Voyager

By

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Submitted to the graduate degree program in Music and the
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of the requirements for the degree of Doctor of Musical Arts.

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The dissertation committee for Ben Justis certifies that
this is the approved version of the following dissertation:

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Abstract

NASA's Voyager mission is an inspiring story of both scientific discovery and humanitarianism. Launched in 1977, the twin spacecraft made observations which revolutionized our understanding of our cosmic neighborhood and simultaneously proclaimed our species' existence in an incomprehensibly vast universe. Onboard both vessels are copies of the Golden Record, a time capsule depicting Earth and humanity in the event that they are discovered by sapient beings in the future. Golden Record producer Timothy Ferris (via planetary scientist Carolyn Porco) has equated Voyager's incomprehensibly long journey ahead to "knocking on eternity's door".[1] That so much *music* from many different cultures was included on the record is a testament to the esteemed place of art in our society. The Voyager program also serves as an awe-inspiring reminder of the ability nations have to use their power for exploratory endeavors that benefit all.

The musical composition *Voyager* for percussion octet consists of 11 parts: a prelude with greetings in 55 languages from the Golden Record, five main movements (called Encounters), and five spatial interludes (called Approaches) for a total production time of approximately one hour and 55 minutes (including a 30-minute pre-concert section). The work is designed to be presented in a large, multi-chambered space such as a museum in order to realize the spatial aspects of the composition and allow for the audience to interact with the piece free from the constraints of a typical concert setting.

[1] Porco, Carolyn. "Science Friday: The Spaceships at the End of the Solar System Turn 40." Transcript.

Acknowledgements

The composer wishes to express heartfelt gratitude to all of his outstanding instructors over the years. Without their expert guidance, this project would not be possible. Special thanks go to Forrest Pierce, Ingrid Stölzel, and Kip Haaheim, professors of composition at the University of Kansas. They are equally wonderful human beings as they are artists, and it has been an honor to study under them.

Voyager is dedicated to my parents, Peggy and Glen, for their boundless love and support. Because words cannot convey the depth of my gratitude, I hope this music can.

The art for the title page of the score was created by my brother. Thank you, Will.

Table of Contents

* For the purposes of this document, the score has been rotated from its original landscape orientation and reduced to 85% size to accommodate the page numbering margins and layout required by The University of Kansas dissertation formatting regulations.

For my parents

Voyager

For Percussion Octet

Ben Justis

(2018 – 2019 C.E.)

Total production time ≈ 1:55:00

Instrumentation

Eight players total. A slideshow assistant controls the procession of images as indicated in the score. As marked in some of the Approach movements, vibraphone 1, vibraphone 2, and percussion 1 must play parts 1 – 3 (respectively) to keep specific equipment with those players. Other than these requirements, assign players as desired to the parts of the Approach movements.

Vibraphone 1 (3-octave, with motor, needs bow) Vibraphone 2 (3-octave, with motor, needs bow)	Marimba 1 (4.3-octave) Marimba 2 (5-octave, 2 players)	Synthesizer and Voice (1 player) (61 or 88-key synth. or midi controller with mod wheel and velocity sensitivity recommended. Also needs sustain pedal, computer, microphone, audio interface, the program MainStage, and a monitor. A volume pedal is helpful but not required.)	Percussion 1 and 2 (2 players) (Crotales [high octave, needs bow], concert bass drum, suspended cymbal, djembe [mounted], tam-tam, ocean drum, brake drum, pair of large caxixi)

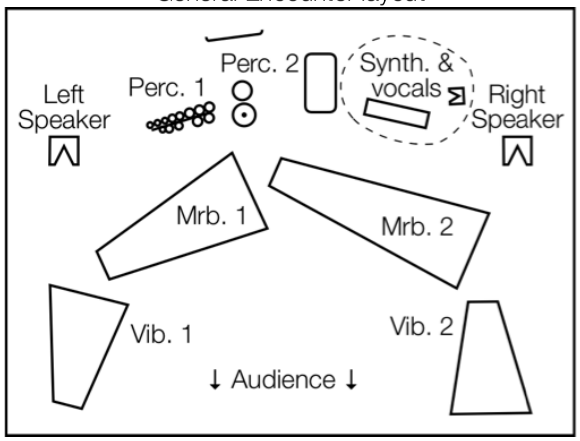
Approach instruments include:

- Two standard sets of four timpani (eight drums total)
- Eight suspended cymbals
- Two octaves of crotales
- An octave of almglocken (C4 – B4)
- Six pairs of knitting needles. I recommend the Boye aluminum 14-inch long size 10 (6mm) model. Product code: BOY3216328010M.
- Two sets of concert chimes
- Eight triangles
- Eight snare drums
- 16 small single Old Fashioned glasses (see performance notes for Approach V)
- Two good speakers, cables, and a small mixer are also need for the fixed media and monitor for the synth. player.

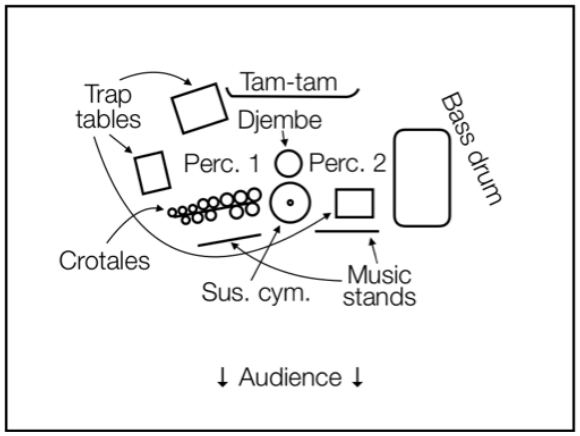
Encounter Layout

Adherence to the Encounter layout below is essential to ensure the spatialization effects built into the music are properly realized.

General Encounter layout

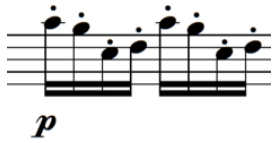


Percussion 1 and 2 detail

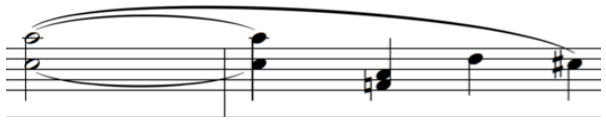


Vibraphone Articulations

- Staccato = totally dry, no pedal

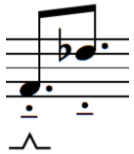


- Slurred = let all slurred notes ring together using the pedal

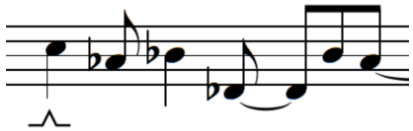


- No marking = length at the performer's discretion (generally full-value but with clarity)

- Tenuto-staccato = very clear mallet-dampening



- Sometimes a pedal-lift caret is used for quick breaks in resonance.



Movements

The page numbers below refer to the entire production, listed in the bottom-right corner of the pages. Intra-movement page numbers are found at the bottom-center. There are performance and program notes specific to each movement at the beginning of each.

For a composer biography, to browse other works, or to inquire about commissions and projects, visit benjustis.com.

General Performance Notes

- Performance and program notes specific to every movement can be found before the first page of each.
- The score is transposing.
- Accidentals carry through the bar.
- Any dynamics not accompanied by *crescendi* or *diminuendi* should be played *subito*.
- A half slurs is used to show when a note or chord should be allowed to vibrate (*l.v.*).
- A down-bow symbol (⊓) indicates that a note is to be bowed.
- A forward arrow (→) next to a technique (such as *8va*, or *ped.*), indicates that the technique is to be active until cancelled or changed by another instruction.
- A dampen symbol (⊕) indicates a sudden, precise silencing of a note. These are often found above rests.
- Whenever a hardness of mallet is specified (medium mallets, for example), the choice of yarn versus cord and mallet weight is at the discretion of the players.
- When a portion of music is enclosed by bracketed arrows (↦ ↤) and followed by a repeat symbol (𝄇) with a thick line, this instructs the performer to repeat that content, sometimes with variations. The global time continues to move ahead, though, so do not return to the beginning of excerpt. For instance, in Encounter I, measure 10, marimba 2 (high) is provided a one-measure pattern (enclosed in bracketed arrows) followed by a line. They should play measure 10 as written, then go immediately on to measure 11 while improvising a similar running 16th-note pattern on the same pitches for the duration of the line.
- All improvisations should be similar to, but noticeably different from, any provided example passages.
- Floating noteheads with brackets (o⎯⌝) show how long to extend an aleatoric passage within a bar. For example, see Encounter I, measure 13. Marimba 2 (high) should continue their improvisation for four quarter-notes in measure 13 before stopping on beats five and six.
- Except for the end of Encounter II when all players sing, the synth./vocals performer should always sing into the microphone to activate the various vocoders set up in MainStage. Numbers in hexagons correspond to the patch procession.
- The synth. player should pre-set appropriate volume levels for all playback tracks within MainStage so they don't need to make adjustments while the audio is playing.
- A conductor may be employed, if desired.
- Ideally, all movements will be performed in order without pause. Encounters and/or Approach movements may be excerpted for production in a conventional concert environment, but this is not preferable.
- Performers should move expeditiously and gracefully between their Encounter and Approach setups. The motion itself is not intended to draw any attention.
- Due to the spatialization aspect of this production, *Voyager* should be performed in a large, multi-chambered, indoor space such as an art gallery or museum. For more information about staging ideas including the layout for the premiere, see the Production Guide document.
- The overall volume level should never get so loud as to make venue-goers (or venue administrators) uncomfortable. Staying beneath a 90-decibel ceiling is advisable.
- In-depth information such as mallet suggestions, electronics concerns, venue mapping, and build instructions can be found in the Production Guide.
- I anticipate the score will be continually refined, especially after the premiere (slated for November, 2019). Contact the composer through benjustis.com for the most up-to-date version, errata, and Production Guide which will be made available after the first performance.
- If questions arise or you find an error, please reach out using the contact page at benjustis.com.

It's like knocking on eternity's door.

(Golden Record producer Timothy Ferris via
mission planetary scientist Carolyn Porco)

NASA's Voyager mission is an inspiring story of both scientific discovery and humanitarianism. Launched in 1977, the ensuing observations made by the twin spacecraft revolutionized our understanding of our cosmic neighborhood and proclaims our species' existence to an incomprehensibly vast universe. This emblem of humanity is currently over 17 billion miles away (traveling at 11 miles per second). It took over 11,000 work-years to build and cost billions of dollars. Its next encounter will be with the "nearby" Gliese star system in about 40,000 years. Onboard both spacecraft are copies of the Golden Record, a time capsule depicting Earth and humanity in the event that the Voyagers are discovered by sapient beings in the future. That the scientists involved thought it wise to include recordings of so much *music* on such an important mission is a testament to the esteemed place of art in our society. The Voyager program also serves as an awe-inspiring reminder of the ability nations have to use their power for exploratory endeavors that benefit of all.

The musical composition *Voyager* (for percussion octet) consists of 11 parts: a prelude with greetings in 55 languages from the Golden Record, five main movements (called "Encounters"), and five spatial interludes (called "Approaches") for a total production time of approximately one hour and 55 minutes (including a 30-minute pre-concert section). The work is designed to be presented in a large, multi-chambered space such as a museum in order to realize the spatial aspects of the composition and allow for the audience to interact with the piece free from the constraints of a typical concert setting.

Voyager is dedicated to my parents Peggy and Glen.

✧ Prelude: Greetings

Performance Notes

- Movement duration ≈ 30:30
- The synth. player should launch the greeting audio playback track within the first patch of MainStage exactly 30 minutes prior to the advertised performance start time. As audience members enter the venue, they will hear greetings in 55 languages as they were recorded on the Golden Record. If *Voyager* is being presented in a concert hall, the house lights should be left up during the greeting audio.
- Performers should not be at their Encounter I positions during the bulk of the greeting audio. They should wait to move in during the final minute or two.

Program Notes

The music you hear consists of greetings in 55 languages featured on the Golden Record, as spoken by language professors at Cornell University prior to Voyager's launch. Charmingly, whale sounds were also included along with short speeches by members of the United Nations and can be prominently heard at several points during this piece. Though the grunts, clicks, and squeals of the creature's songs are delightful in their original state, they take on a rich, symphonic timbre when drastically stretched out using an algorithm. Other instances of sound stretching are employed many times throughout this piece to convey a sense of immense, astronomical expanses of distance and time. Swirling underneath is the text "Hello from the children of planet Earth" spoken by Nick Sagan (son of famous astronomer and science advocate Carl Sagan) but the words have been heavily manipulated through granular alterations. The text fades randomly in and out, backward and forward, as the audio moves in stereo unpredictably. We finally hear it unaltered at the very end, which brings us to the first Encounter, a portrait of our home, Earth.

⊕ Encounter I: Terra Firma

Performance Notes

- Movement duration ≈ 7:45
- If *Voyager* is being presented in a concert hall, house lights should fade down at the beginning of this movement.
- At the beginning, marimba 1 will start their pattern while Nick Sagan's spoken "Earth" from "Hello from the children of planet Earth" echoes at the end of the Golden Record greetings. Entrances are staggered according to the instructions listed in each part. Players all have independent tempi and should not strive to synchronize.
- At letter E, the repeated rhythm changes but players should still not synchronize.
- At letter F, someone should give a big cue. The mallets play the ascending 32nd-note patterns as fast as possible without synchronizing, meaning that players will arrive at the *mp* roll at slightly different times. The vibes should cue each other at the start their 32nd-note pattern after their quarter note which lasts for one second. Very similar gestures occur at letter I and L.
- Players should be synchronized at letter H and K. Crescendo and release together.
- Letter M onward should be in time and synchronized.
- See General Performance Notes (on page five) for an in-depth explanation of bracketed arrows followed by lines.
- At measure 39, the vibraphonists should experiment with playing closer to the nodes with their pitch-bending mallet to achieve a tone that is bright and delicate without being harsh.
- The synth. player will launch the Approach I audio playback track as the final note dies. Players will then move to their Approach I positions and begin.

Program Notes

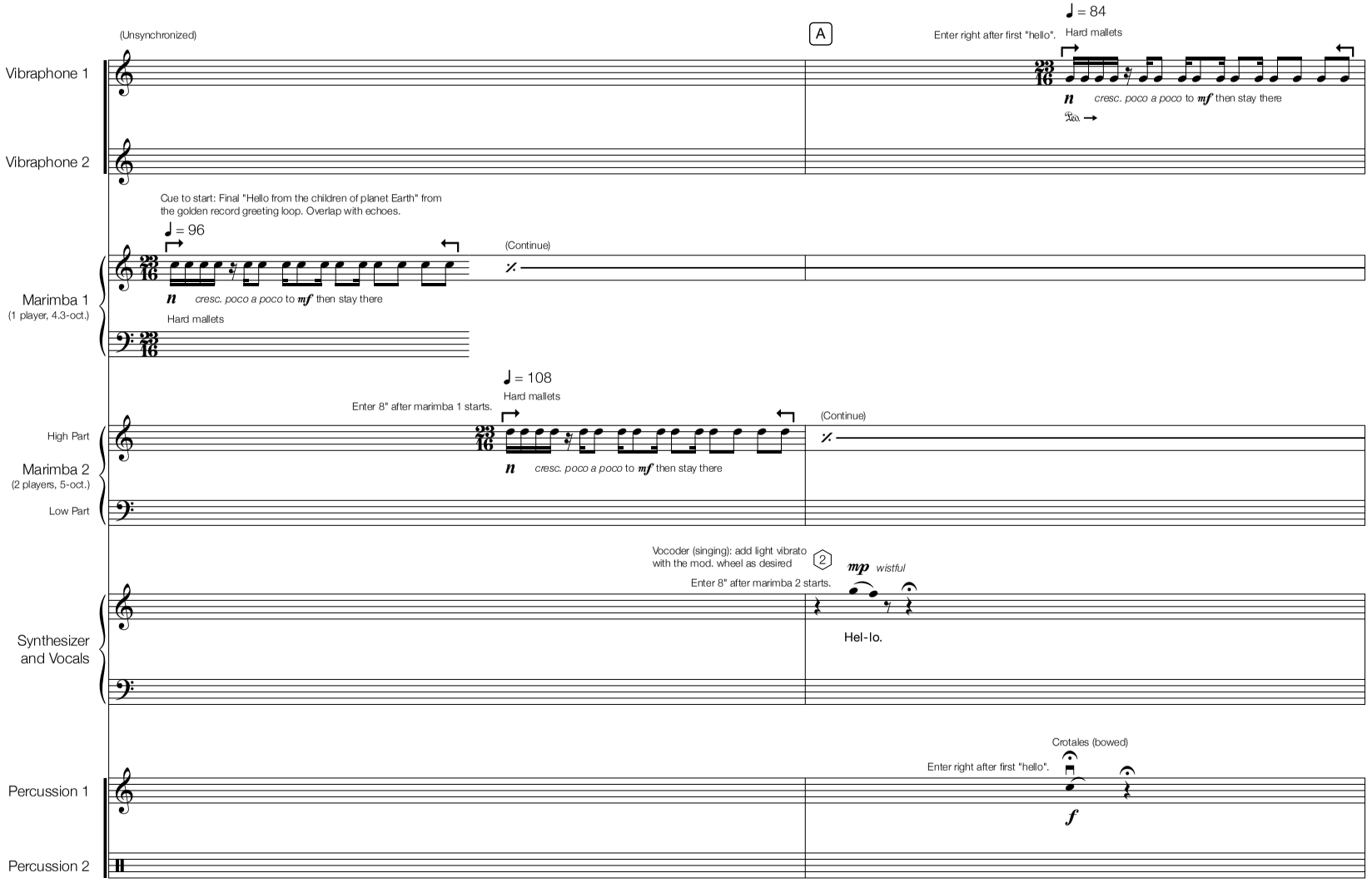
Inclusion of Voyager's origin point as the first Encounter is important, as the mission's cultural and humanistic side is every bit as important as the knowledge it unlocked. The mallet players start in independent tempi playing the morse code for "hello" as they overlap with the echoes of Nick Sagan's words from the Golden Record greetings. Later the vocalist (who is also the synthesizer player) enters over a murmur of keyboard rolls by singing into a vocoder, a virtual instrument which takes the enunciation and volume of speech and runs it through a synthesizer patch. This unification of the human and the technological is fitting given the duality of Voyager's intention. More and more of Sagan's text is heard over a lullaby-like melody that grows in energy and complexity. After the climax of the movement, the texture winnows down and a new idea is heard which foreshadows our next destination. It's a series of strong, parallel-voiced chords referred to as the "Jupiter progression" that will occur several more times during *Voyager*.

