While interacting with the computer system, the performer has a role in shaping all of the computer output. The intent is to create a certain degree of intimacy and interactivity between the performer and the computer in which the performer has the potential to influence the computer output based on aspects of the musical expressivity of his/her interpretation of the score. The computer part is, to a certain degree, an extension of the cajon, so the cajon could be considered more than just an acoustic instrument, while at the same time the computer part could be considered as an independent agent. The relationships exist simultaneously; yet have a certain level of musical and technical ambiguity. Regarding the relationship between the performer and computer, individual expressivity is sometimes meant to serve the whole, and at other times has an individual influence on the entire ensemble, as in any chamber music. The digital synthesis algorithms focus on various kinds of filtering, including resonant filter banks, formant filters, and comb filters, along with delay/feedback, spatialization, frequency shifting, frequency modulation synthesis, and sample playback. This piece is dedicated to Max Matthews, who passed away on April 21, 2011.

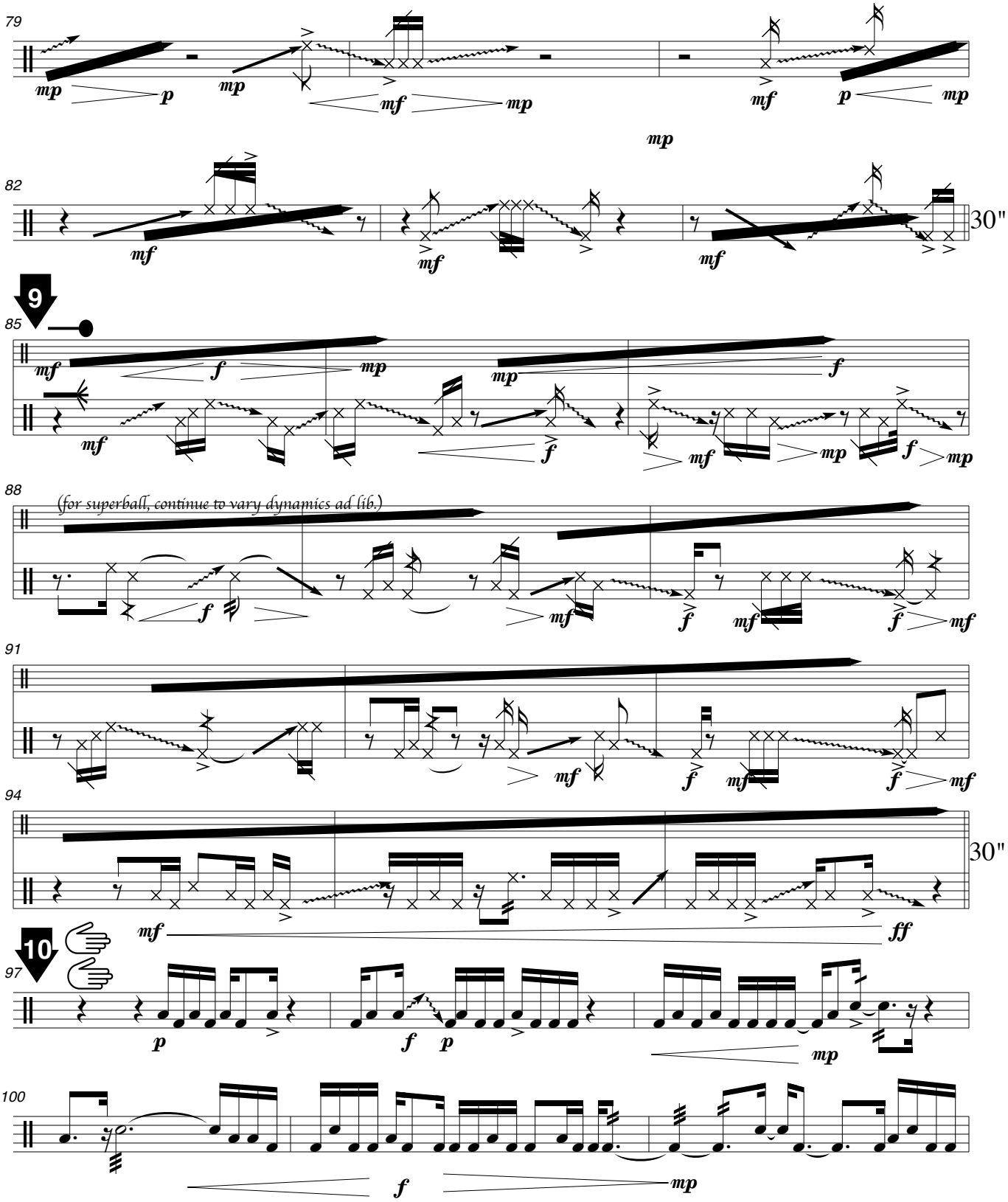
Duo for Cajon and Computer is recorded by the percussionist Patti Cudd on the *SEAMUS Label*, vol. 23 and on *Musicworks Press Recordings*.