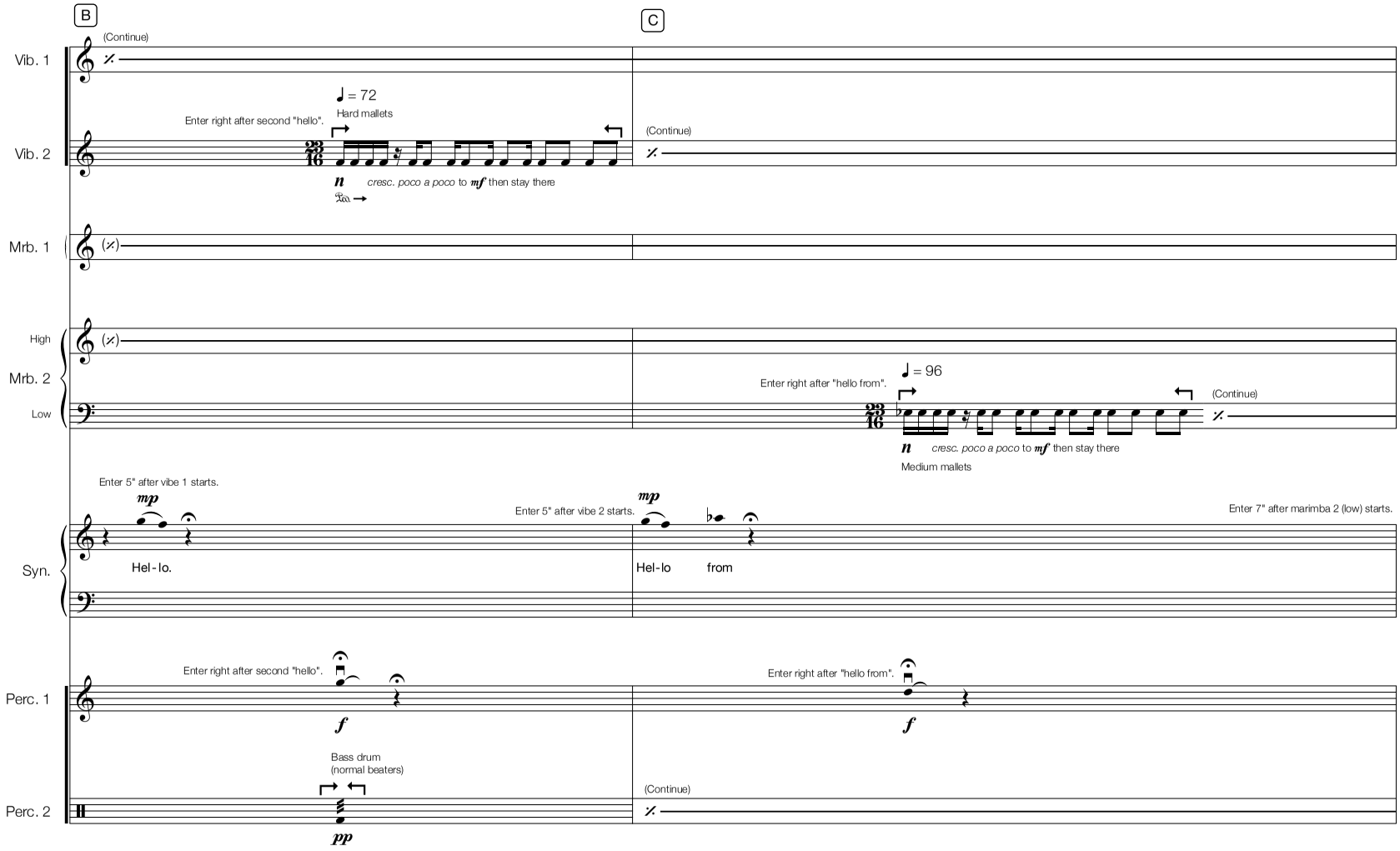
Score

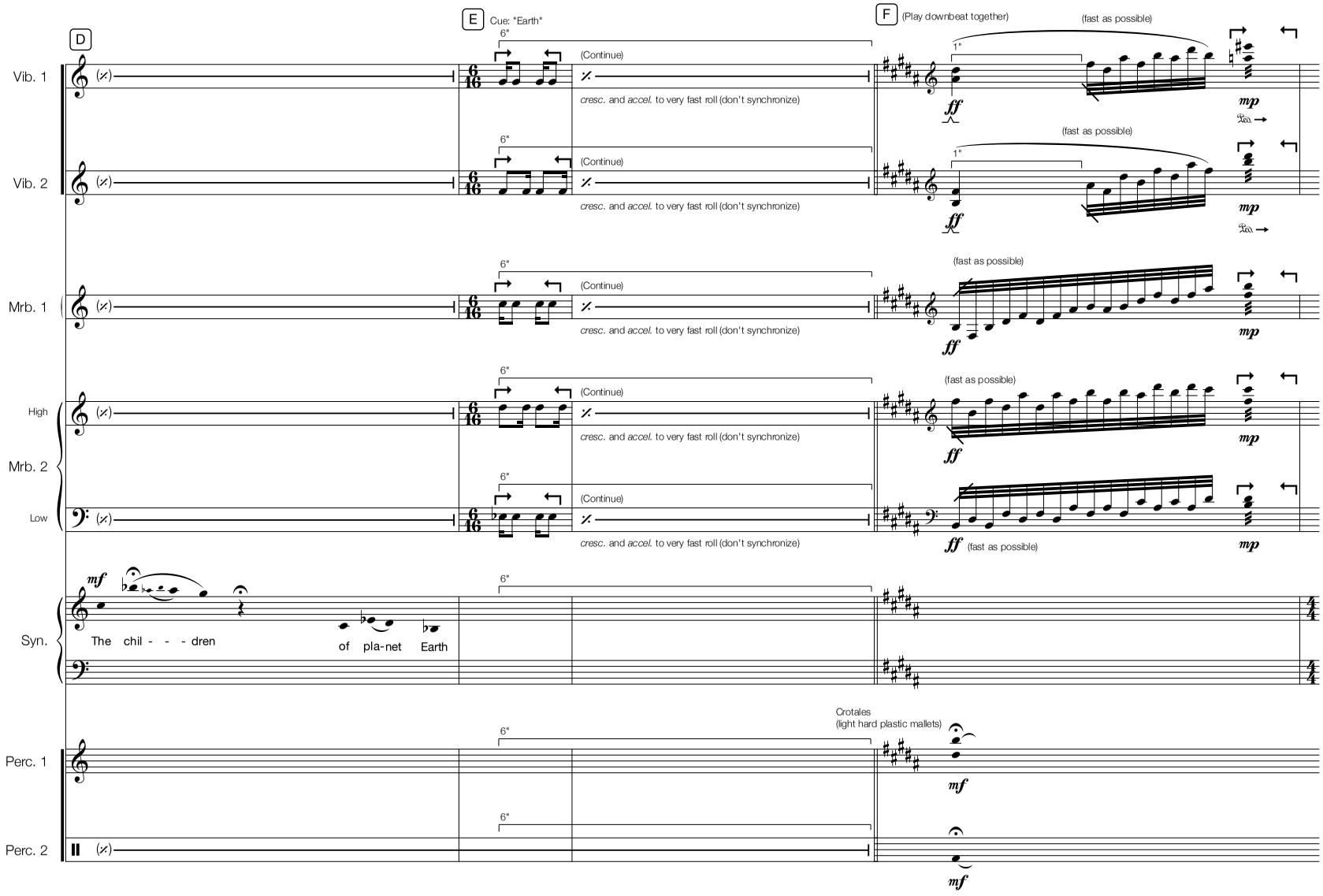
Encounter I: Terra Firma

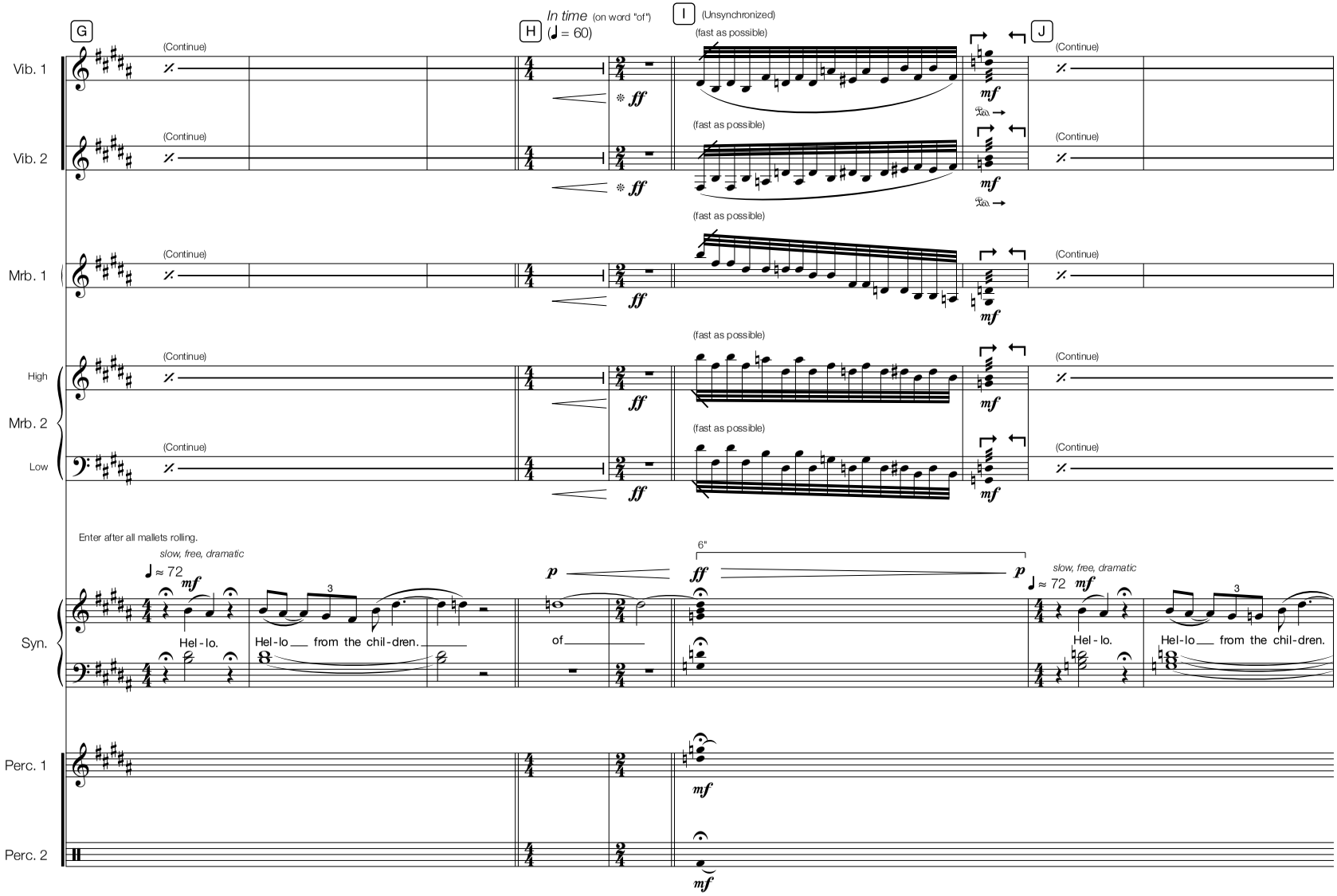
from Voyager

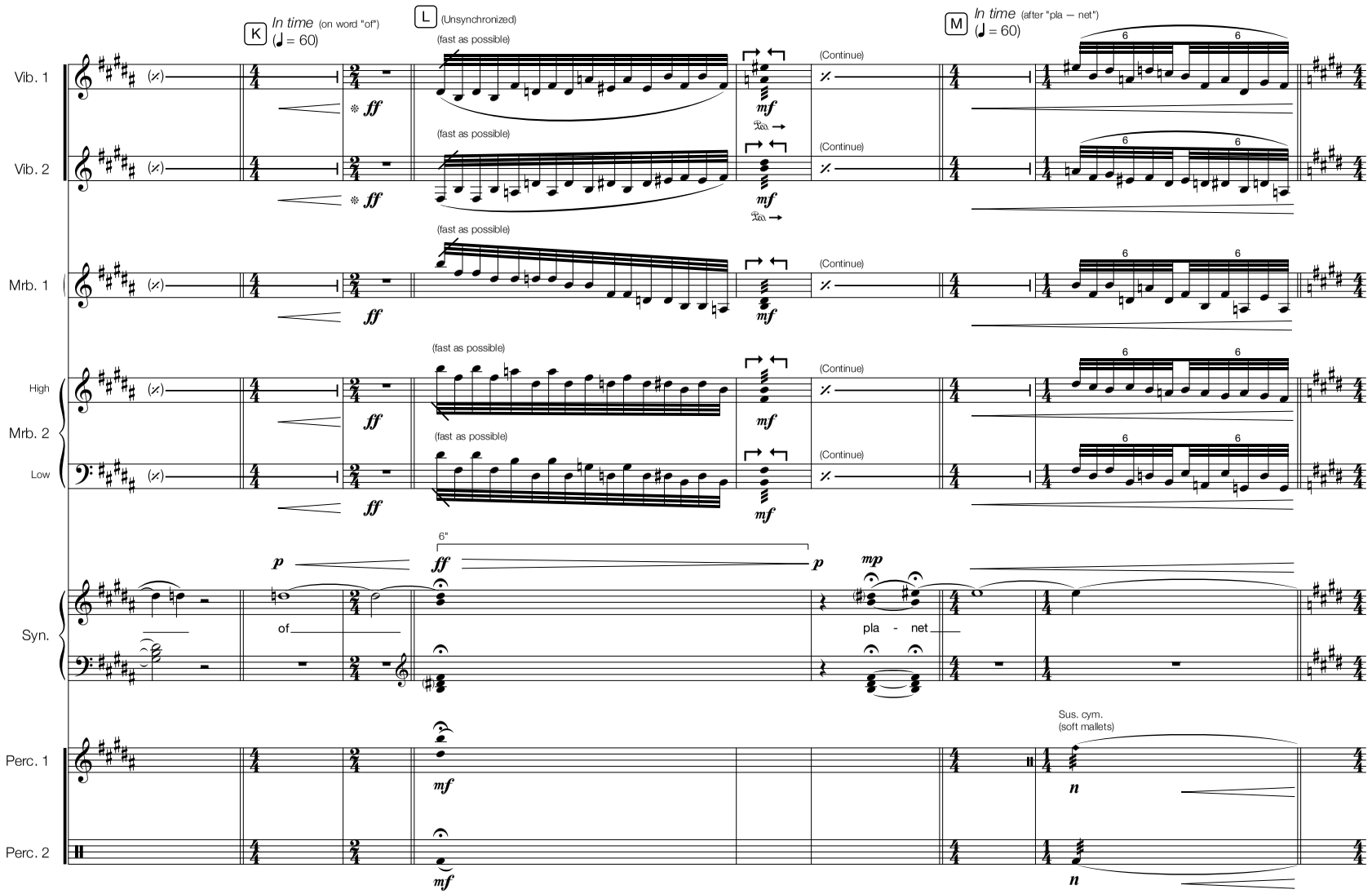
Ben Justis (2018)

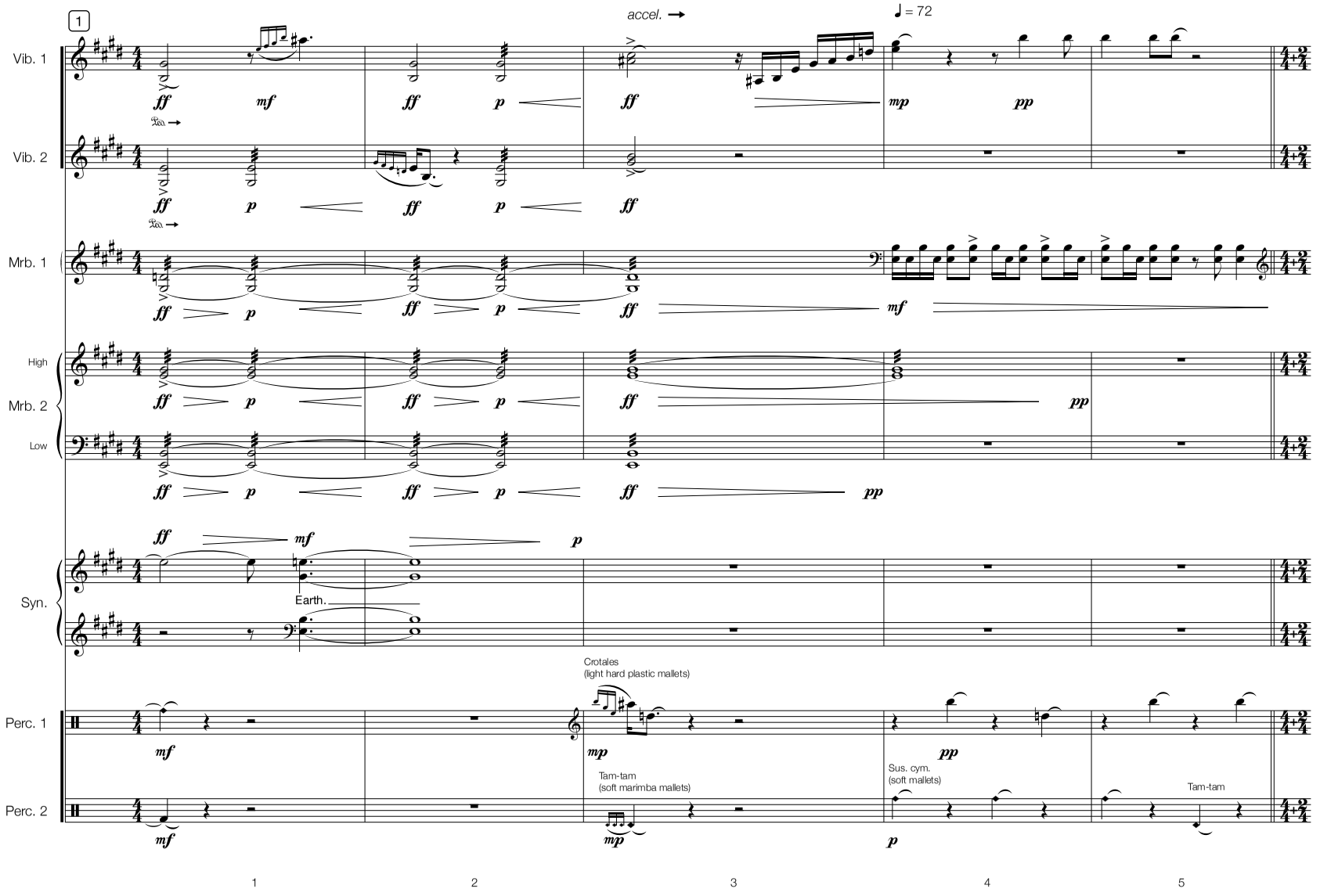


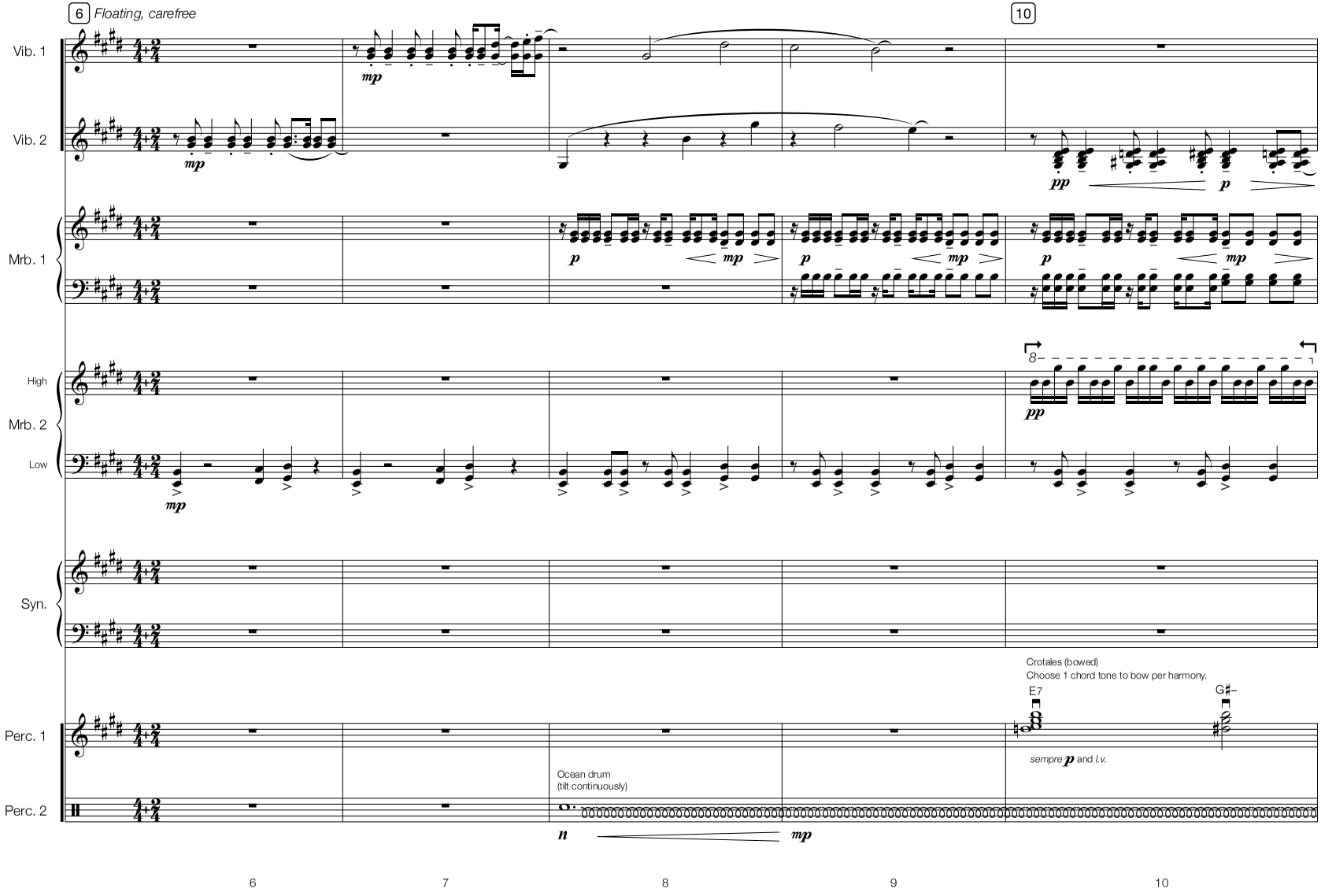

B
C
Vib. 1
(Continue)
Vib. 2
♩ = 72
Hard mallets
Enter right after second "hello".
cresc. poco a poco to mf then stay there
(Continue)
Mrb. 1
High
Mrb. 2
Low
♩ = 96
Enter right after "hello from".
(Continue)
cresc. poco a poco to mf then stay there
Medium mallets
Syn.
Enter 5" after vibe 1 starts.
mp
Hel-lo.
Enter 5" after vibe 2 starts.
mp
Hel-lo
from
Enter 7" after marimba 2 (low) starts.
Perc. 1
Enter right after second "hello".
f
Enter right after "hello from".
f
Perc. 2
Bass drum
(normal beaters)
pp
(Continue)


D
E
Cue: "Earth"
F
(Play downbeat together)
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
6"
1"
(Continue)
cresc. and accel. to very fast roll (don't synchronize)
(fast as possible)
ff
mp
mf
The chil - - - dren
of pla-net Earth
Crotales
(light hard plastic mallets)

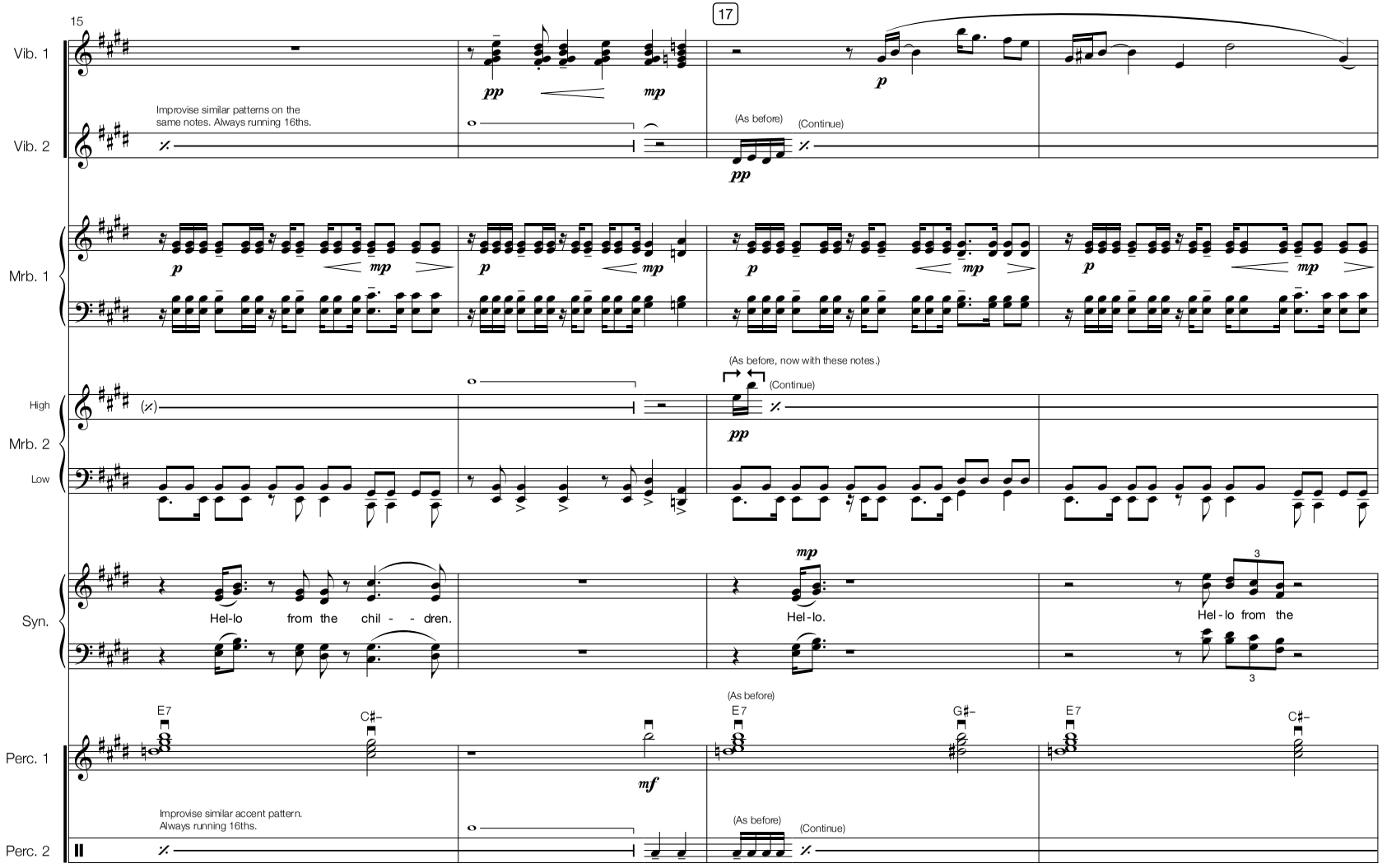

G
H
In time (on word "of")
♩ = 60)
I
(Unsynchronized)
J
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
(Continue)
(fast as possible)
ff
mf
p
Enter after all mallets rolling.
slow, free, dramatic
♩ ≈ 72
Hel - lo.
Hel - lo from the chil - dren.
of
6"
3

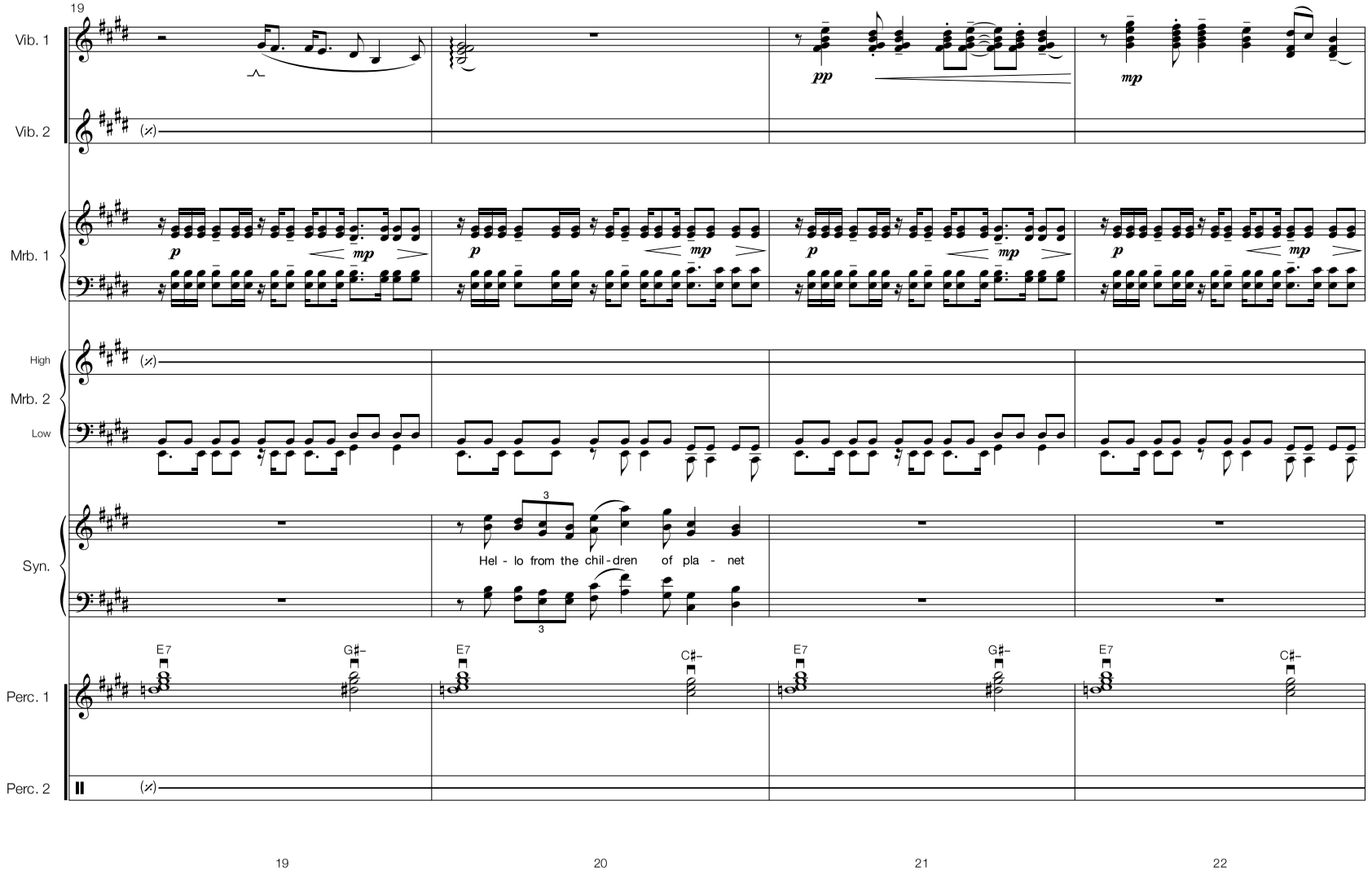

K
In time (on word "of")
♩ = 60)
L
(Unsynchronized)
M
In time (after "pla — net")
♩ = 60)
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
(fast as possible)
(Continue)
6"
of
pla - net
Sus. cym.
(soft mallets)

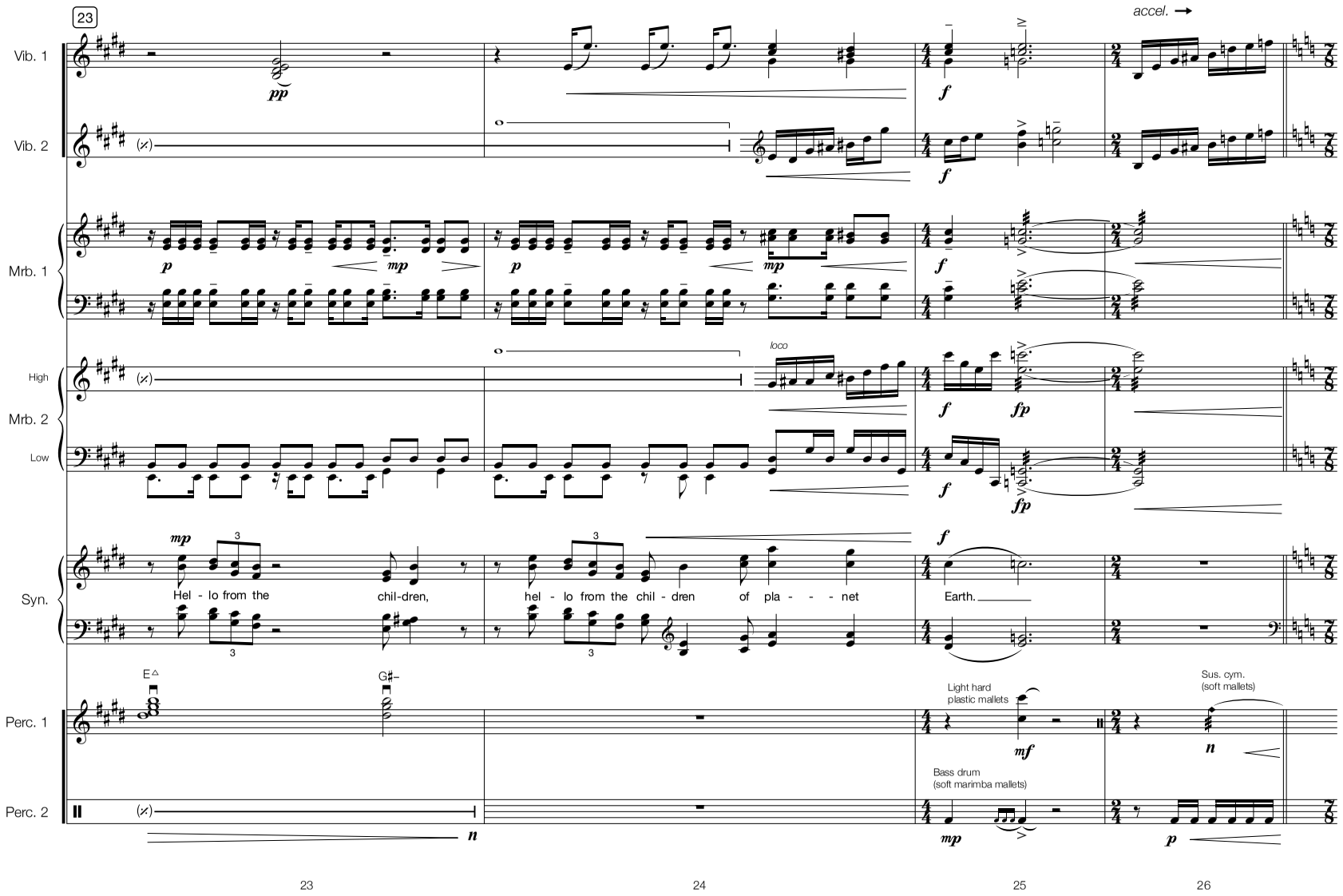

1
accel.
♩ = 72
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Earth.
Perc. 1
Crotales
(light hard plastic mallets)
Perc. 2
Tam-tam
(soft marimba mallets)
Sus. cym.
(soft mallets)
Tam-tam
1
2
3
4
5

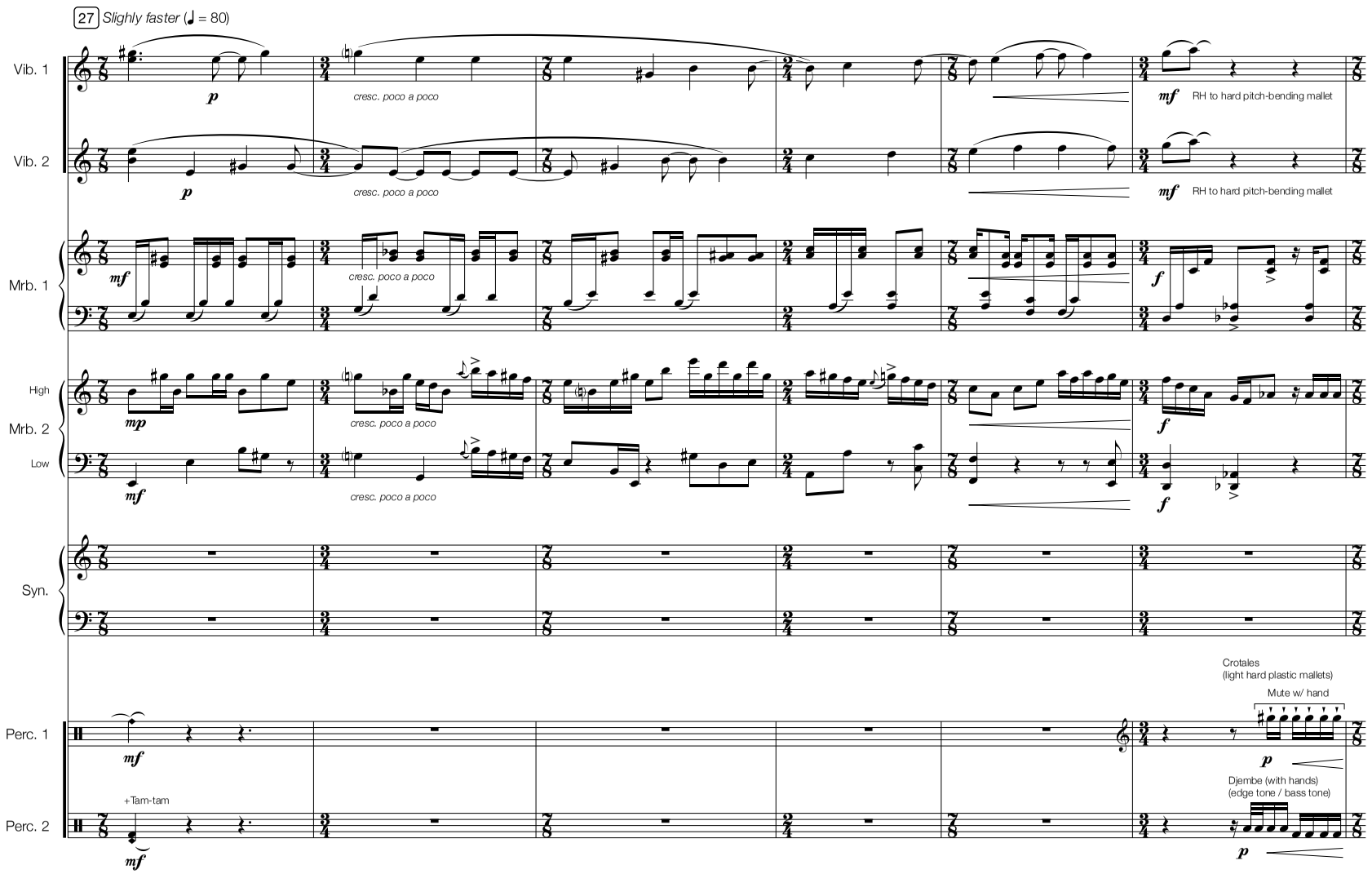

6
Floating, carefree
10
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Crotales (bowed)
Choose 1 chord tone to bow per harmony.
E7
G♯–
sempre p and l.v.
Ocean drum
(tilt continuously)
6
7
8
9
10

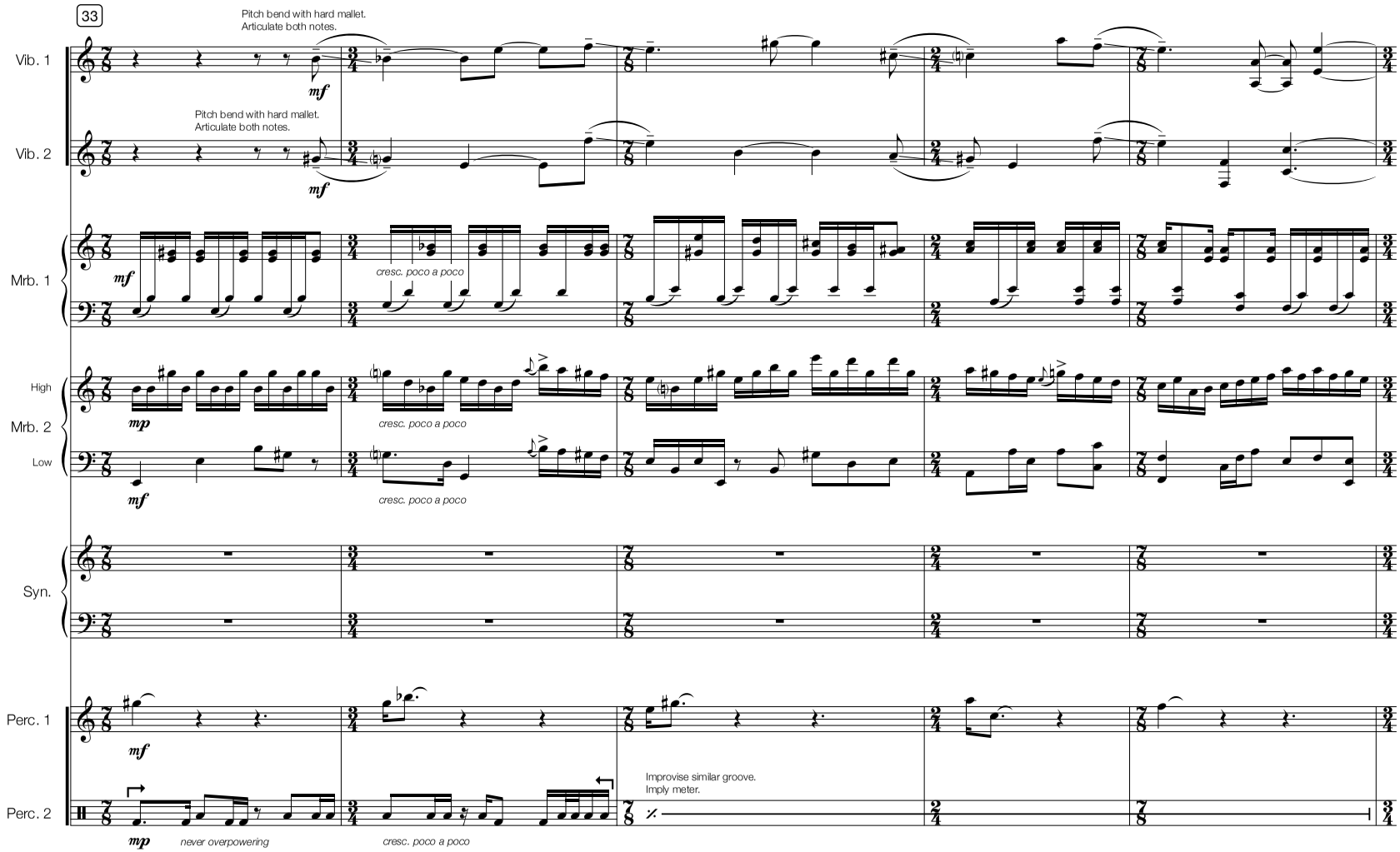

11
14
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
pp
p
mp
mf
sempre pp
Improvise similar patterns on the same notes. Always running 16ths.
(As before)
(Continue)
Hel-lo.
E7
G♯–
Djembe
(rub with brush)
delicate
11
12
13
14

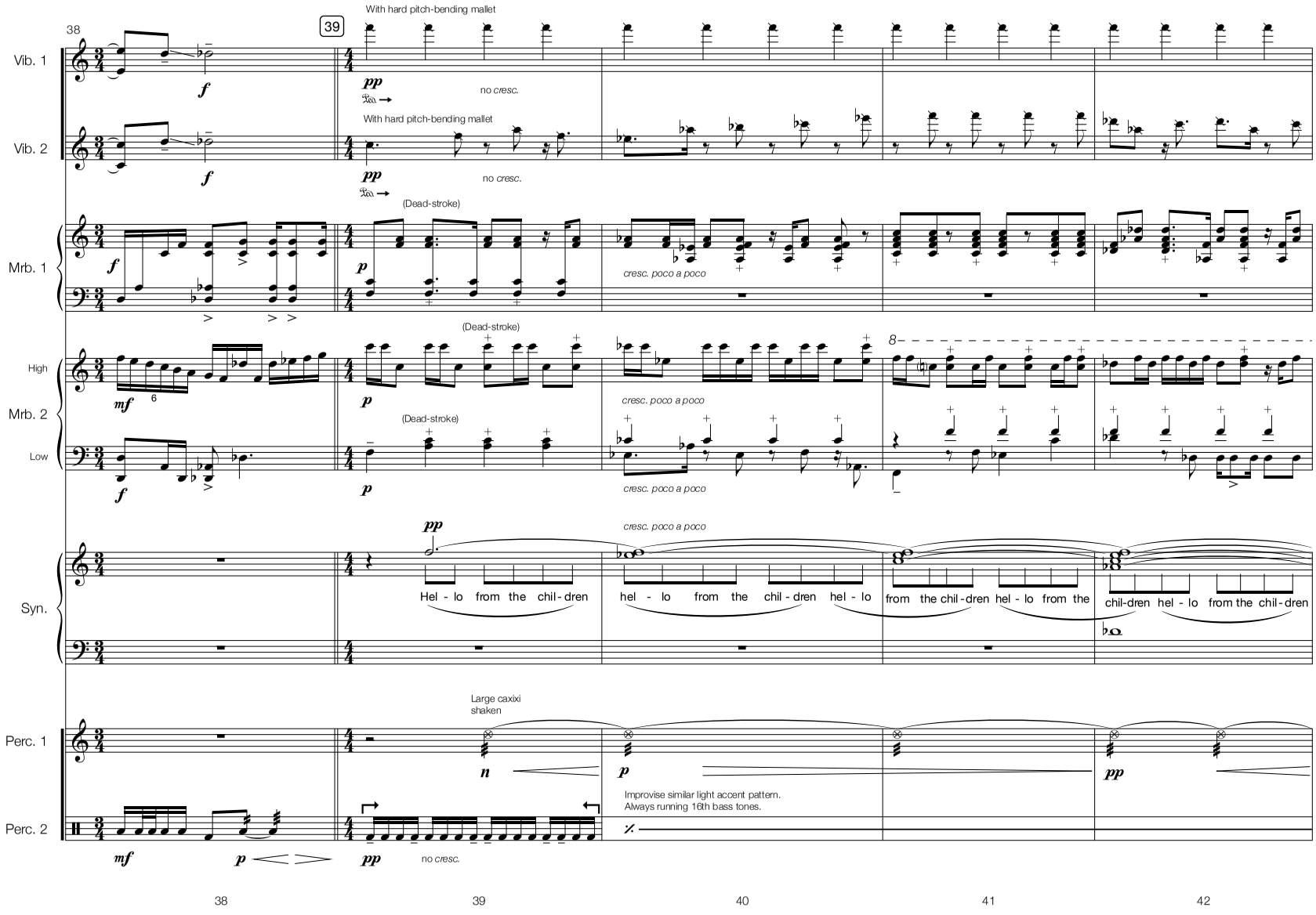

15
17
Vib. 1
Vib. 2
Improvise similar patterns on the same notes. Always running 16ths.
(As before)
(Continue)
Mrb. 1
(As before, now with these notes.)
High Mrb. 2
Low
Syn.
Hel-lo from the chil - - dren.
Hel-lo.
Hel-lo from the
E7
C♯–
G♯–
Perc. 1
Improvise similar accent pattern. Always running 16ths.
Perc. 2
15
16
17
18

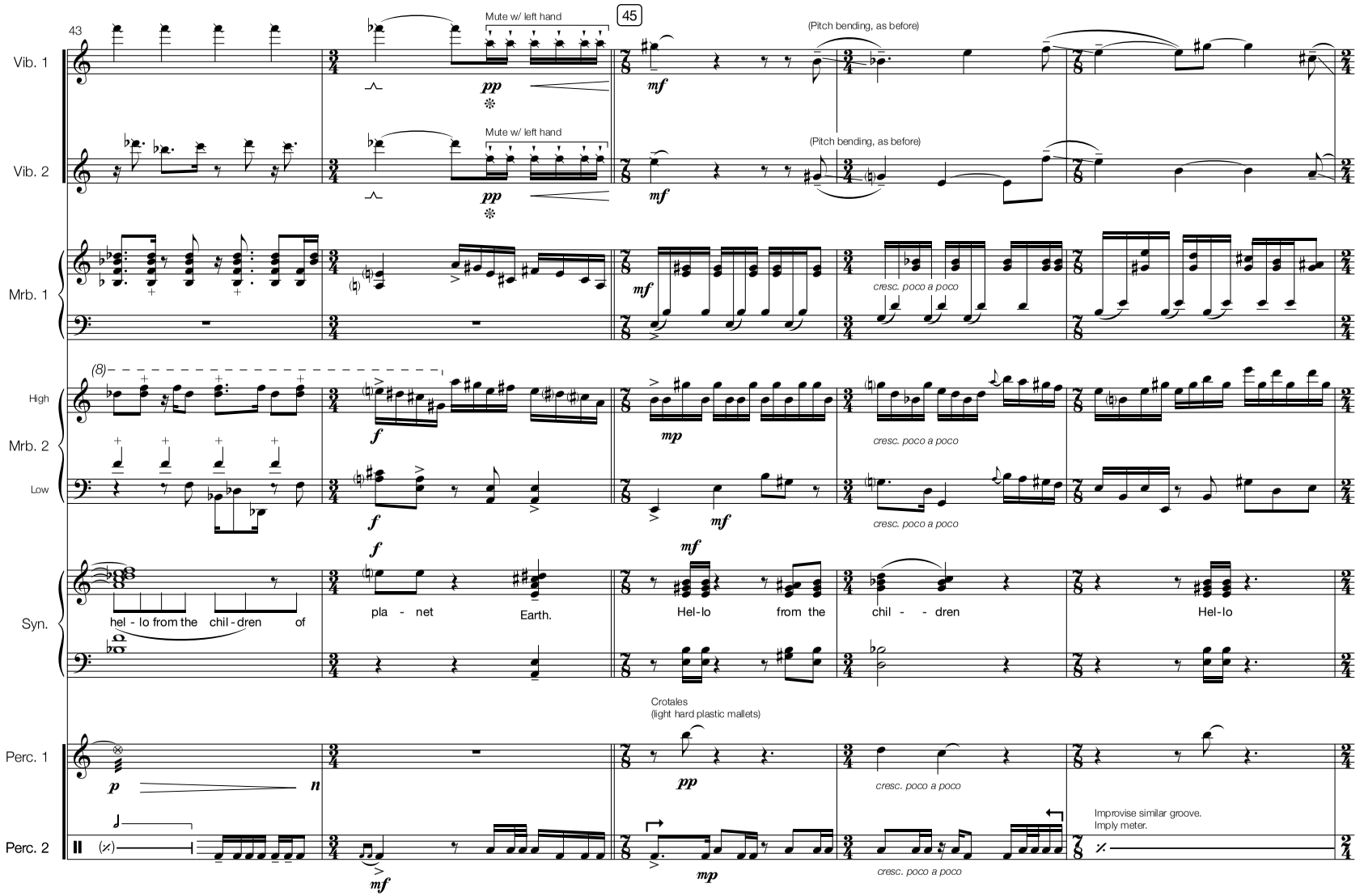

19
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
pp
mp
p
mp
Hel - lo from the chil - dren of pla - net
E7
G♯–
E7
C♯–
E7
G♯–
E7
C♯–
19
20
21
22

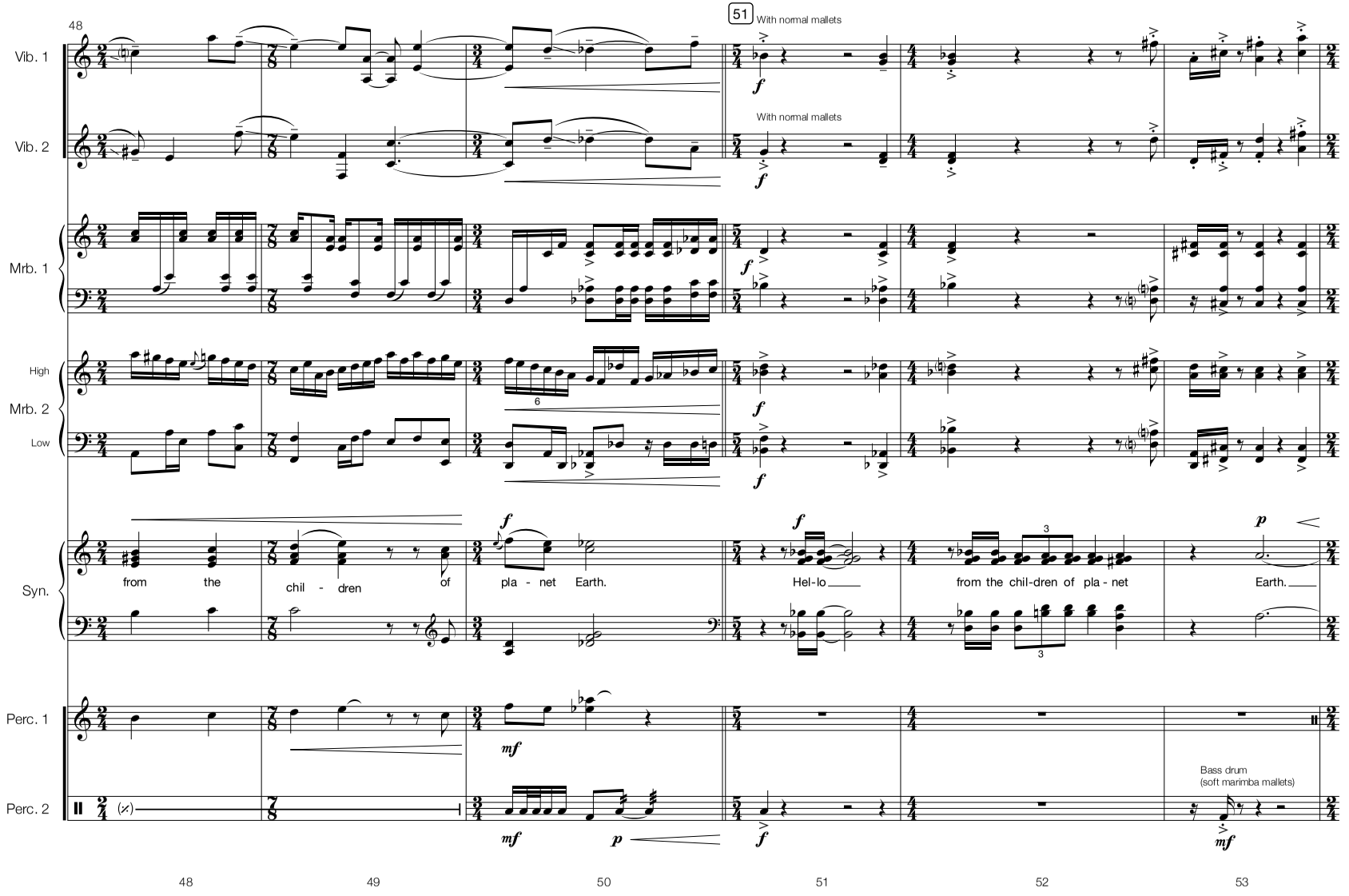

23
accel.
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
loco
Syn.
Hel - lo from the chil-dren,
hel - lo from the chil - dren of pla - - - net
Earth.
Perc. 1
Light hard plastic mallets
Sus. cym. (soft mallets)
Perc. 2
Bass drum (soft marimba mallets)
23
24
25
26