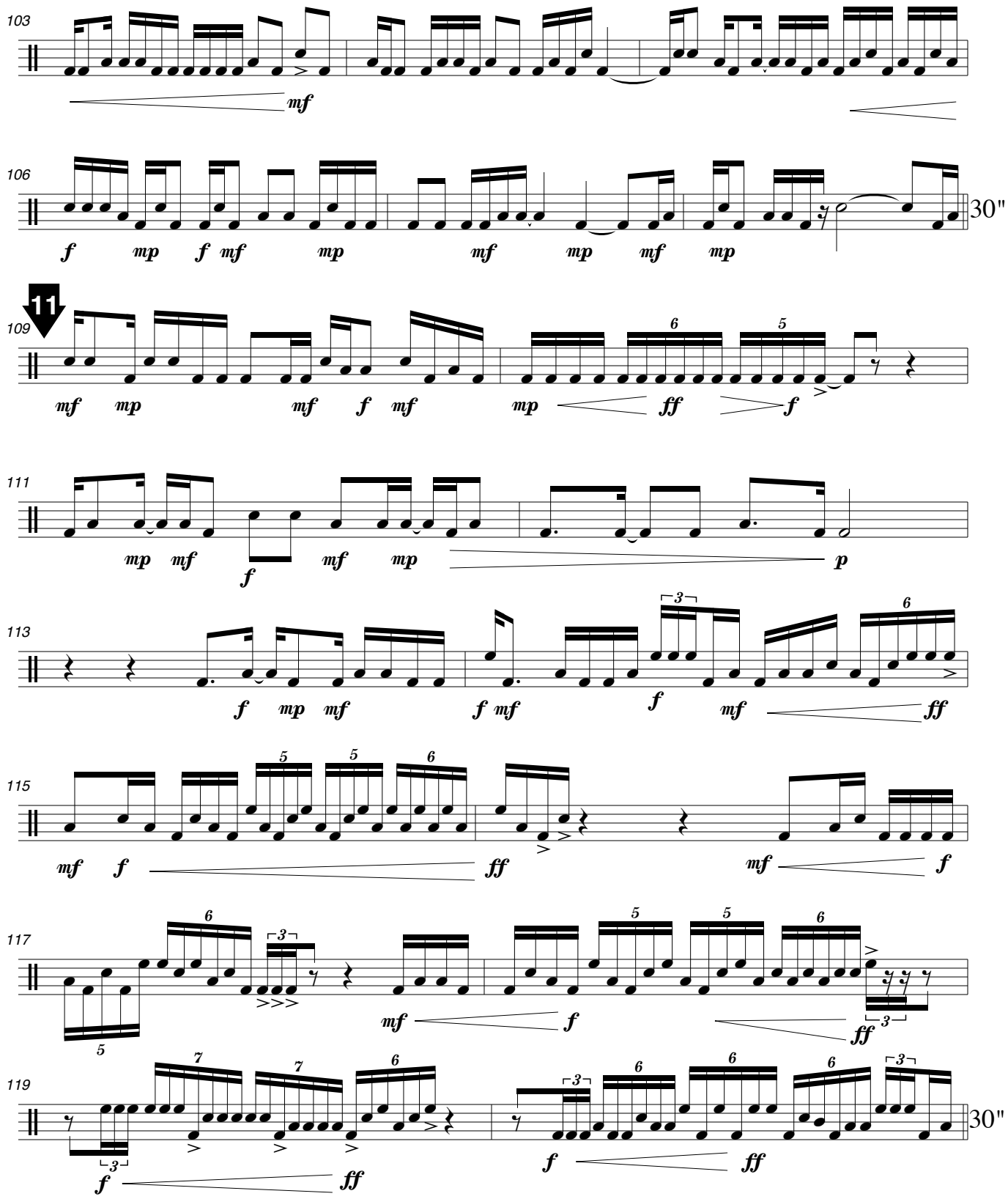
Duo for Cajon & Computer by Cort Lippe 2011

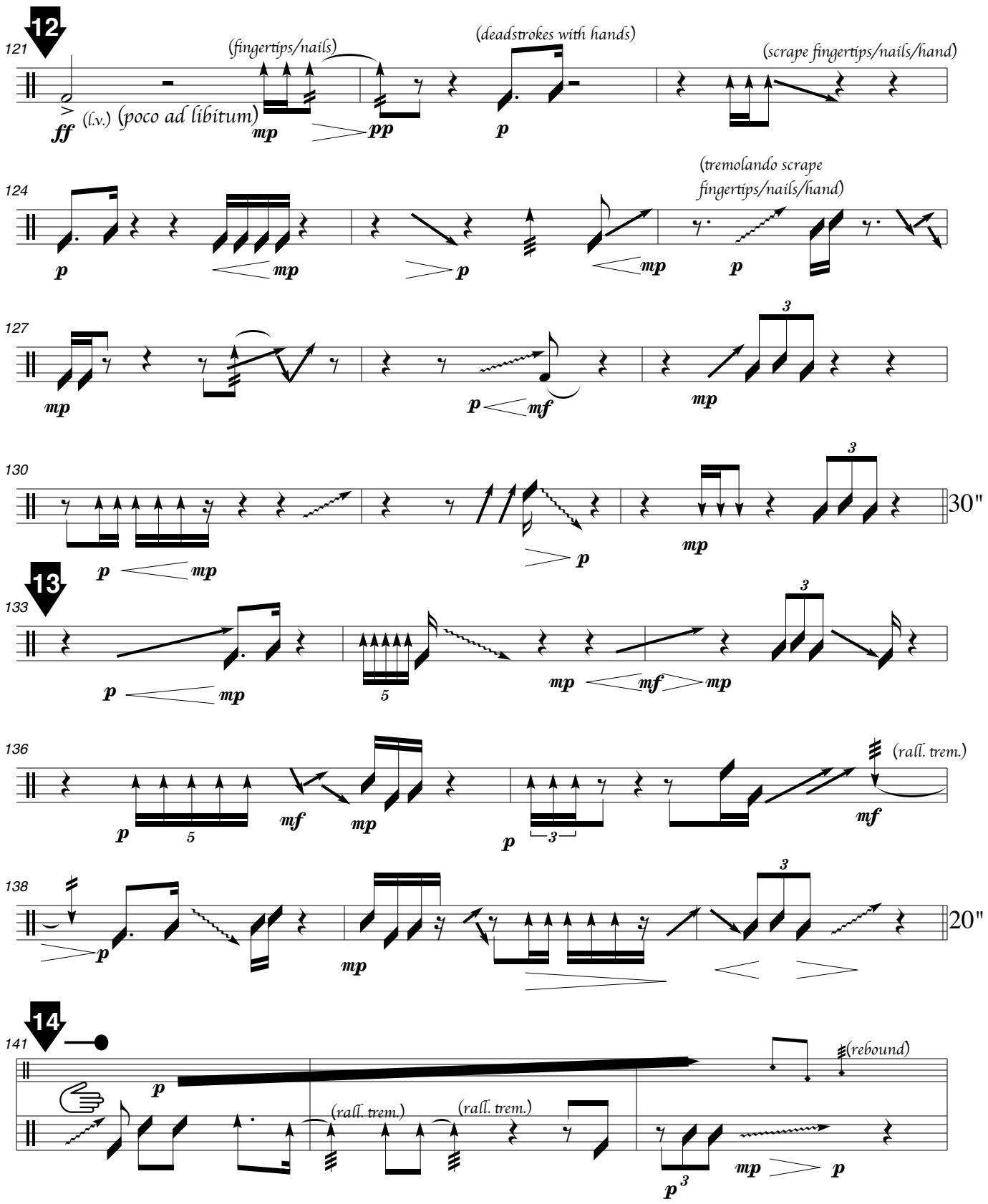


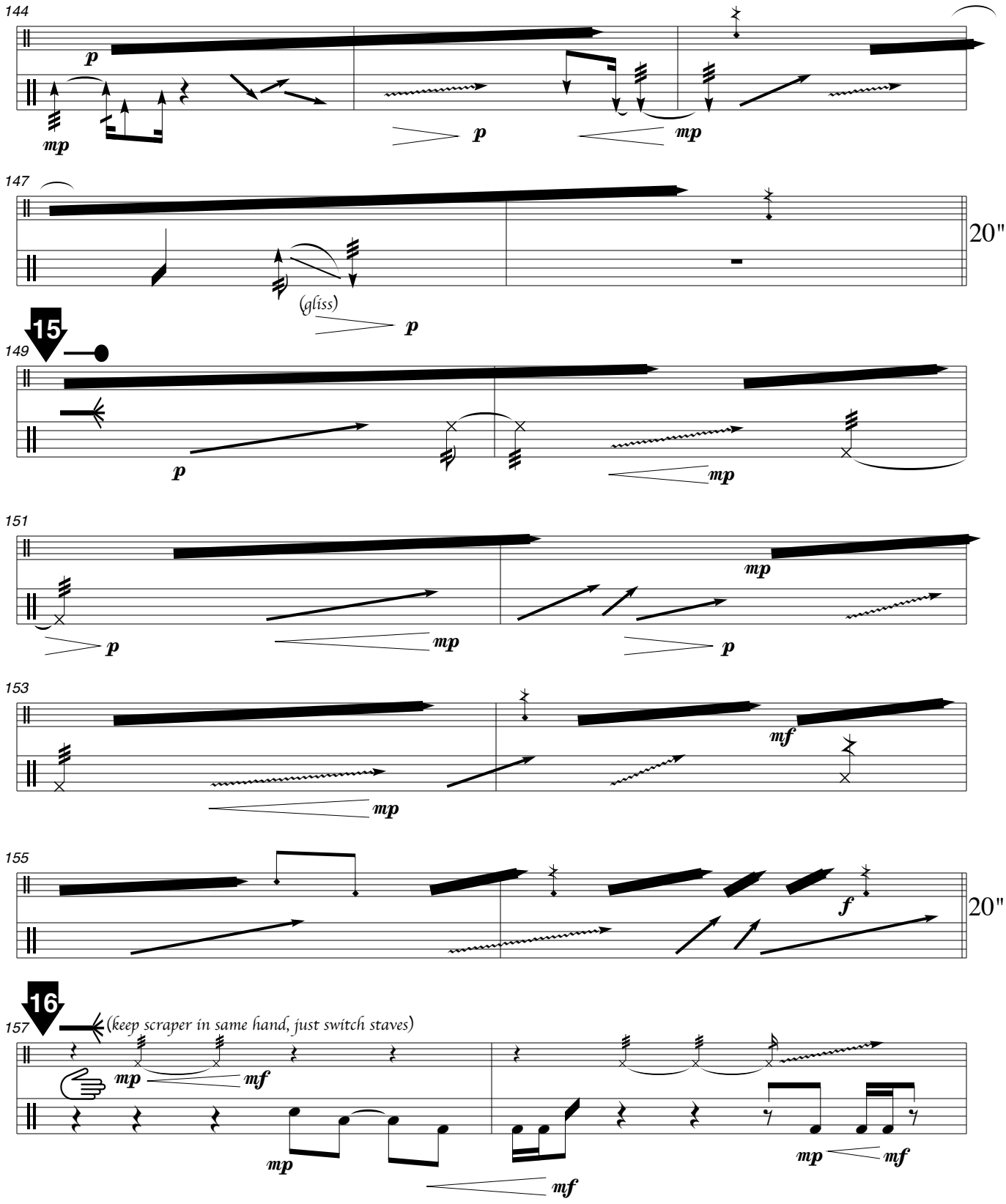

34
30"
5
37
rít.
40
(accel trem.)
a tempo
43
46
30"
6
49
51
53

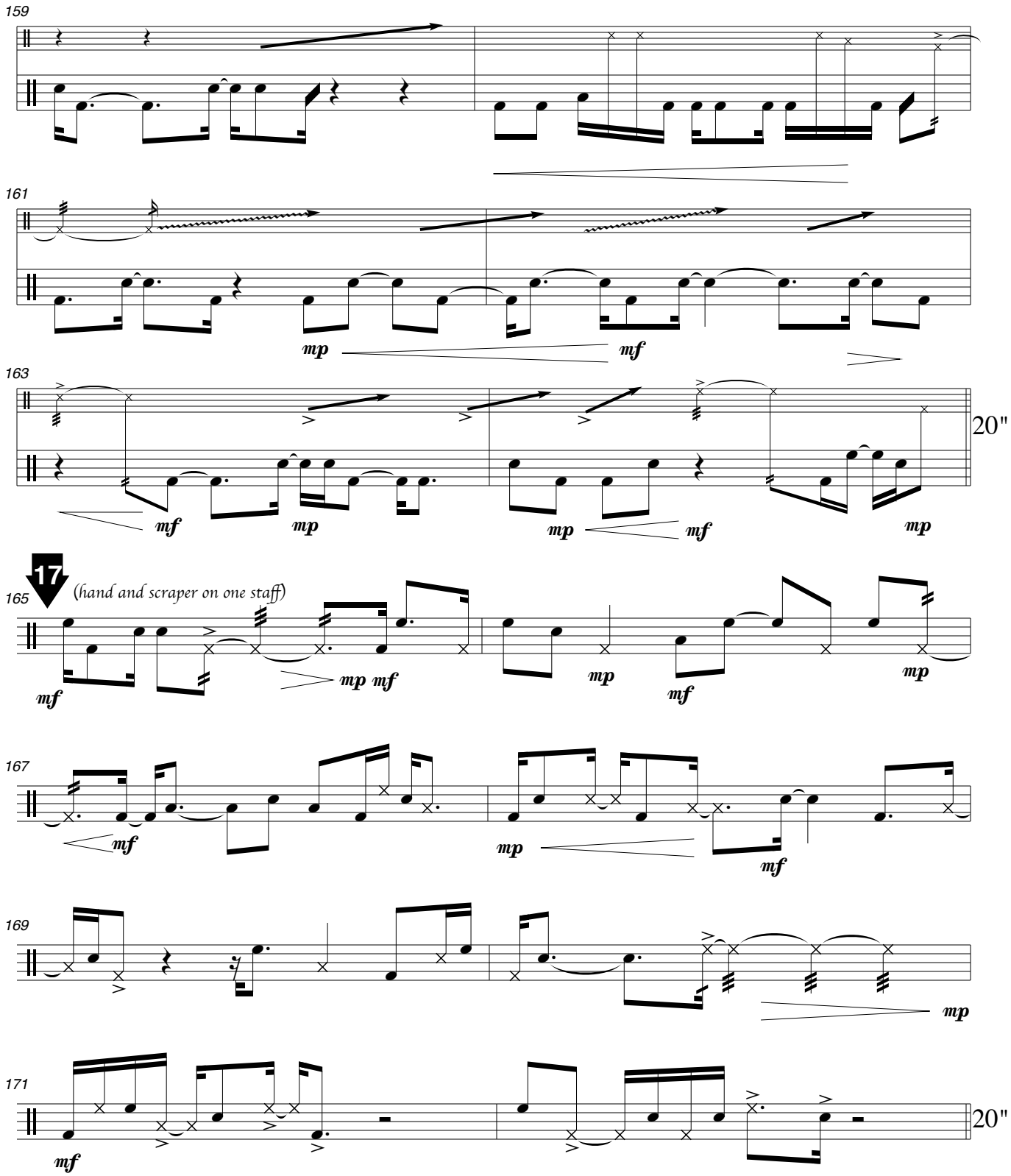

55
57
f
59
30"
pp
7
61
pp
(poco ad libitum)
(fingertips/nails)
pp
(single long scraper scrape)
pp
64
(tremolando
scraper scrape)
p
p
67
(tremolando
fingertips/nails)
70
30"
(rit. tremolo)
(trem. scrape, then strike)
mp
8
73
(scraper strike, then trem. scrape)
mp
p
(single superball rub)
p
76
(scrape without trem.)
p
mp
p
mp
mf
mp
mp
mf
mp