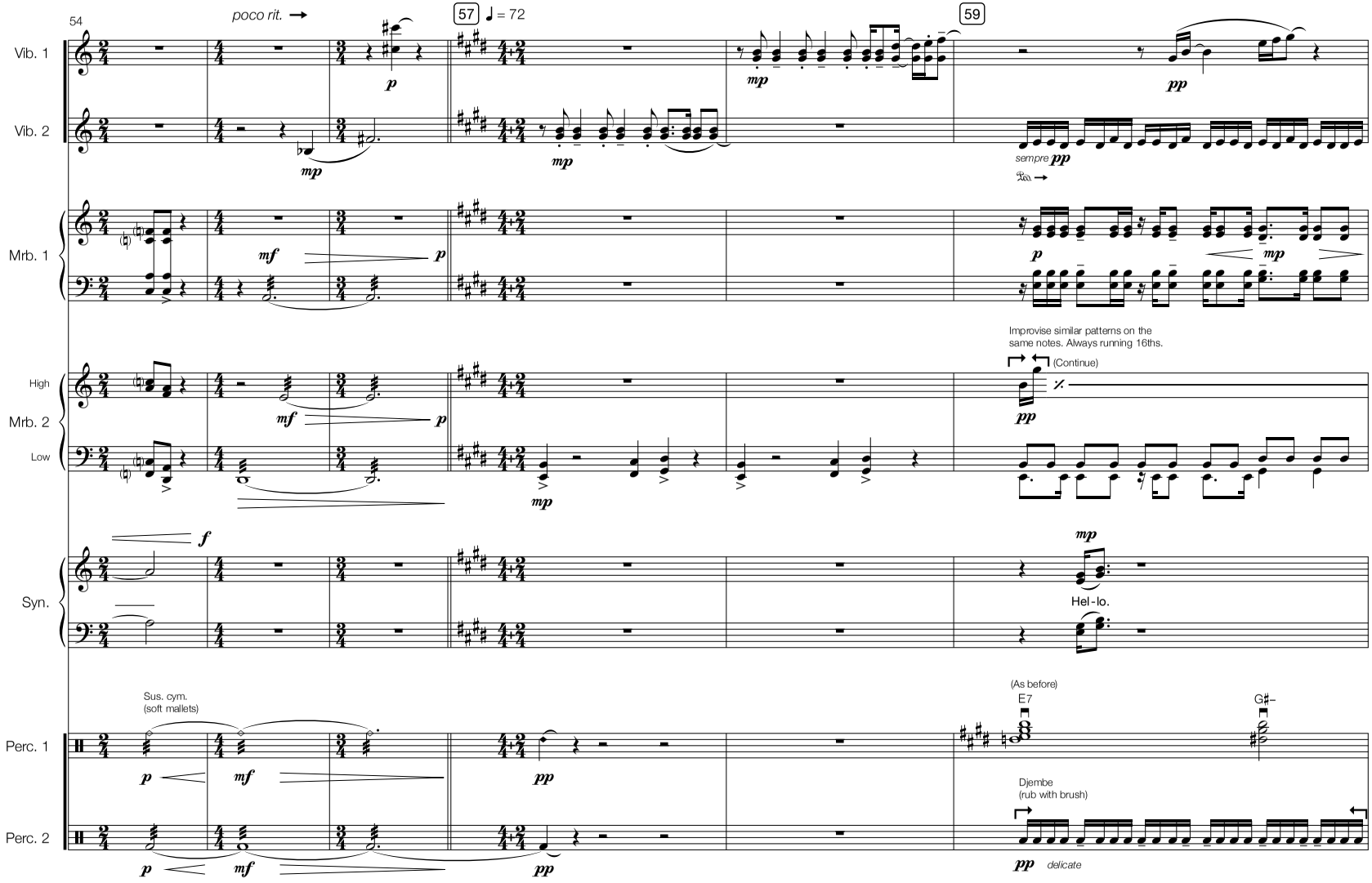

27 Slighly faster (♩ = 80)
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
p
mf
f
mp
cresc. poco a poco
RH to hard pitch-bending mallet
Crotales
(light hard plastic mallets)
Mute w/ hand
Djembe (with hands)
(edge tone / bass tone)
+Tam-tam
27
28
29
30
31
32

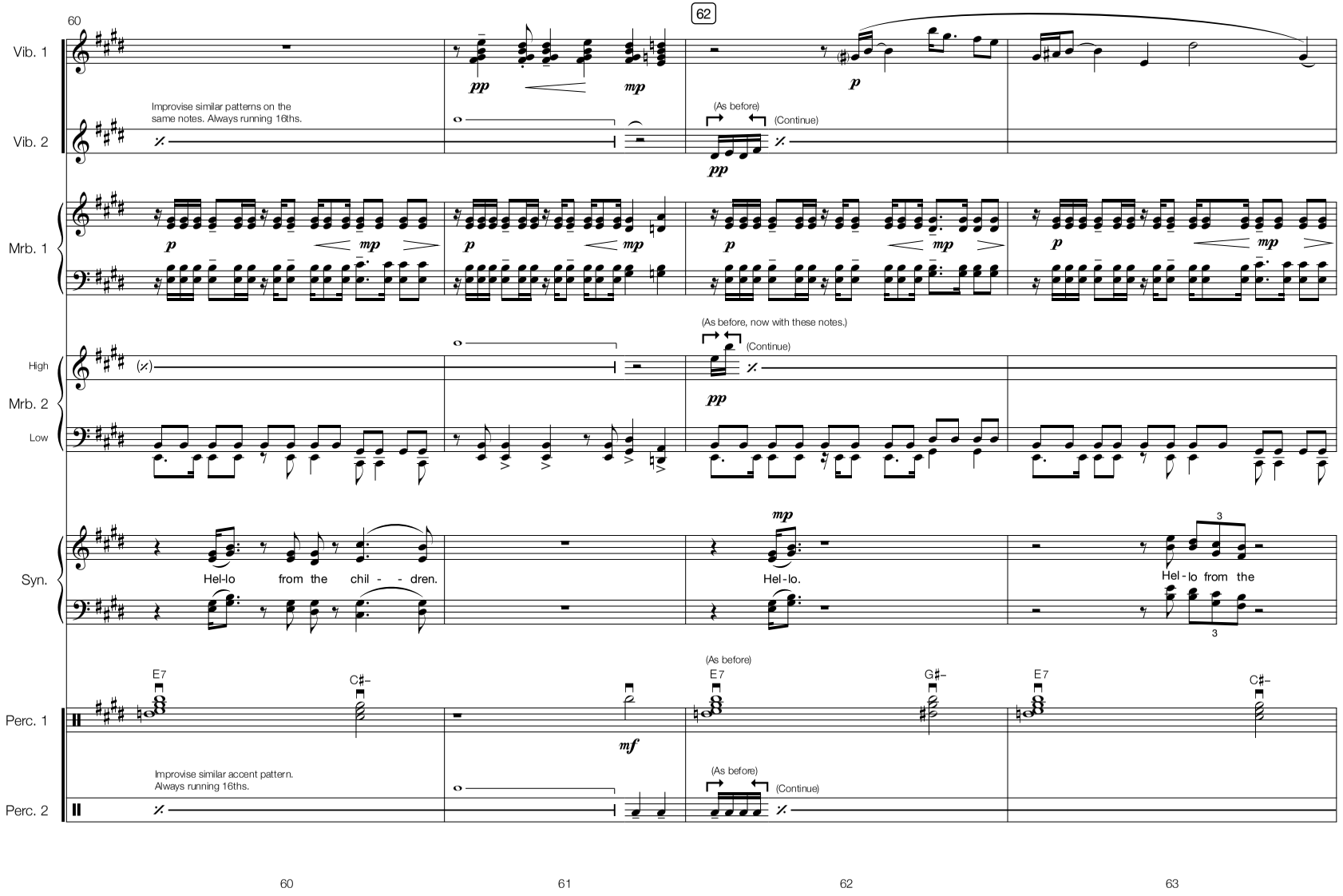

33
Pitch bend with hard mallet.
Articulate both notes.
Vib. 1
Pitch bend with hard mallet.
Articulate both notes.
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mf
mp
cresc. poco a poco
never overpowering
Improvise similar groove.
Imply meter.
33
34
35
36
37

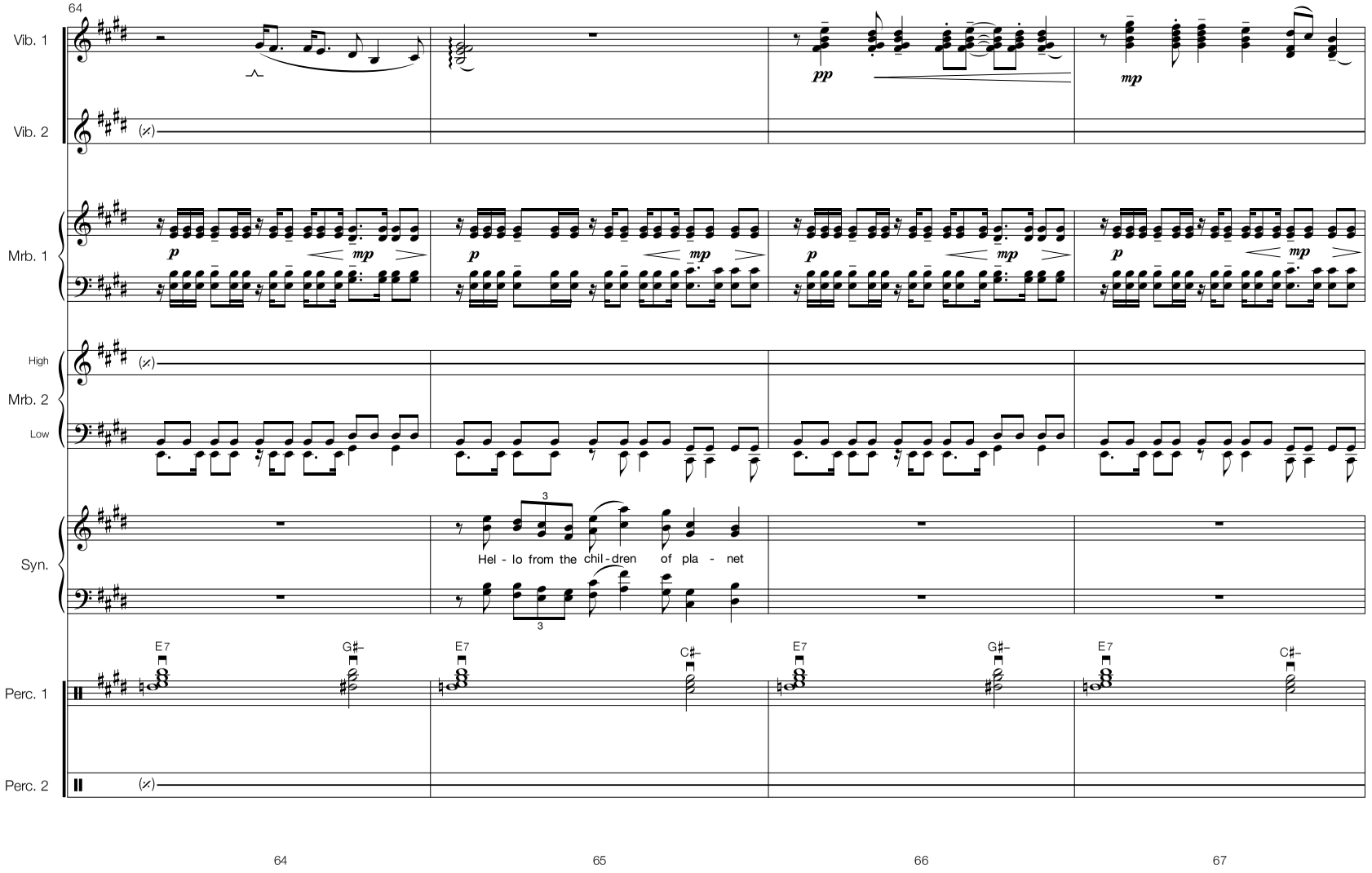

38
39
With hard pitch-bending mallet
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
no cresc.
(Dead-stroke)
cresc. poco a poco
Hel - lo from the chil - dren
hel - lo from the chil - dren hel - lo
from the chil - dren hel - lo from the
chil - dren hel - lo from the chil - dren
Large caxixi
shaken
Improvise similar light accent pattern.
Always running 16th bass tones.
38
39
40
41
42

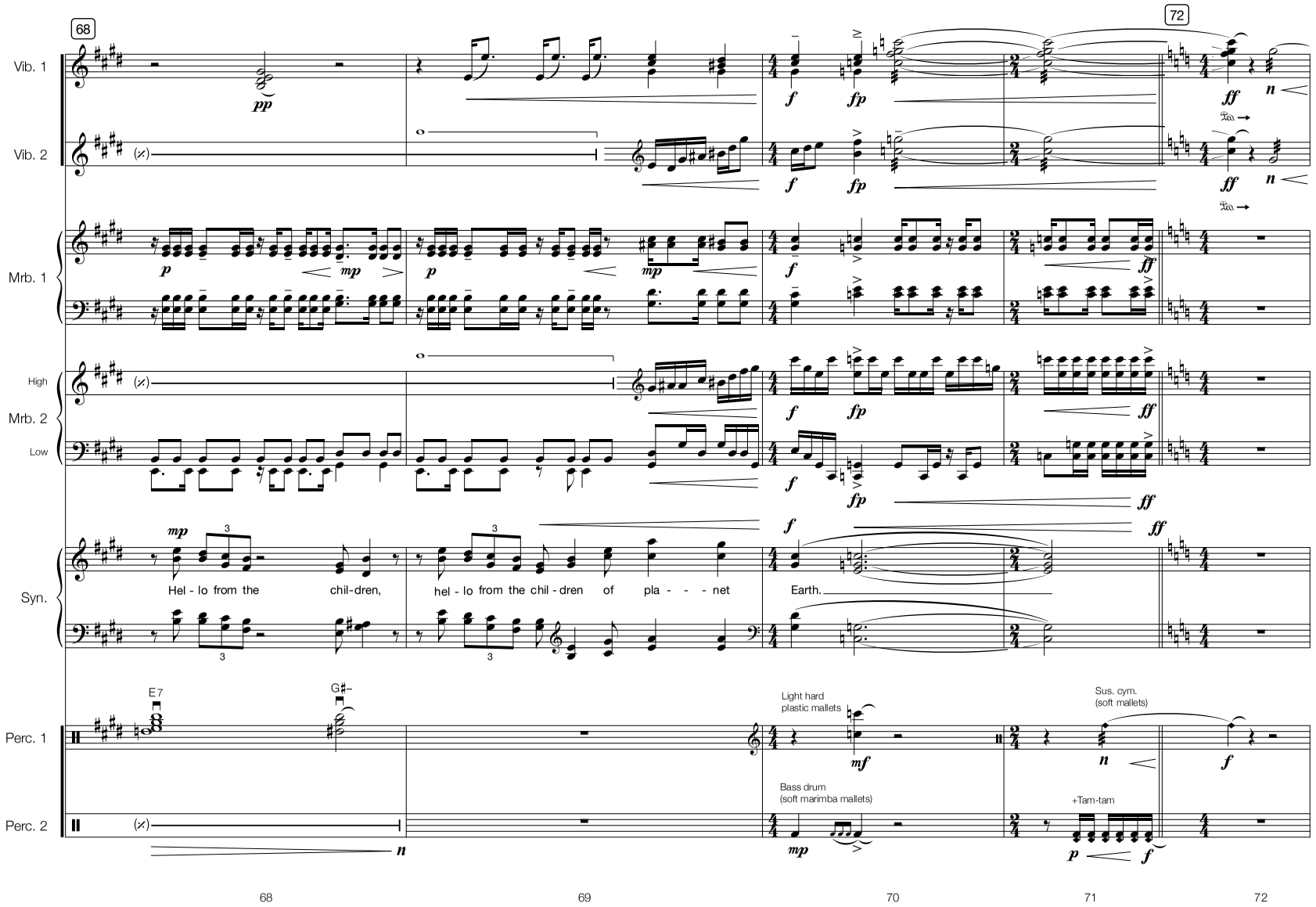

43
45
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Mute w/ left hand
Mute w/ left hand
(Pitch bending, as before)
(Pitch bending, as before)
pp
mf
cresc. poco a poco
(8)
f
mp
hel - lo from the chil - dren of
pla - net
Earth.
Hel-lo
from the
chil - - dren
Hel-lo
Crotales
(light hard plastic mallets)
p
n
Improvise similar groove.
Imply meter.
43
44
45
46
47

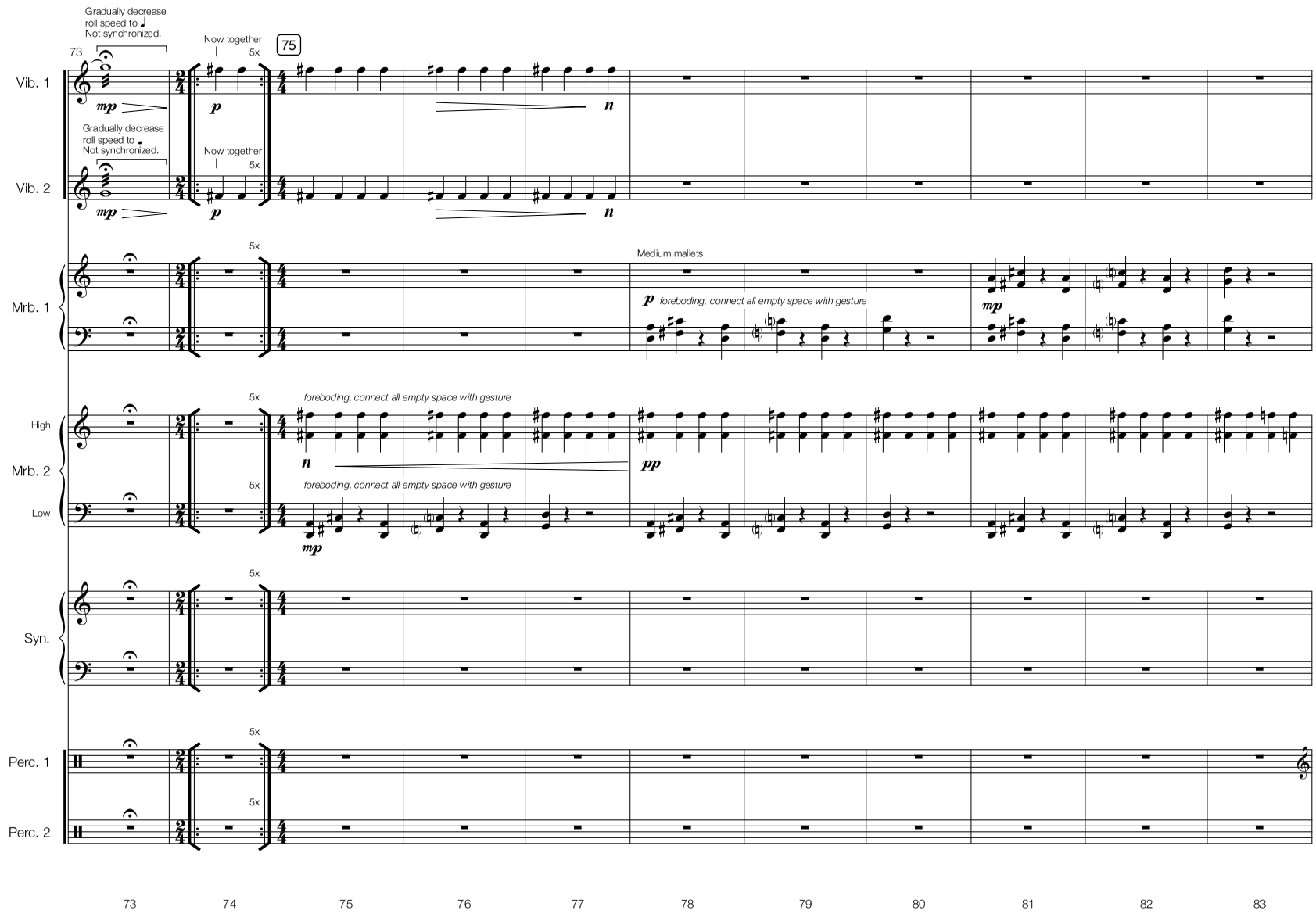

48
51
With normal mallets
Vib. 1
With normal mallets
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
from the chil - dren of pla - net Earth.
Hel-lo
from the chil-dren of pla - net
Earth.
Perc. 1
Bass drum
(soft marimba mallets)
Perc. 2
48
49
50
51
52
53

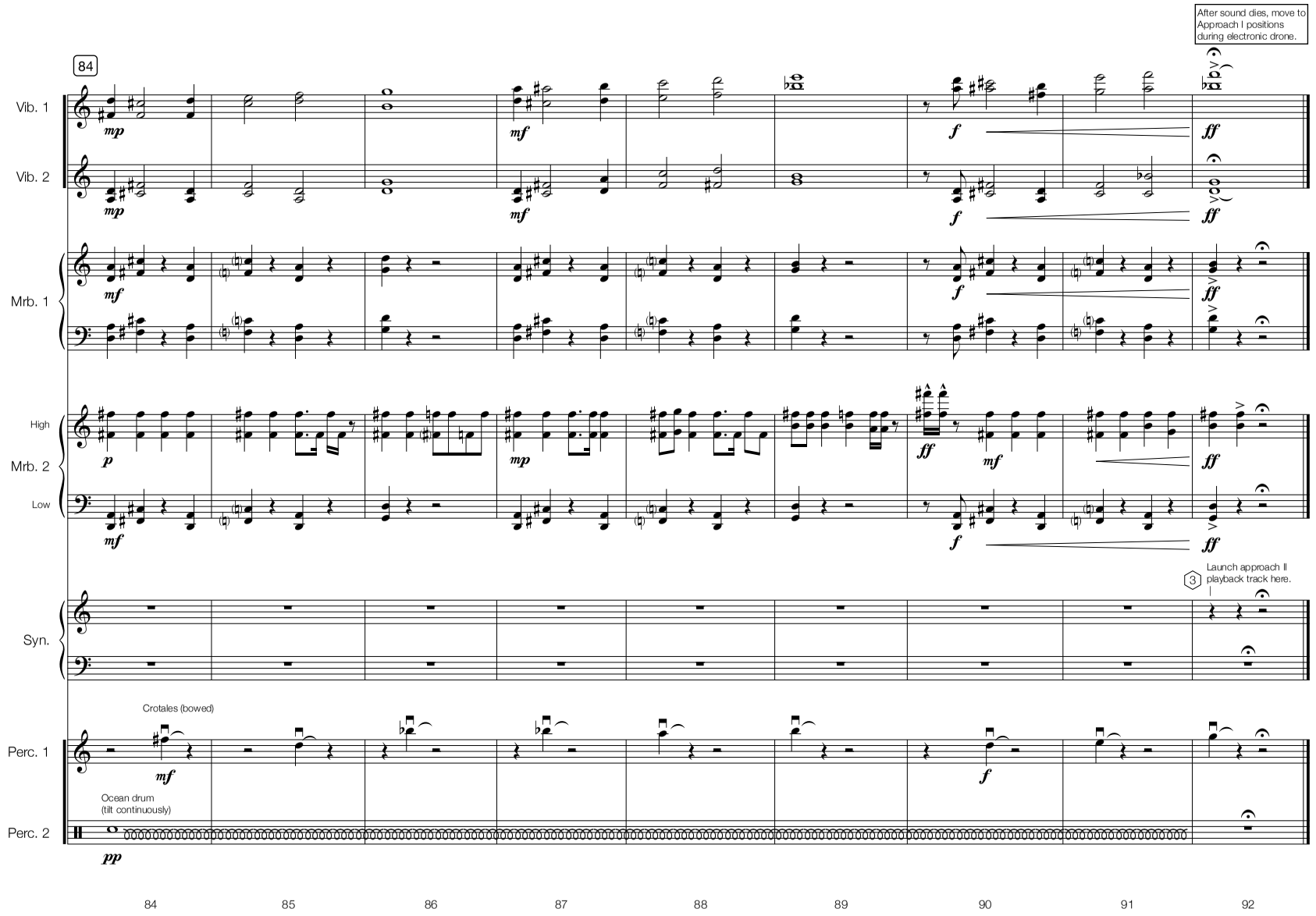

54
poco rit.
57
♩ = 72
59
Vib. 1
Vib. 2
sempre pp
Mrb. 1
High
Mrb. 2
Low
Improvise similar patterns on the same notes. Always running 16ths.
(Continue)
Syn.
Hel - lo.
(As before)
E7
G♯–
Sus. cym.
(soft mallets)
Perc. 1
Djembe
(rub with brush)
Perc. 2
delicate
54
55
56
57
58
59