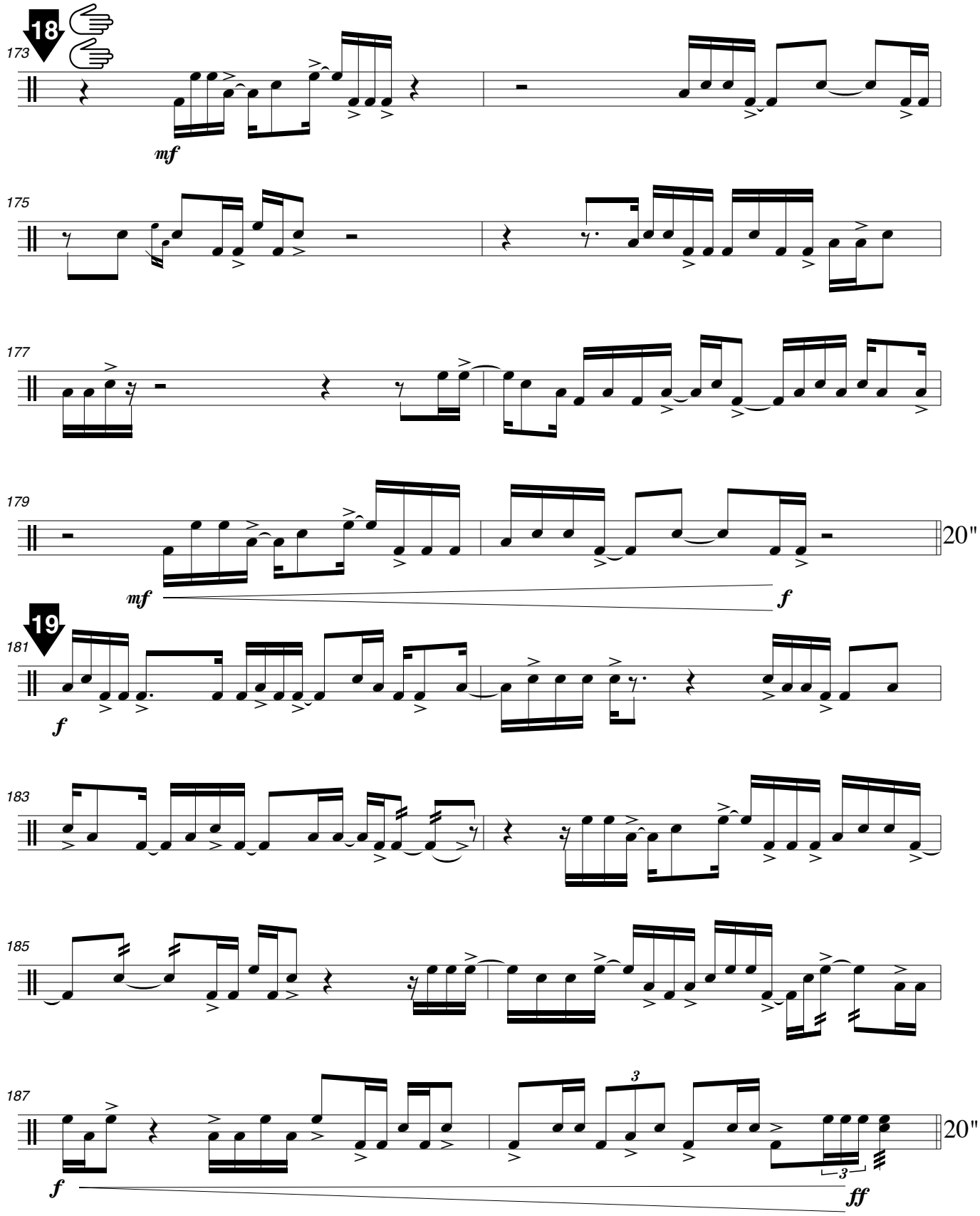

79
mp
p
mp
mf
mp
mf
p
mp
mp
82
mf
mf
mf
30"
9
85
mf
f
mp
mp
f
mf
f
mf
mp
f
mp
88
(for superball, continue to vary dynamics ad lib.)
f
mf
f
mf
f
mf
91
mf
f
mf
f
mf
94
30"
mf
ff
10
97
p
f
p
mp
100
f
mp

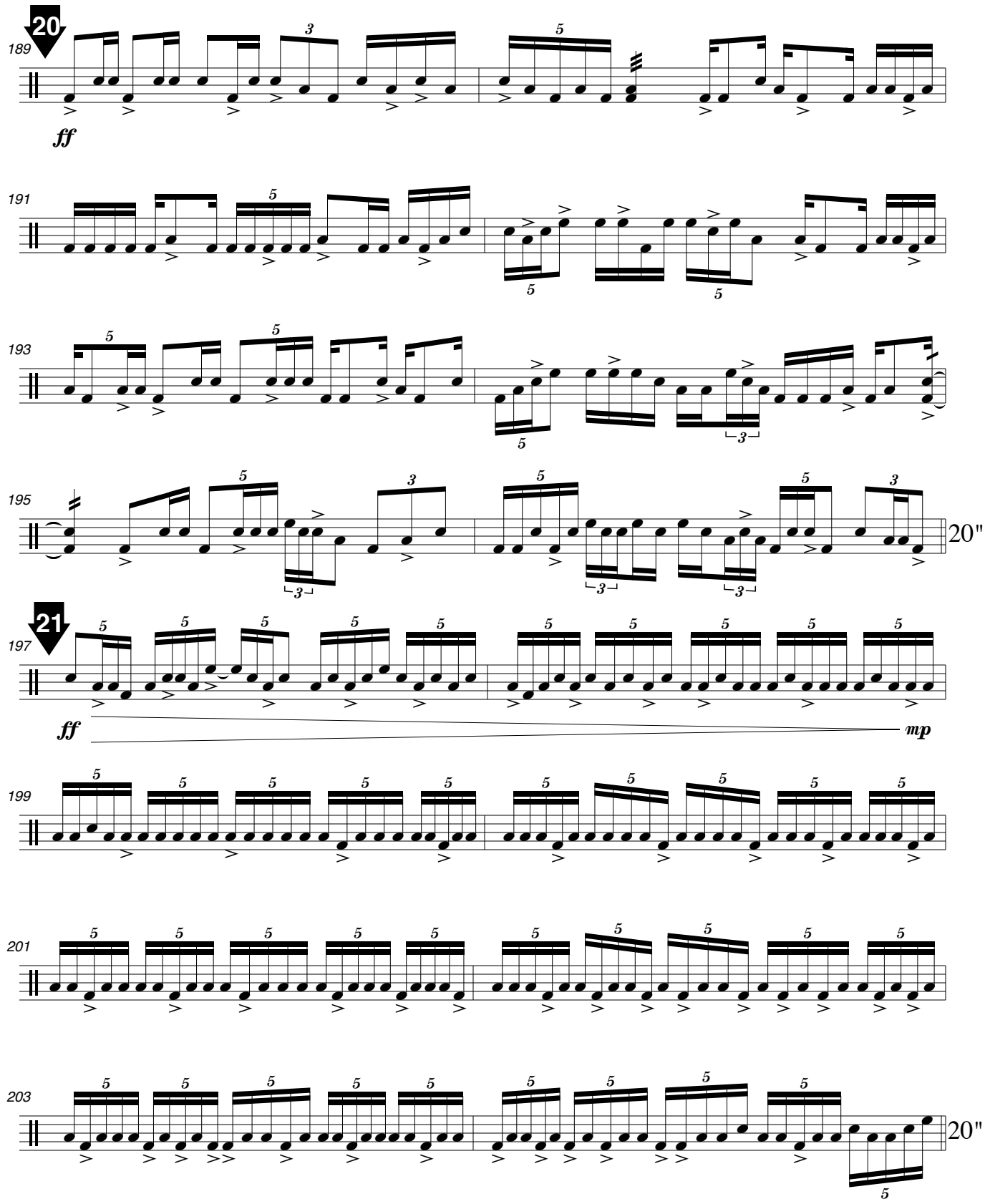

103
mf
106
f mp f mf mp mf mp mf mp
30"
11
109
mf mp mf f mf mp ff f
111
mp mf f mf mp p
113
f mp mf f mf f mf ff
115
mf f ff mf f
117
mf f ff
119
f ff f ff
30"