60
62
Vib. 1
Vib. 2
Improvise similar patterns on the same notes. Always running 16ths.
(As before)
(Continue)
Mrb. 1
(As before, now with these notes.)
High
Mrb. 2
Low
Syn.
Hel-lo from the chil - - dren.
Hel-lo.
Hel-lo from the
E7
C♯–
G♯–
Perc. 1
Improvise similar accent pattern. Always running 16ths.
Perc. 2
60
61
62
63


64
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
pp
mp
p
mp
Hel - lo from the chil - dren of pla - net
E7
G♯–
E7
C♯–
E7
G♯–
E7
C♯–
64
65
66
67


68
72
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Hel - lo from the chil-dren,
hel - lo from the chil - dren of pla - - - net
Earth.
Perc. 1
Perc. 2
E7
G♯–
Light hard plastic mallets
Sus. cym. (soft mallets)
Bass drum (soft marimba mallets)
+Tam-tam
68
69
70
71
72


Gradually decrease roll speed to ♩ Not synchronized.
73
Now together
5x
75
Vib. 1
Vib. 2
mp
p
n
Mrb. 1
Medium mallets
foreboding, connect all empty space with gesture
High
Mrb. 2
Low
pp
Syn.
Perc. 1
Perc. 2
73
74
75
76
77
78
79
80
81
82
83


84
After sound dies, move to Approach I positions during electronic drone.
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
3
Launch approach II playback track here.
Crotales (bowed)
Perc. 1
Ocean drum (tilt continuously)
Perc. 2
84
85
86
87
88
89
90
91
92

✧ Approach I

Performance Notes

- Movement duration ≈ 10:00
- Because players are synchronized for much of this movement, they should be placed within ear and eye-shot of one another in the venue. They should all be close enough to hear the arpeggios that emerge about halfway through the audio track.
- The playback audio is launched by the synth. player at the end of Encounter I as indicated in their part.
- An identical cue staff is indicated above each player's part. A bright, bell-like sound will be heard in the audio track around the elapsed time indicated (1:20, for instance).
- Until rehearsal letter B, nothing needs to synchronize. Entrances are staggered based on the instructions in each part.
- Some fermati must be held for a long time until there is a cue to continue as other players finish their musical gestures.
- Someone should give a big cue to play rehearsal letter B together. From B onward, players should be in time and synchronized.
- From letter F to H, players should listen to the 16th-note arpeggios in the audio for tempo.
- The volume should never get loud enough to cover the playback audio track.

Program Notes

Transit time to Jupiter: 2 years. Distance from Earth: 390 million miles.

To illustrate the vast distance and travel time between planetary Encounters, the Approach movements employ slow-moving, ambient backdrops and the performers disperse within the venue. As the mission progresses, the degree of structure changes as the precise pitches, rhythms, synchronization, amount of improvisation, and even specificity of the instructions themselves deteriorate. This plays into the concept of an über-diminuendo, whereby many musical elements are reduced or downgraded over a long period of time. This mirrors the drop in transmission strength received from Voyager which is so far away (at over 13.4 billion miles as of this writing) that the signal wattage received here on Earth is less than 20-billionths the power of a watch battery.

Several coincidental near-integer orbital resonances exist between the planets. Basically, there are tidy relationships between how often the planets in the solar system go around the sun. Almost exactly eight years pass here on Earth for every 13 Venusian orbits, for instance. The resulting ratios can be used to derive rhythmic material or even an exact musical interval. For example, the Venus – Earth resonance creates something close to a major 6th (the opening interval to “My Bonnie Lies Over the Ocean”). These ratios factored heavily into Voyager’s mission design, as its launch was scheduled to take advantage of a near-alignment of the outer planets sometimes referred to as the “Grand Tour” that only occurs every 176 years. Both spacecraft used the gravitational pull of each celestial body to drastically increase their speed. Without such “slingshot” maneuvers, travel to the far reaches of the solar system using a chemical propulsion system requires a huge amount of fuel at launch and would take much, much longer. In fact, Voyager 2 did not have adequate escape velocity to leave the sun’s gravitational influence until after its flyby of mighty Jupiter.

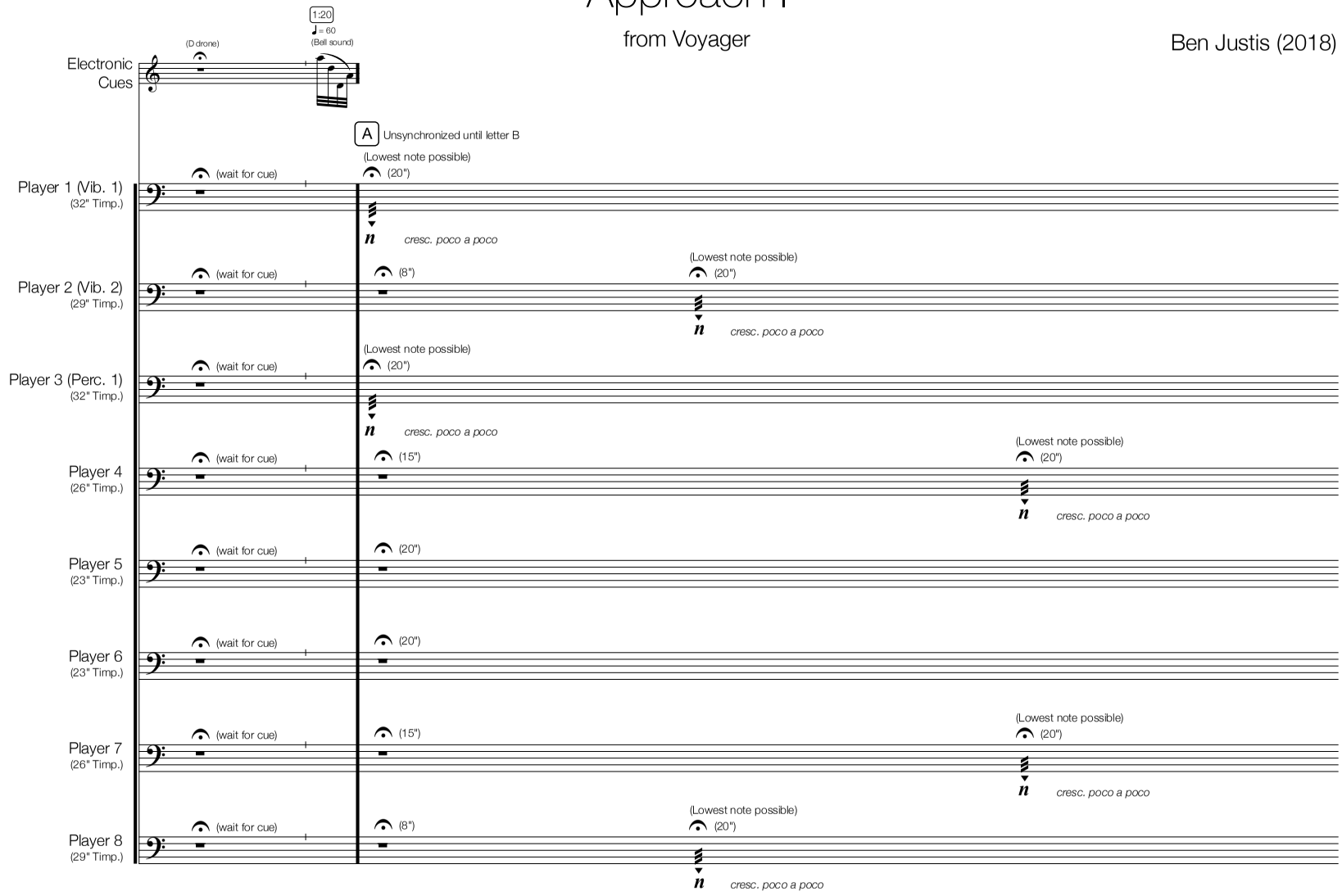
The movement opens with a rich drone on D, which serves as the pitch center for the movement. It is derived from the extreme stretching of a synthetic string sound, so that its embedded harmonics are brought to the fore. This is accomplished by processing the original source through an algorithm that drastically elongates and smooths the audio at a granular level. The sustained pitch wanders to F-sharp, then F, and finally G, which outlines the roots of a series of chords yet to come. The rhythms played on the timpani relate to the Jupiter – Earth orbital resonance of 1:12. The interval produced from this ratio is a perfect fifth, which features prominently in the design of the “Jupiter progression” heard at the end of the first Encounter and halfway through this movement. The fixed media employs pythagorean intonation which is mathematically in tune when the pitch center is D but sound perplexingly (and deliciously) out of tune when in other “keys”. As the progression repeats and gains intensity, new voices, patterns, and timbres are added to the mix, and finally the timpani join the chorale in full force before dissolving into a wash of cymbal rolls.

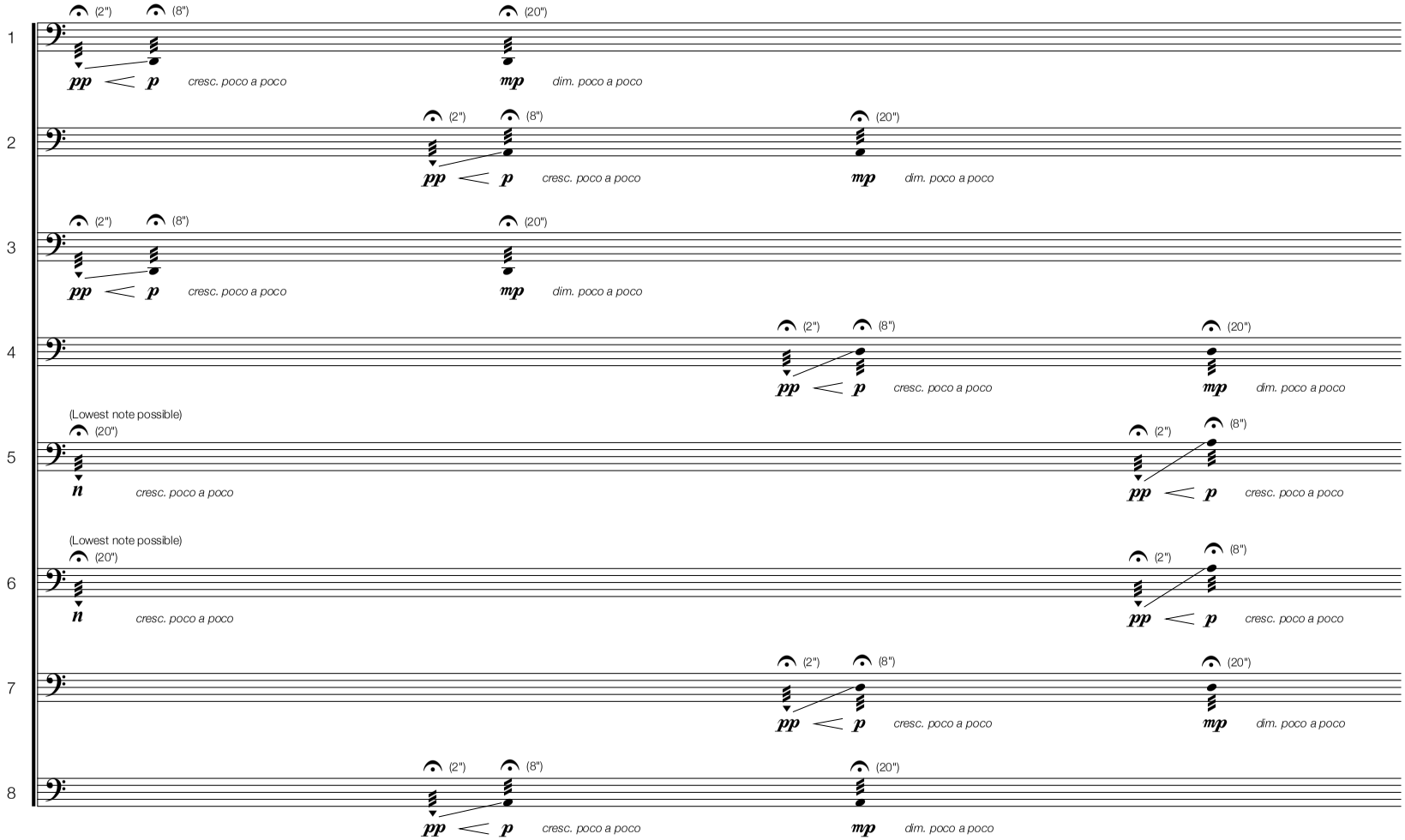
Score

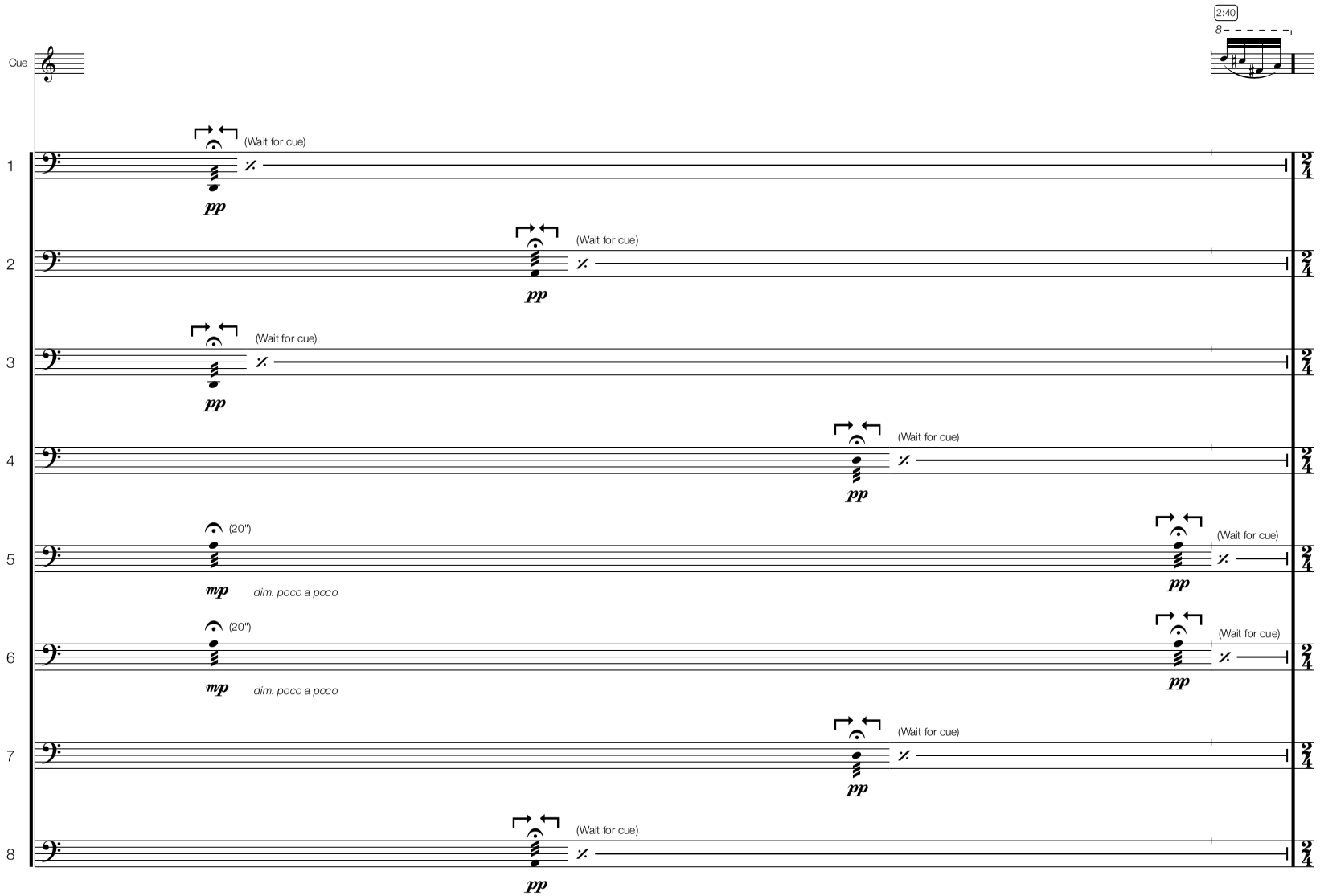
Approach I

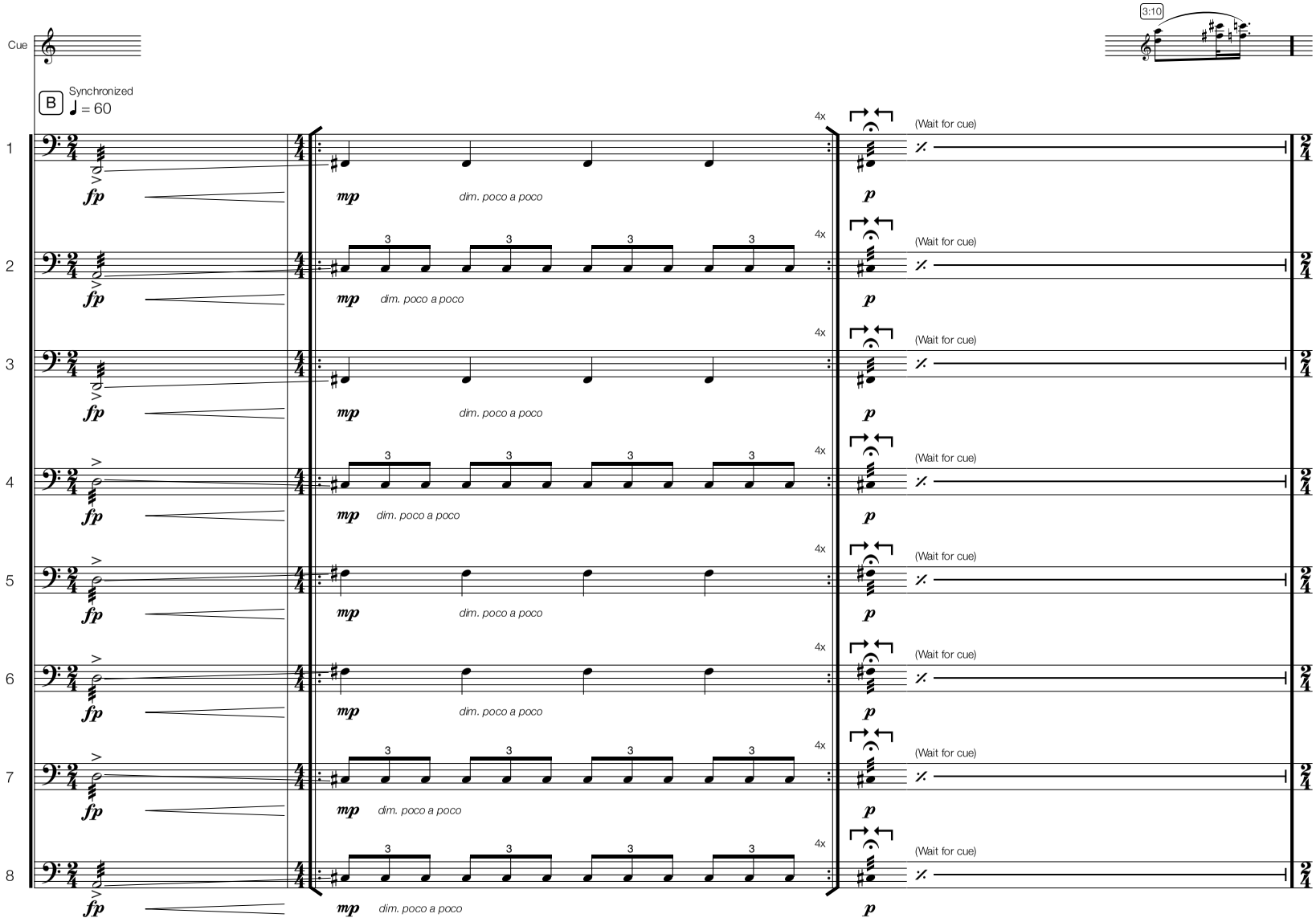
from Voyager

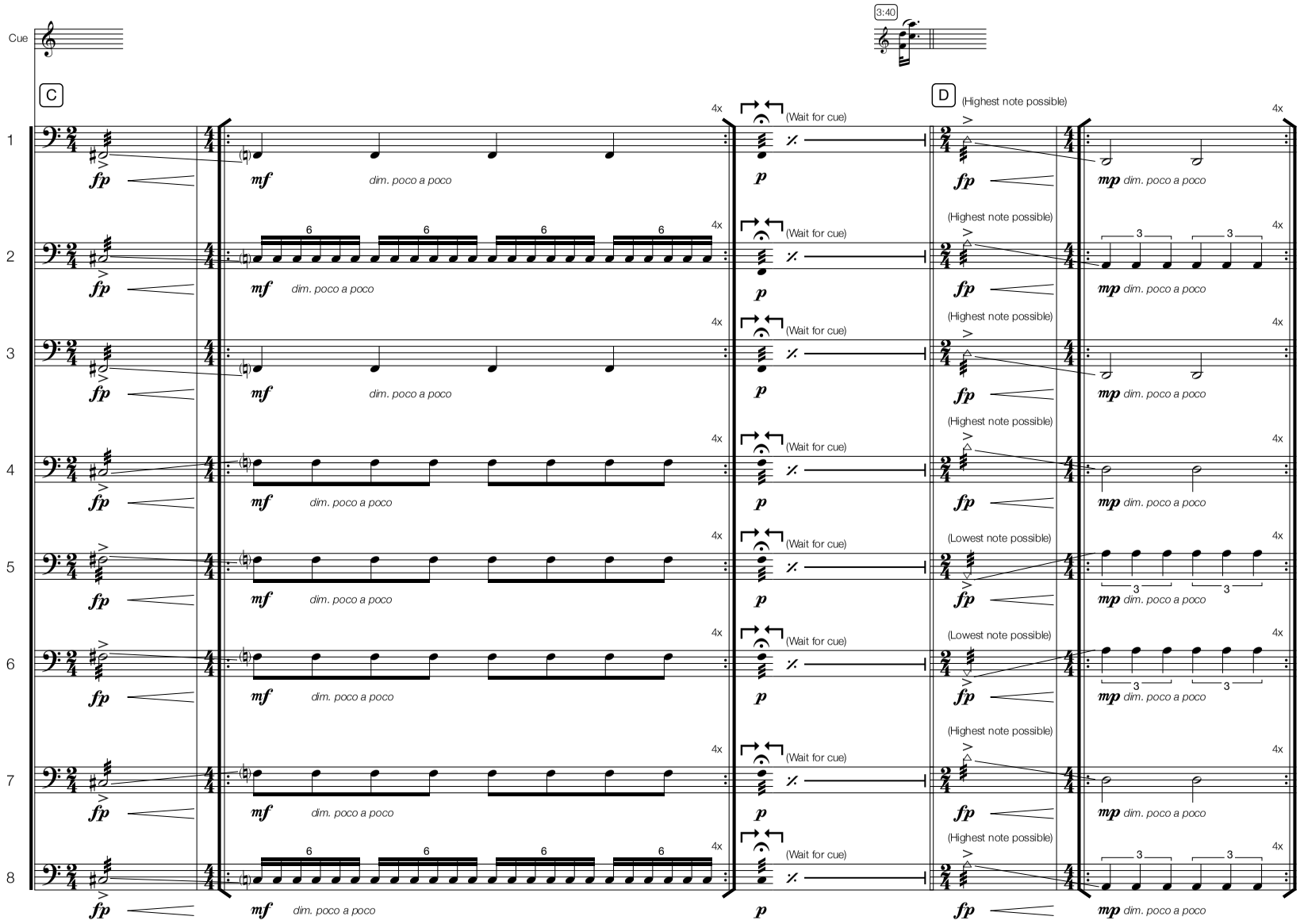
Ben Justis (2018)

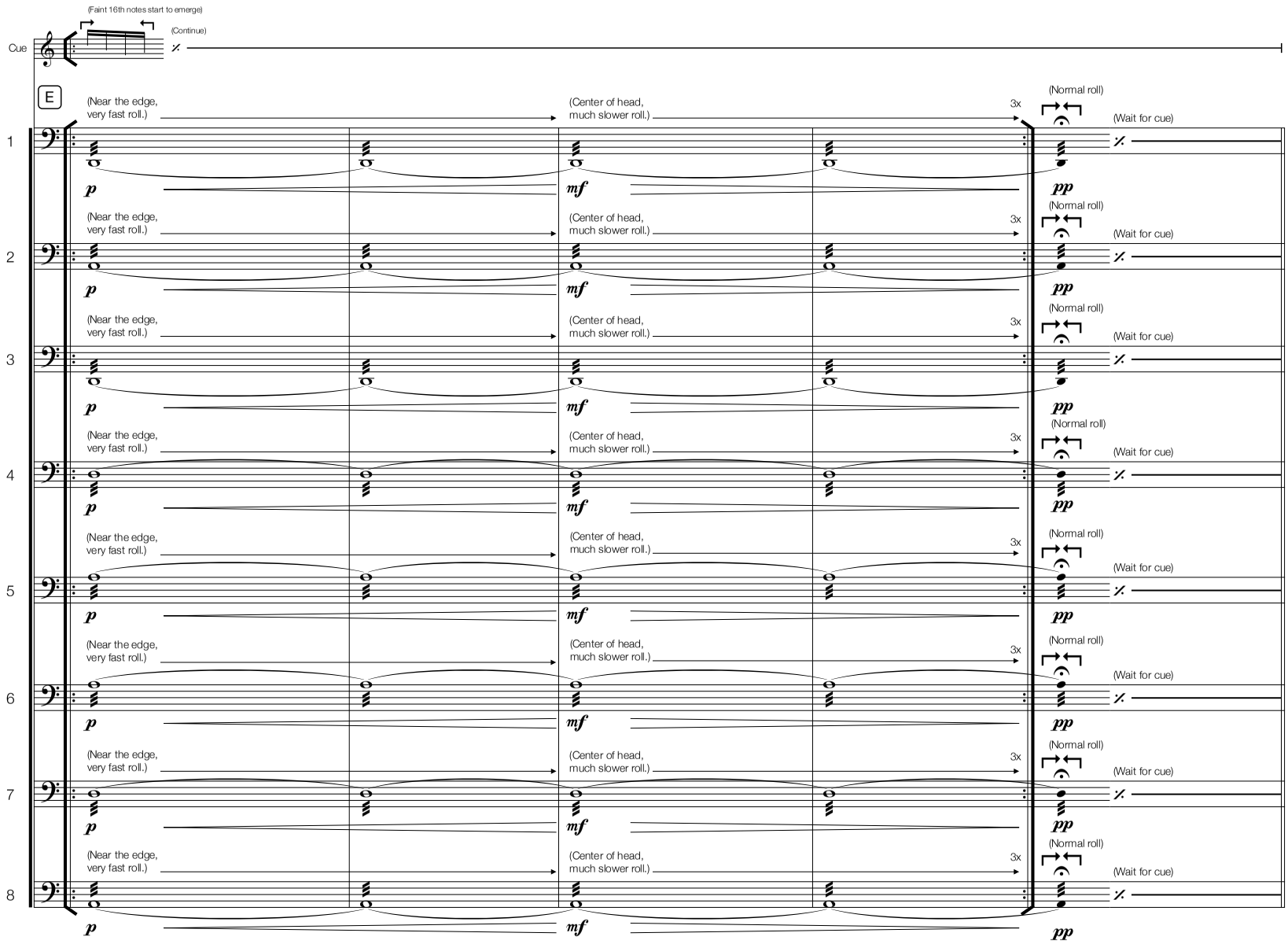


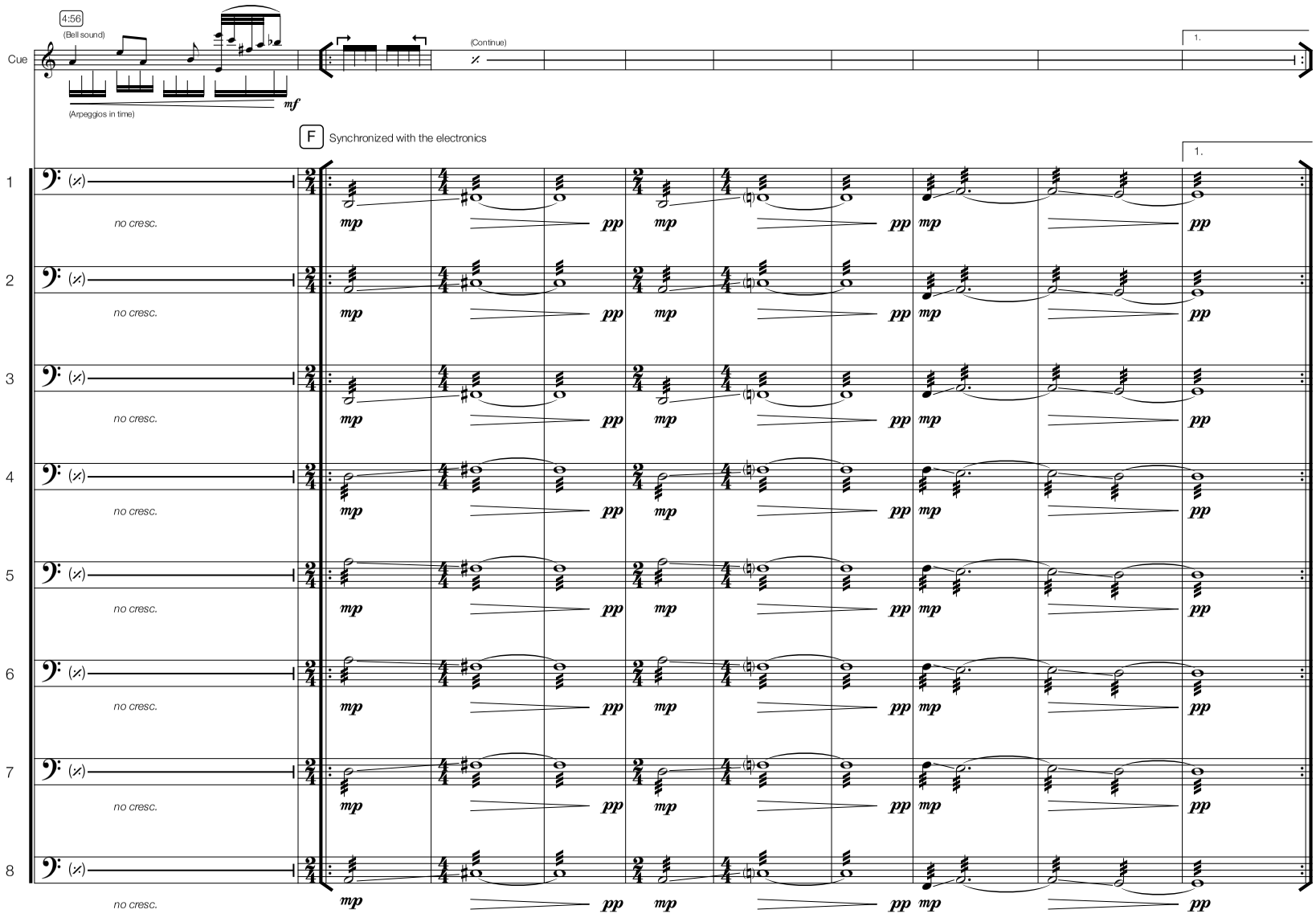

1
2
3
4
5
6
7
8
(2")
(8")
(20")
pp
p
mp
cresc. poco a poco
dim. poco a poco
(Lowest note possible)
n

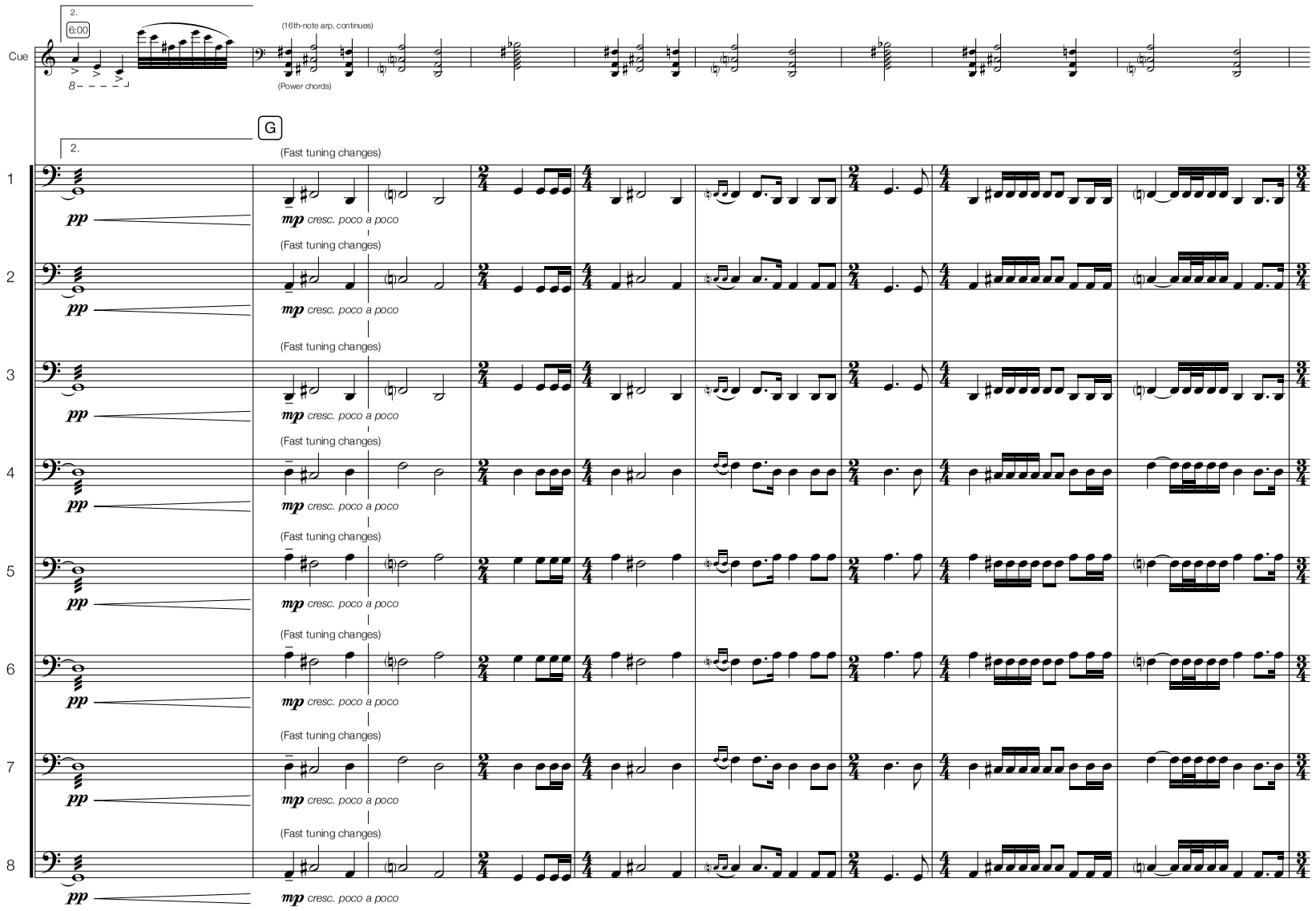

2:40
Cue
1
2
3
4
5
6
7
8
(Wait for cue)
pp
(20")
mp
dim. poco a poco

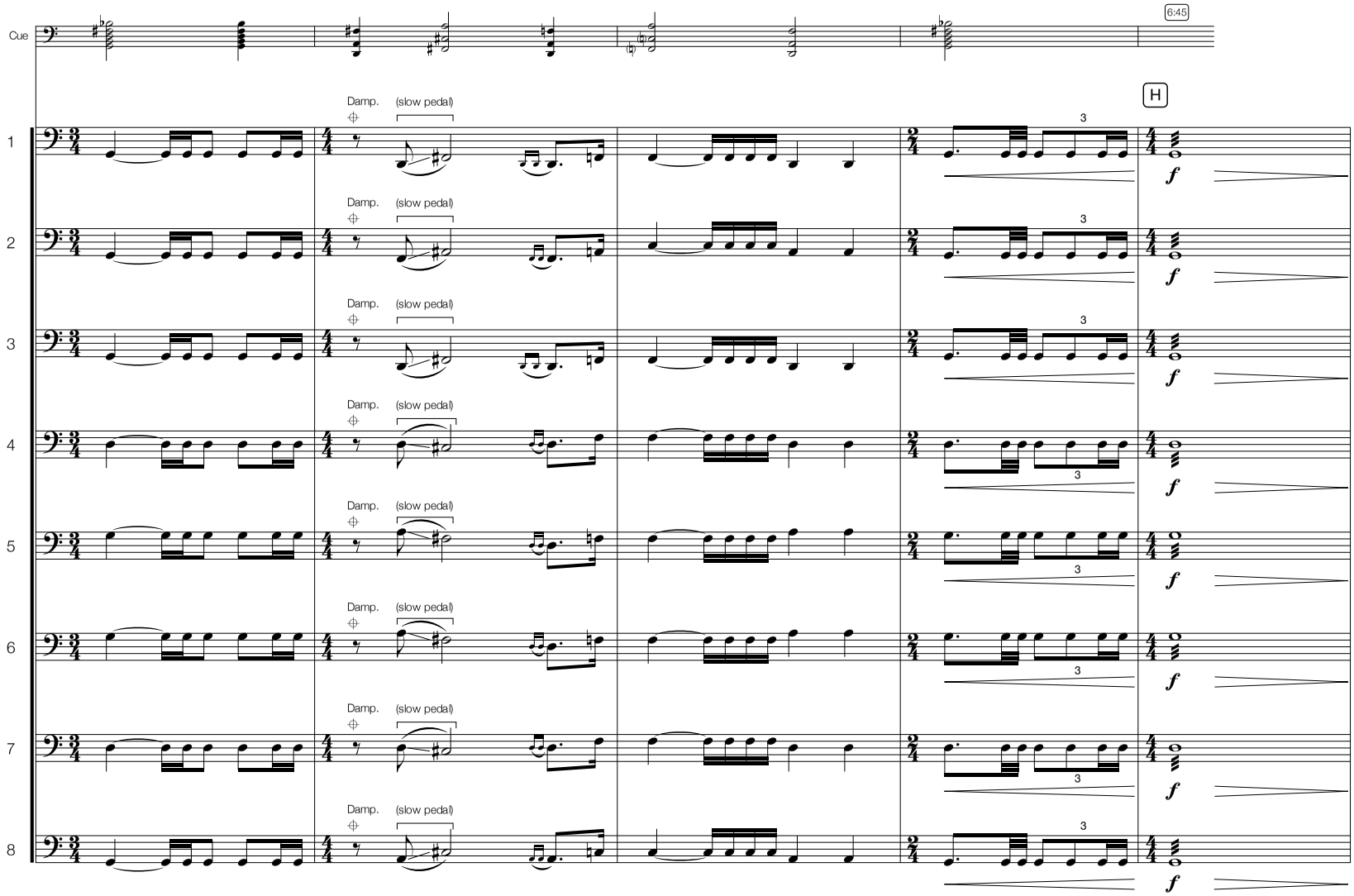

Cue
3:10
B
Synchronized
♩ = 60
1
2
3
4
5
6
7
8
4x
(Wait for cue)
fp
mp
dim. poco a poco
p

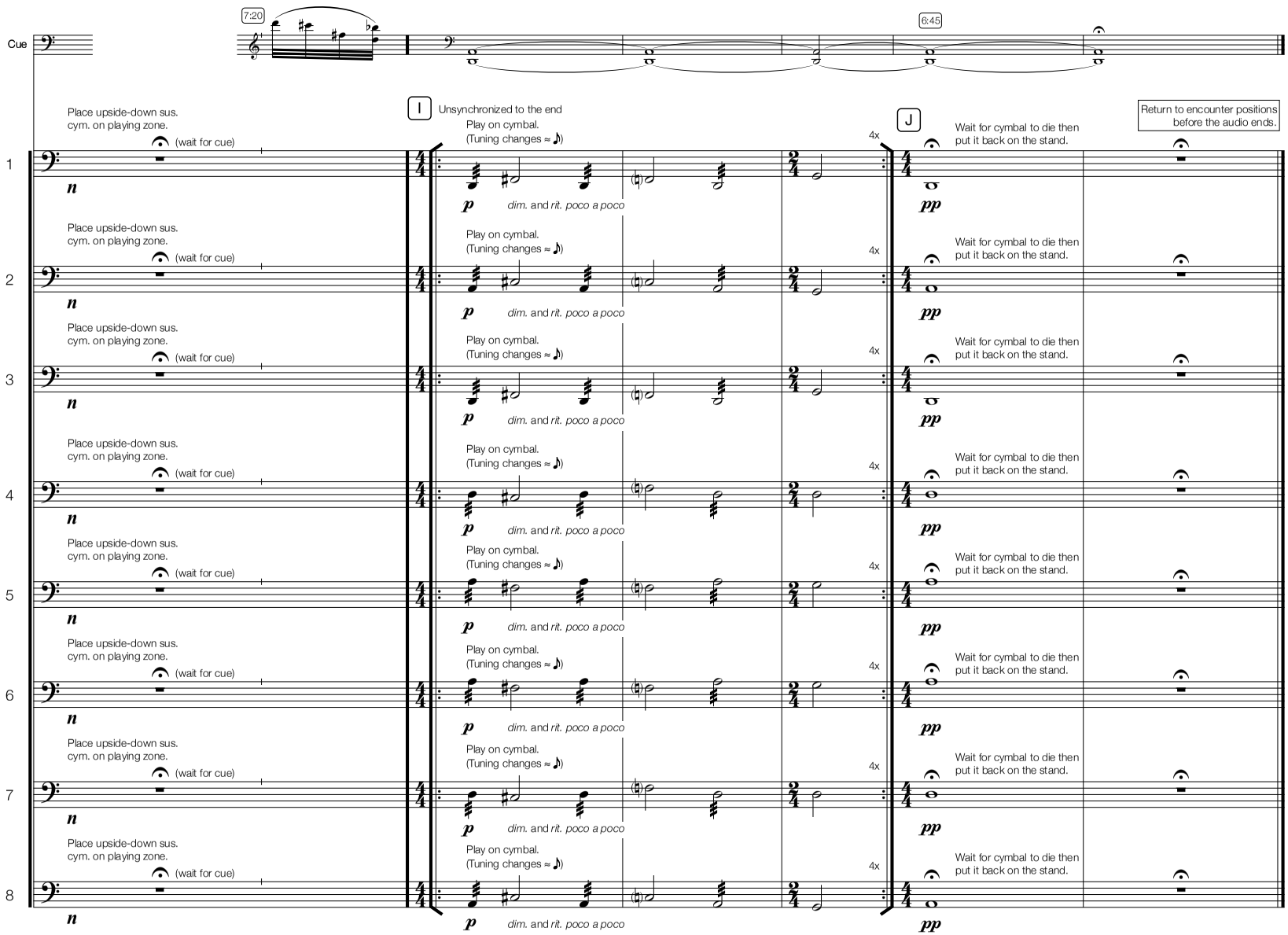

Cue
3:40
C
D
(Highest note possible)
(Wait for cue)
(Lowest note possible)
4x
fp
mf
p
mp
dim. poco a poco
1
2
3
4
5
6
7
8


(Faint 16th notes start to emerge)
(Continue)
Cue
E
(Near the edge, very fast roll.)
(Center of head, much slower roll.)
3x
(Normal roll)
(Wait for cue)
p
mf
pp
1
2
3
4
5
6
7
8


4:56
(Bell sound)
Cue
(Arpeggios in time)
mf
(Continue)
1.
F
Synchronized with the electronics
1
2
3
4
5
6
7
8
no cresc.
mp
pp


Cue
2.
6:00
(16th-note arp. continues)
(Power chords)
G
2.
(Fast tuning changes)
1
2
3
4
5
6
7
8
pp
mp cresc. poco a poco


Cue
6:45
H
1
2
3
4
5
6
7
8
Damp.
(slow pedal)
f
3


Cue
7:20
6:45
I
Unsynchronized to the end
J
Return to encounter positions before the audio ends.
1
2
3
4
5
6
7
8
Place upside-down sus. cym. on playing zone.
(wait for cue)
Play on cymbal.
(Tuning changes ≈ 𝅘𝅥𝅯)
4x
dim. and rit. poco a poco
Wait for cymbal to die then put it back on the stand.

Performance Notes

- Movement duration ≈ 6:30
- The movement starts with percussion 2 playing a bass drum roll that roughly follows the line contour indicated in their part. The roll should be very dramatic without getting very loud. When percussion 2 starts this gesture, the synth. player should press the “stop and fade out” button on the MainStage display which will automatically fade out the Approach I track very slowly.
- Percussion 2 should connect the end of their long gesture with the notated *pp* roll at measure 1.
- Once percussion 2 finishes their gesture and sustains a *pp* roll, vibraphone 1 enters at measure 1.
- After the G.P. in measure 176 (in time), all players enter singing on beat 1 of measure 177 according to the instructions in the score and parts.

Program Notes

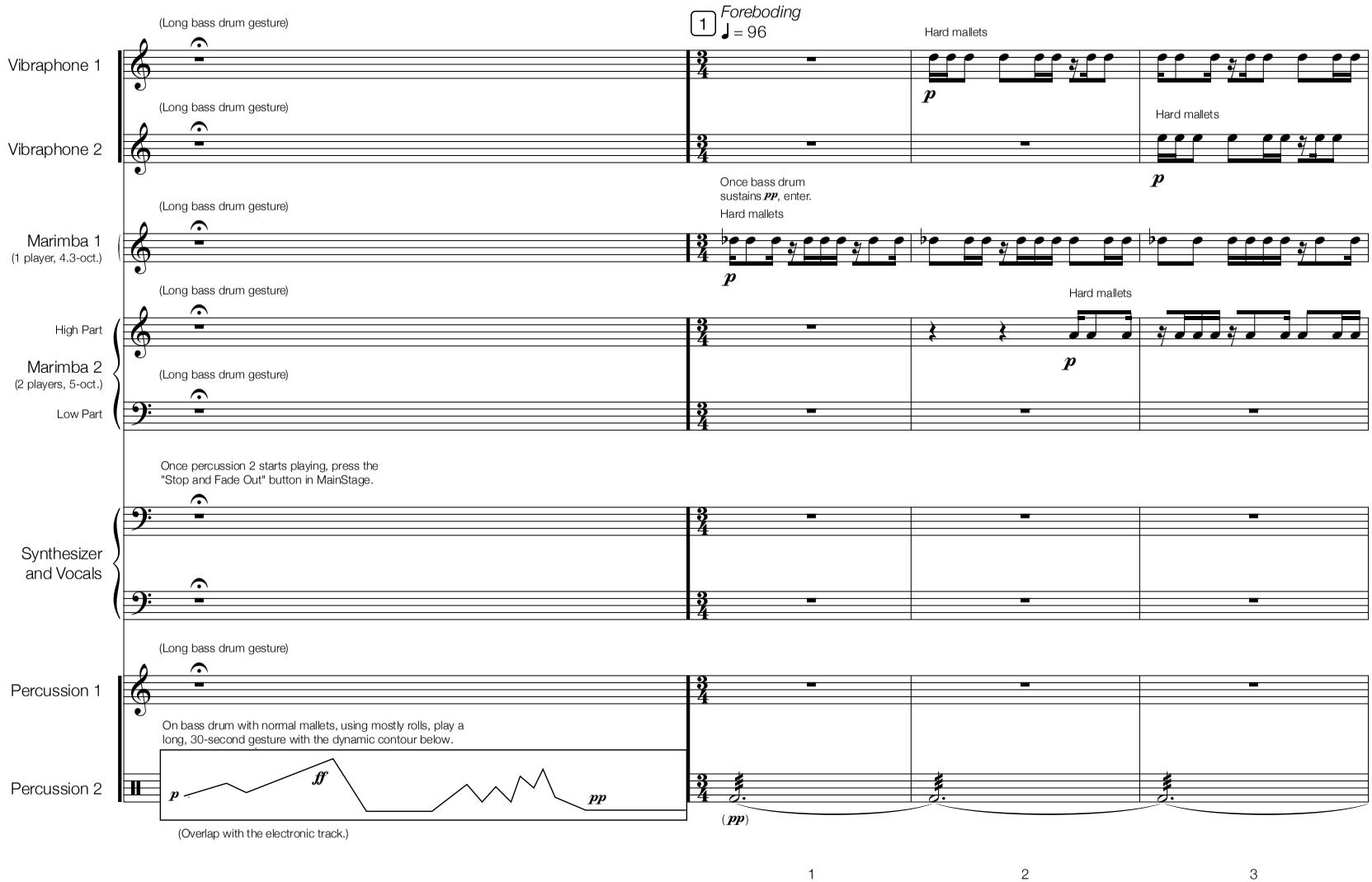
Jupiter, king of the solar system, is known for the beautiful bands of storms that perpetually swirl in its thick atmosphere. In fact, the diameter of The Great Red Spot (a maelstrom thought to have been continuously raging for over 350 years) is greater than that of the entire Earth.