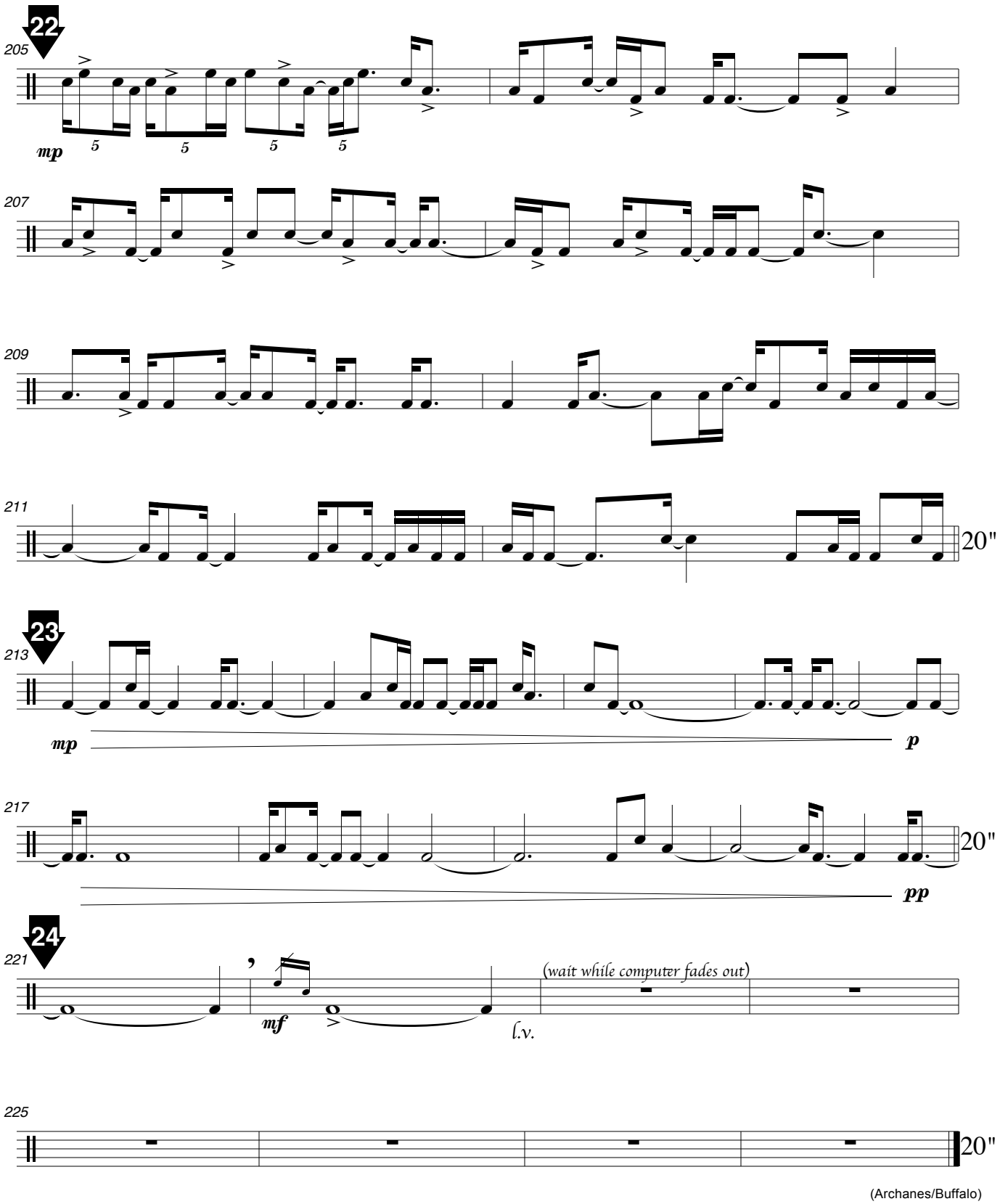

12
121
(fingertips/nails)
(deadstrokes with hands)
(scrape fingertips/nails/hand)
ff (l.v.) (poco ad libitum)
mp
pp
p
124
(tremolando scrape fingertips/nails/hand)
127
130
30"
13
133
136
(rall. trem.)
138
20"
14
141
(rebound)
(rall. trem.)
(rall. trem.)


144
p
mp
p
mp
147
20"
(gliss)
p
15
149
p
mp
151
mp
p
mp
p
153
mf
mp
155
f
20"
16
157
(keep scraper in same hand, just switch staves)
mp
mf
mp
mf
mp
mf


159
161
mp
mf
163
20"
mf
mp
mp
mf
mp
17
(hand and scraper on one staff)
165
mf
mp mf
mp
mf
mp
167
mf
mp
mf
169
mp
171
mf
20"


18
173
mf
175
177
179
mf
f
20"
19
181
f
183
185
187
f
3
3
ff
20"


20
189
ff
191
193
195
20"
21
197
ff
mp
199
201
203
20"



(Archanes/Buffalo)