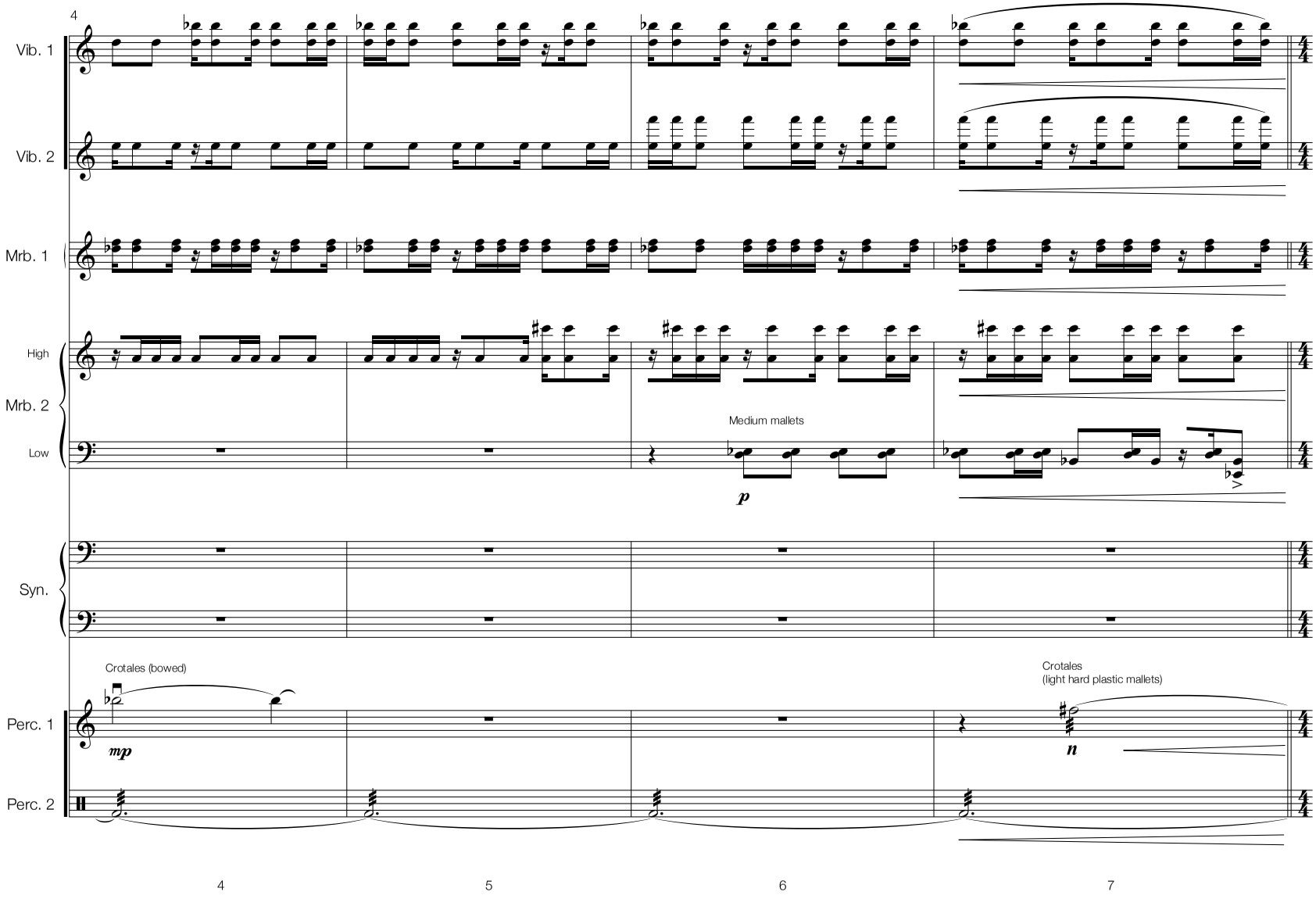
The turbulent bass drum roll in the beginning sets the tone of the movement before an explosive mallet motive bursts in, cast in D half-whole octatonic. The parts intertwine and dance around each other before lining up for thunderous impacts. This material is repeated and developed until the contrasting middle section, a break in the tempest, arrives. The music continues to move ahead but with less aggression, while a very old tune by Spanish composer Thomas Luis de Victoria is presented. *O Magnum Mysterium*, which translates to “O great mystery”, is a nod to Voyager’s exploratory purpose. The elegant, stirring harmonies of this sixteenth-century motet provide a refreshing contrast to the violence of the primary motives. The calm doesn’t last, however, and the undulating, gentle polyrhythms are replaced by recapitulatory material. It builds to a fevered coda based on the pre-established Jupiter progression, a final burst of thunder, then, finally, tranquility.

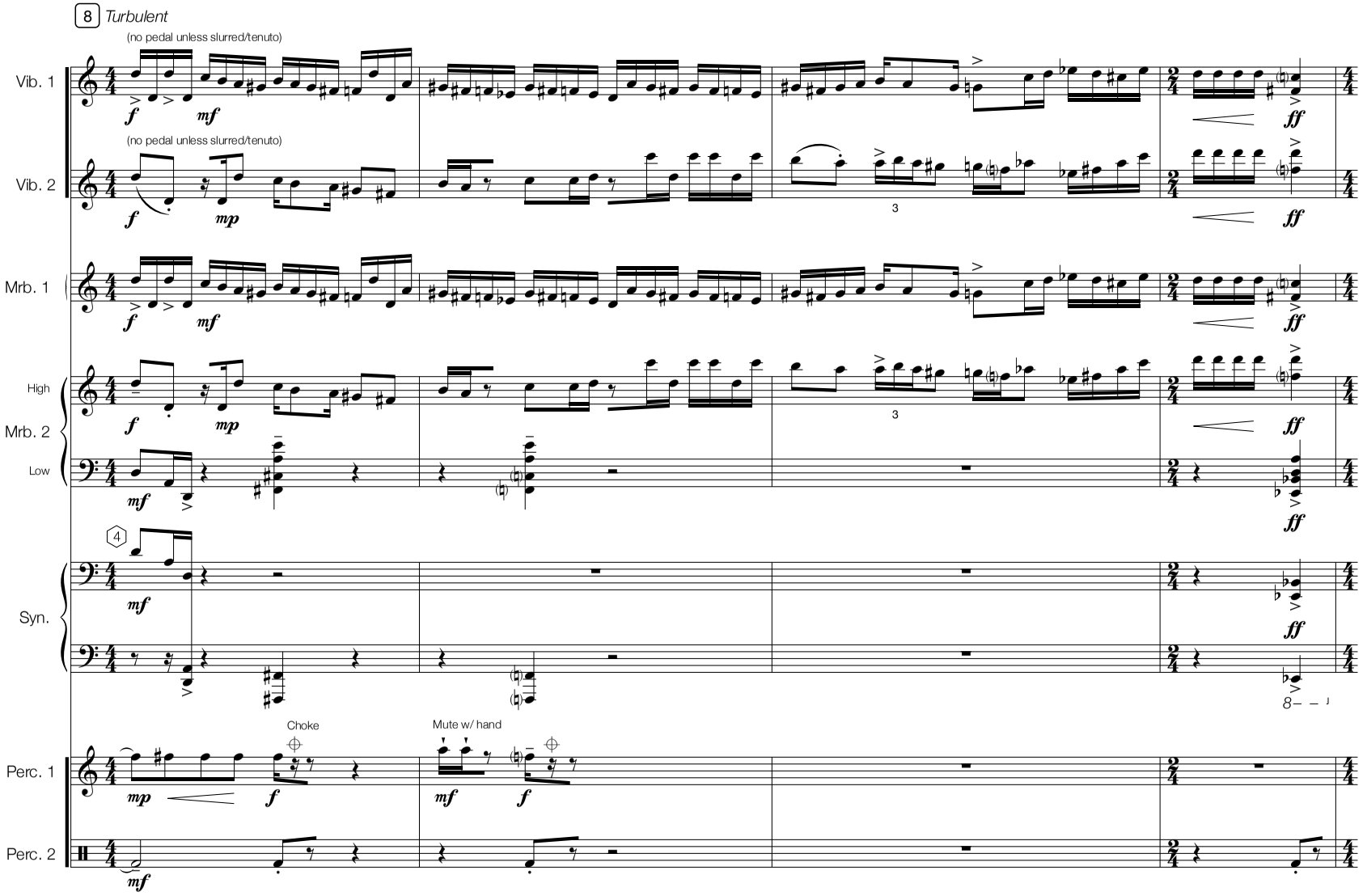
Encounter II: World of Storms

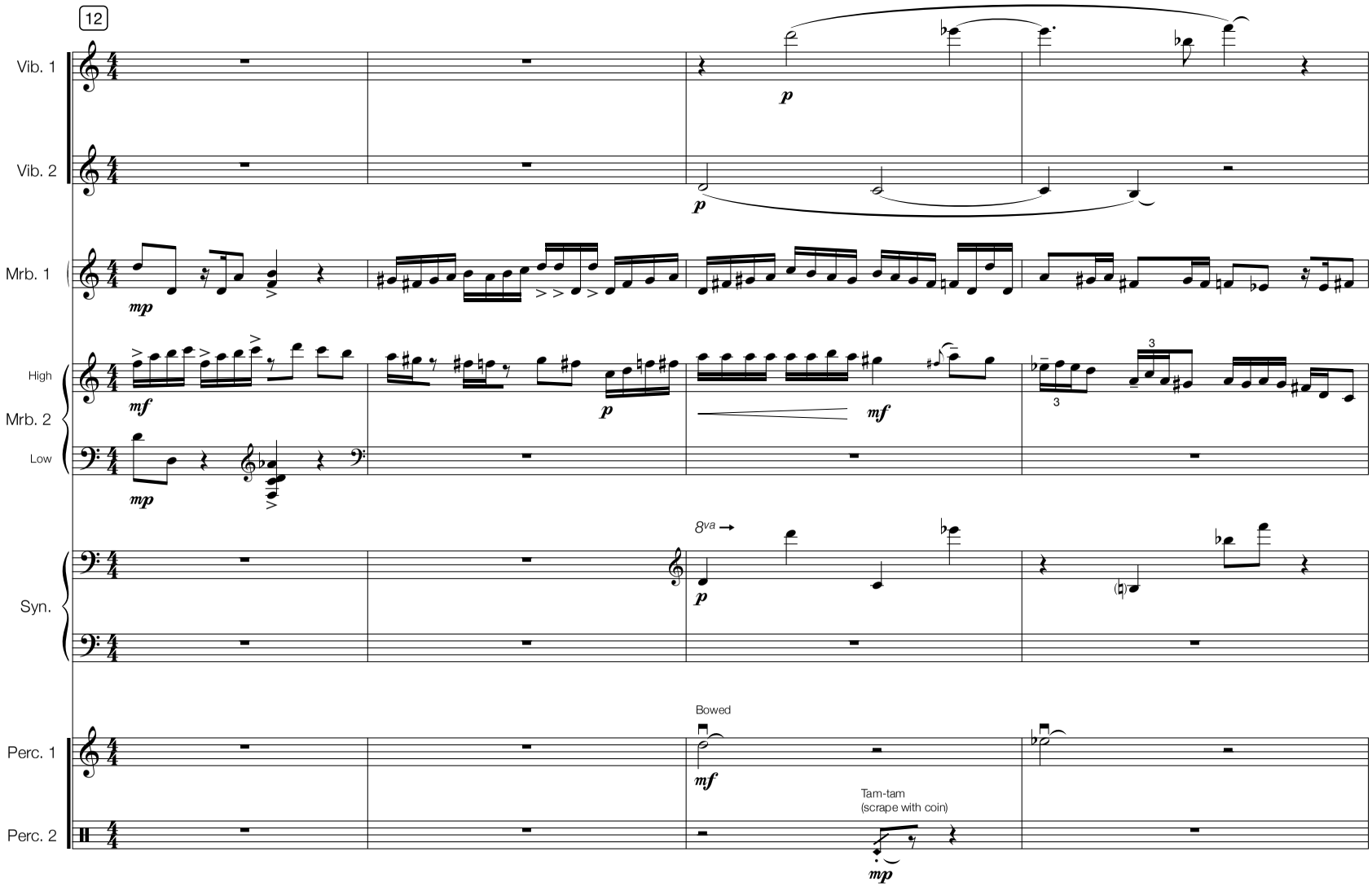
from Voyager

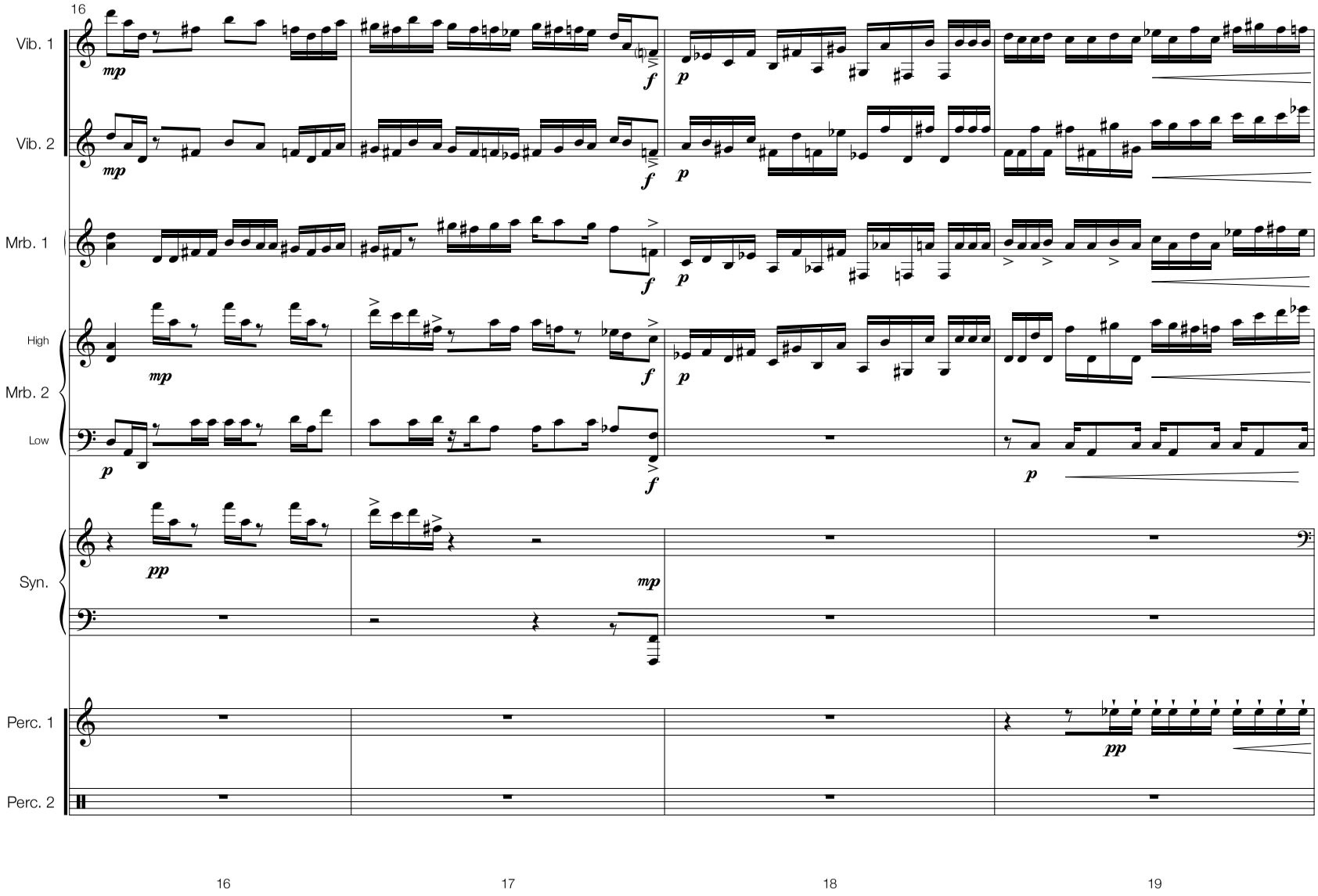
Ben Justis (2018)

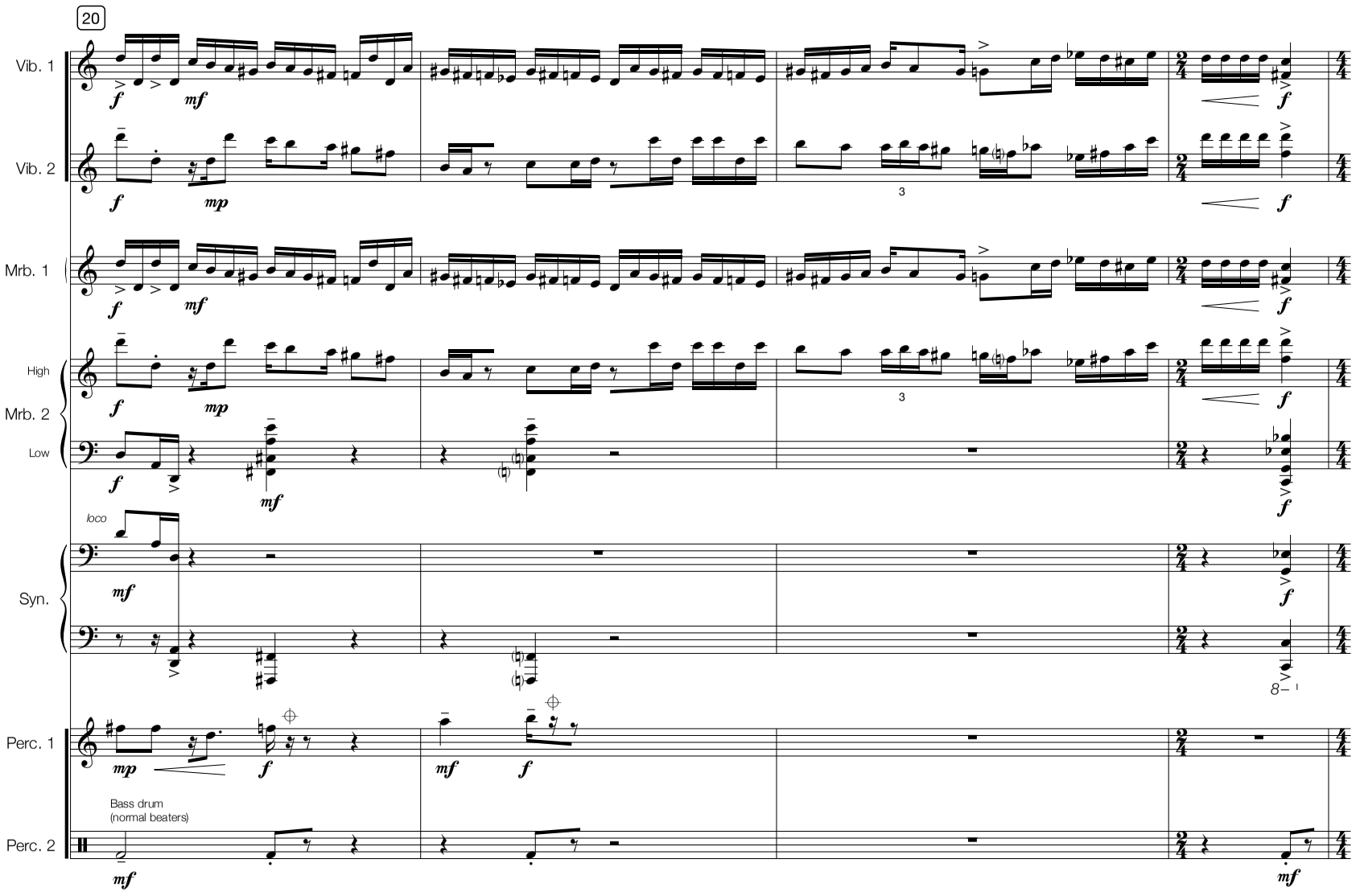


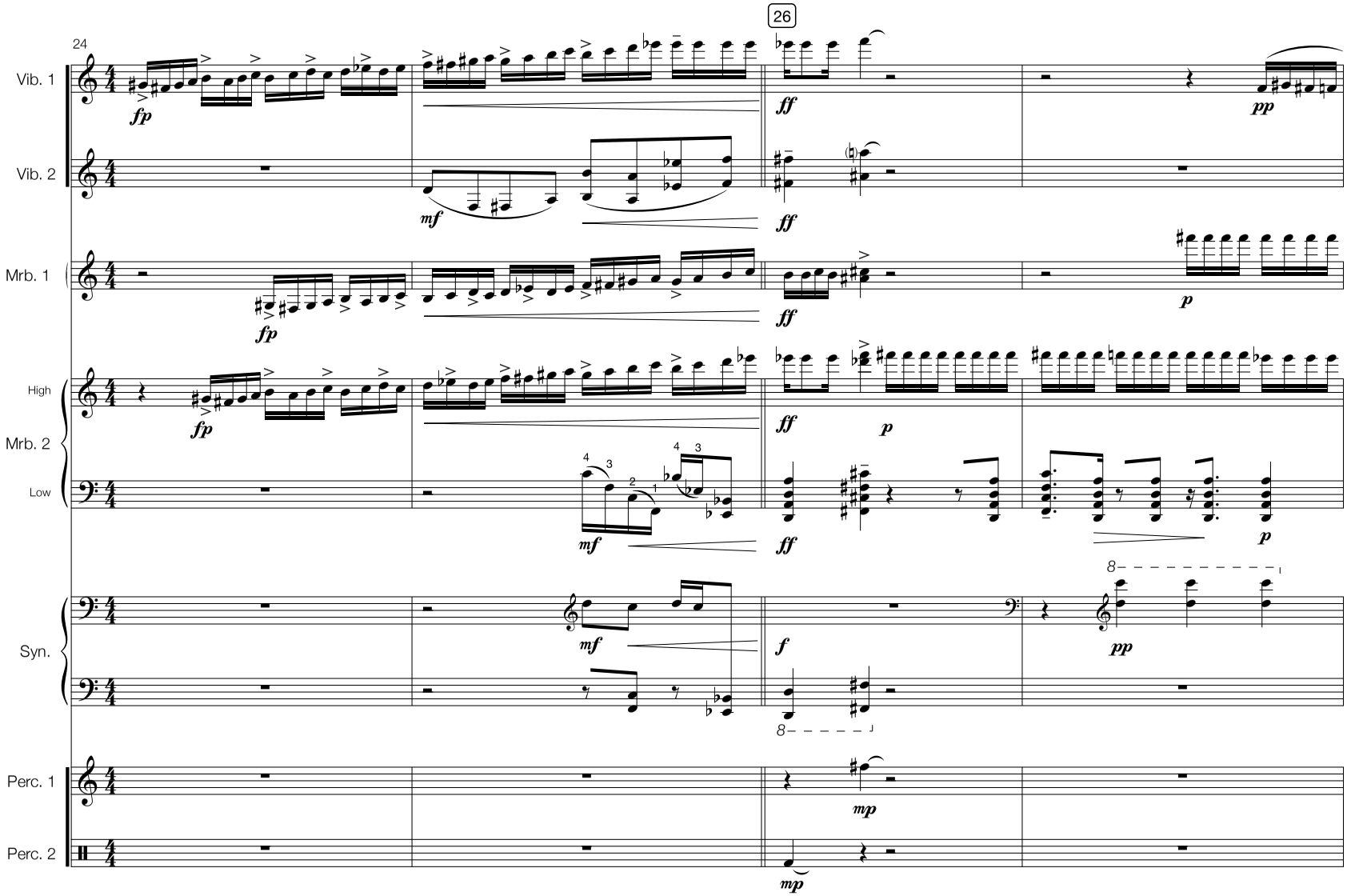

4
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Medium mallets
p
Syn.
Crotales (bowed)
mp
Crotales
(light hard plastic mallets)
n
Perc. 1
Perc. 2
4
5
6
7

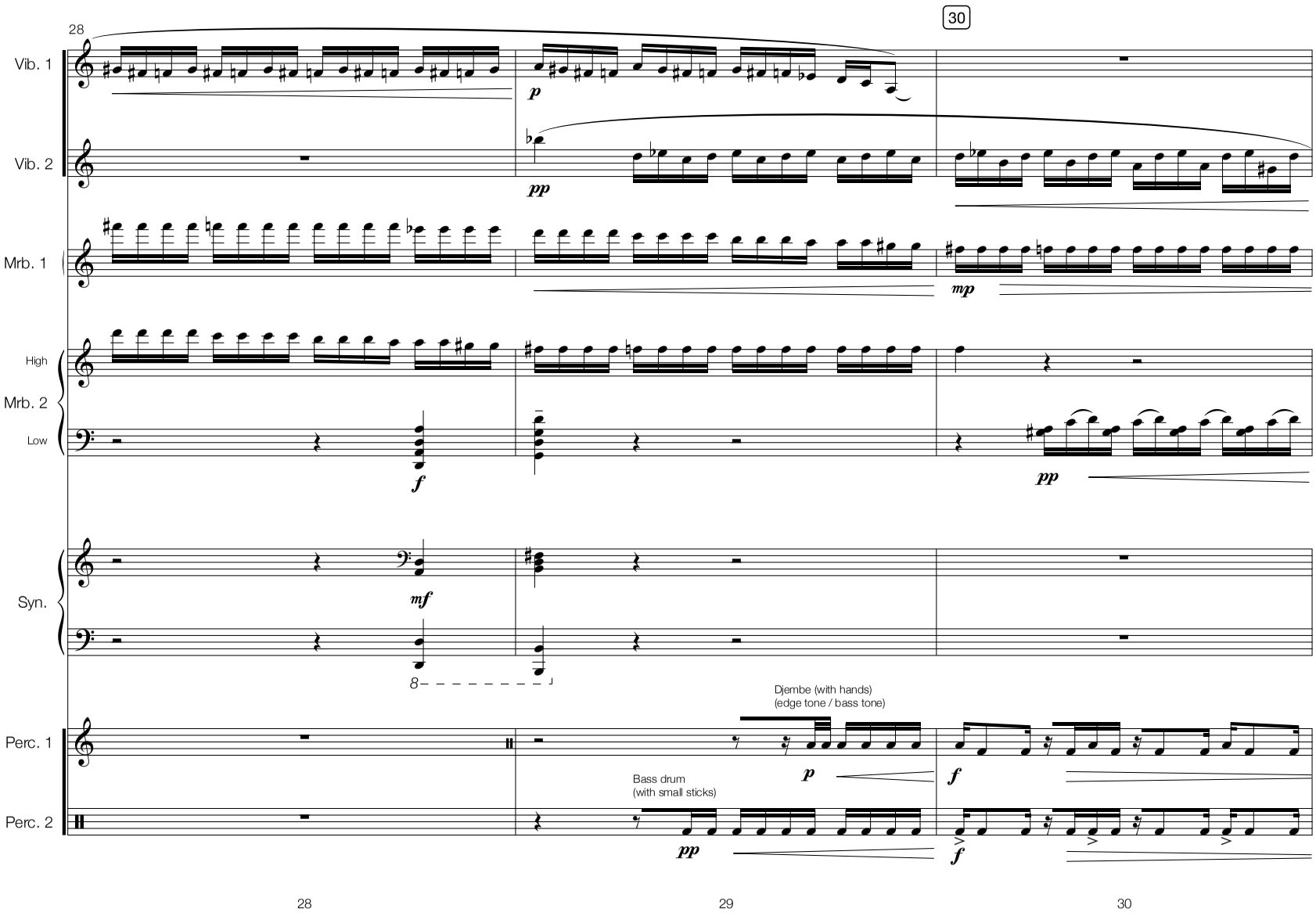

8 Turbulent
(no pedal unless slurred/tenuto)
Vib. 1
(no pedal unless slurred/tenuto)
Vib. 2
Mrb. 1
High
Mrb. 2
Low
4
Syn.
Choke
Mute w/ hand
Perc. 1
Perc. 2
8
9
10
11

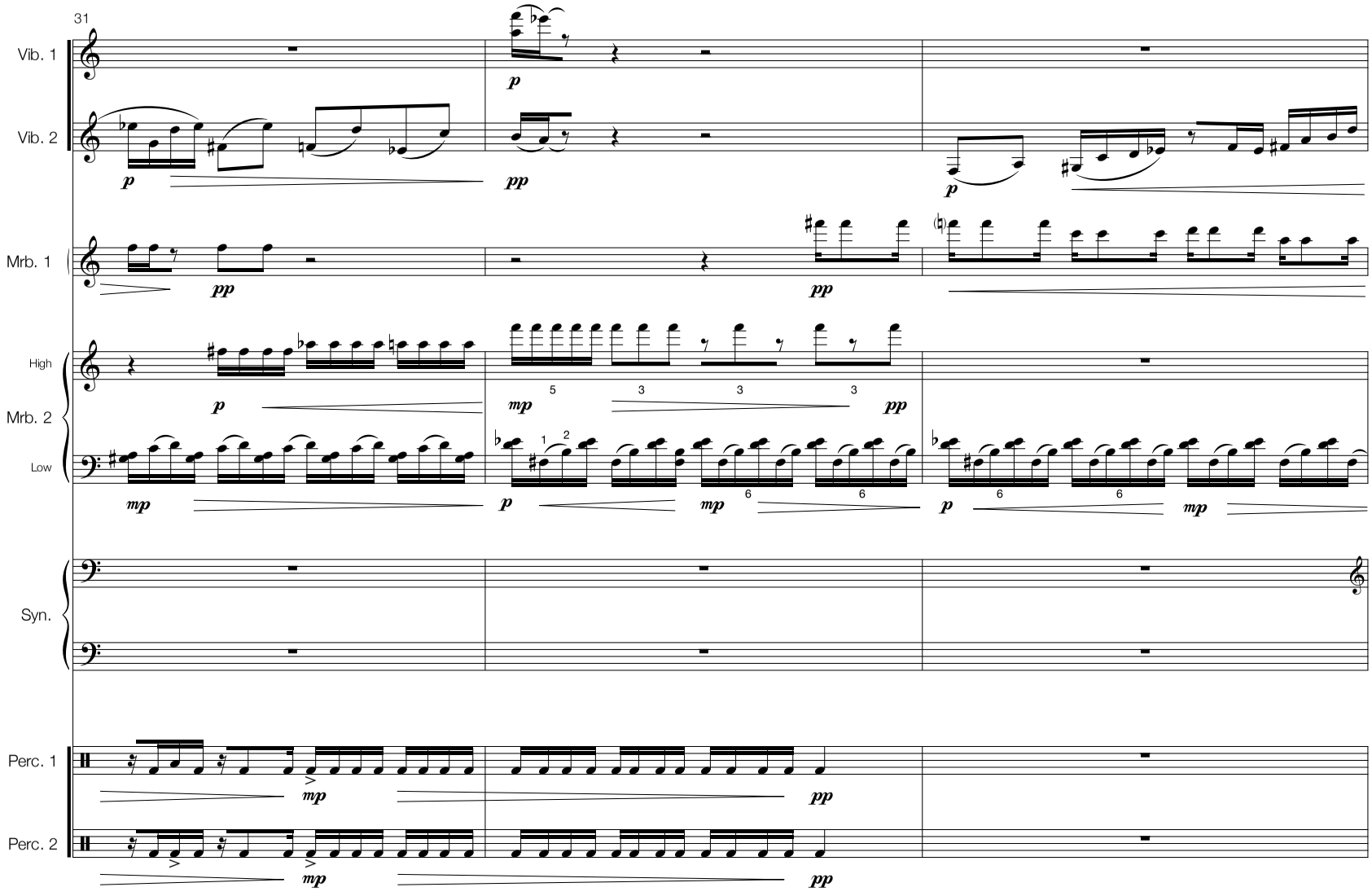

12
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
8va
Bowed
Tam-tam
(scrape with coin)
12
13
14
15

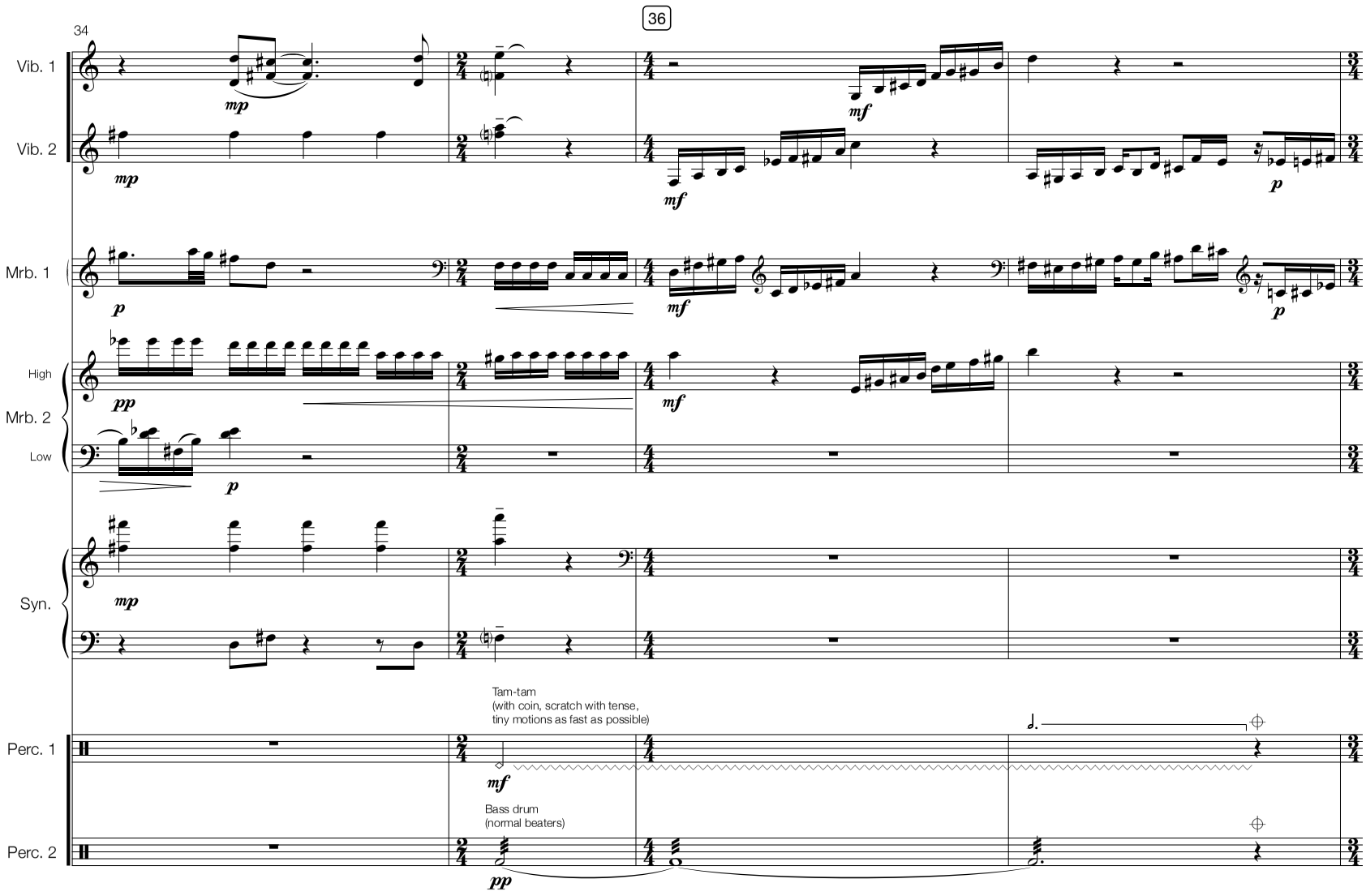

16
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
16
17
18
19

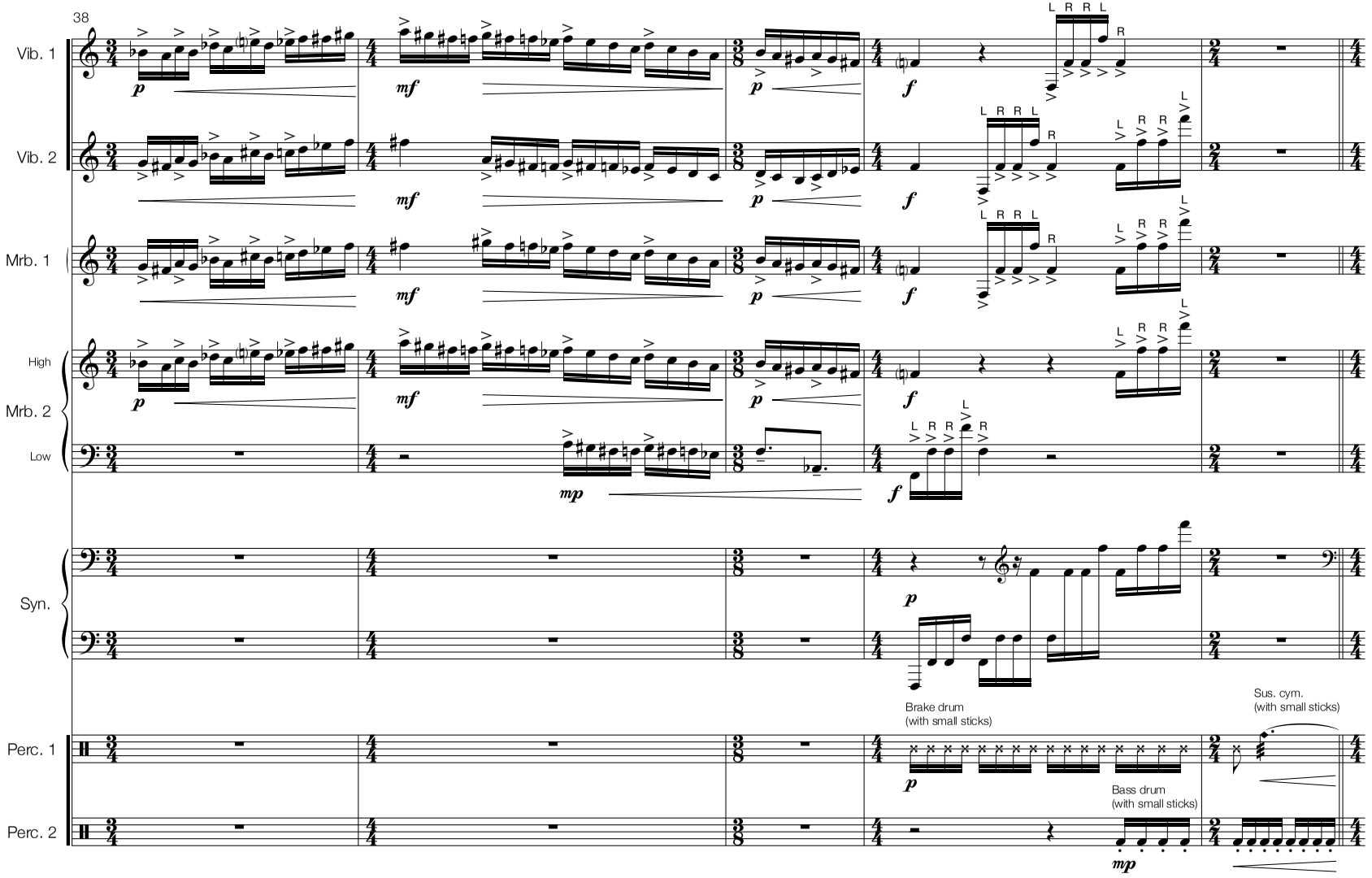

20
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
loco
Syn.
Perc. 1
Bass drum
(normal beaters)
Perc. 2
20
21
22
23

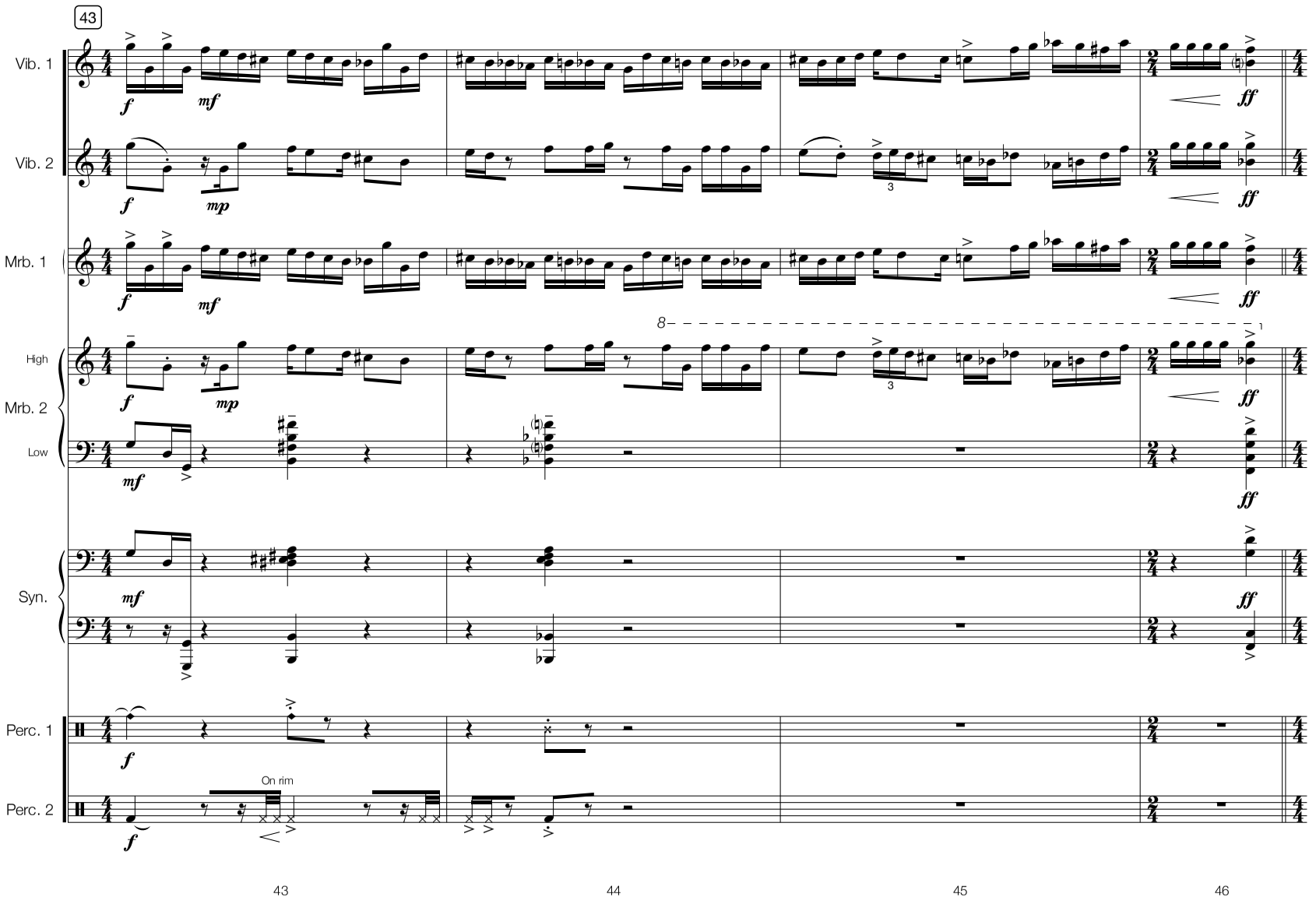

24
26
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
fp
mf
ff
pp
p
f
mp
24
25
26
27

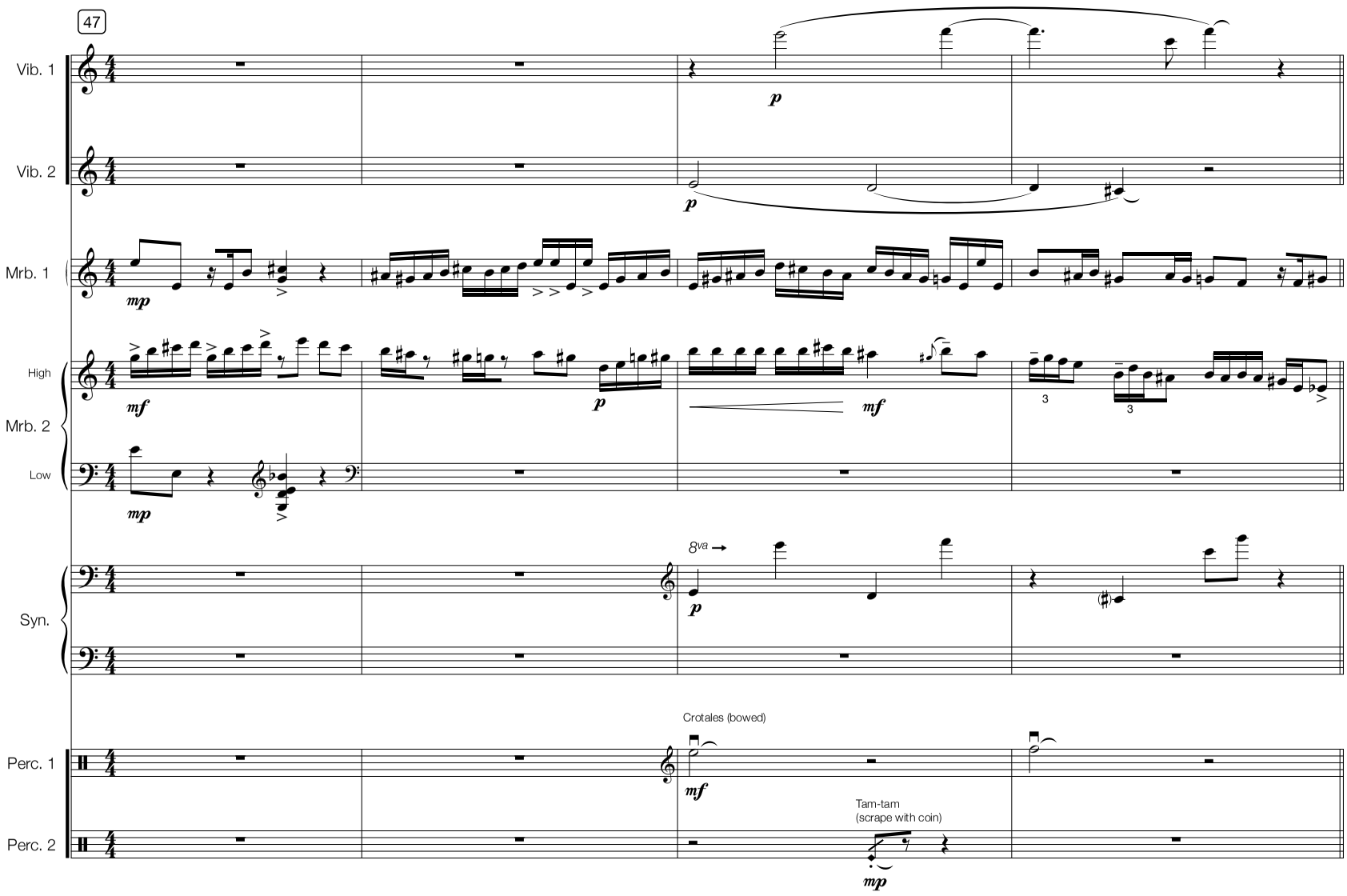

28
30
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
p
pp
mp
f
pp
mf
8
Djembe (with hands)
(edge tone / bass tone)
p
f
Bass drum
(with small sticks)
pp
f
28
29
30

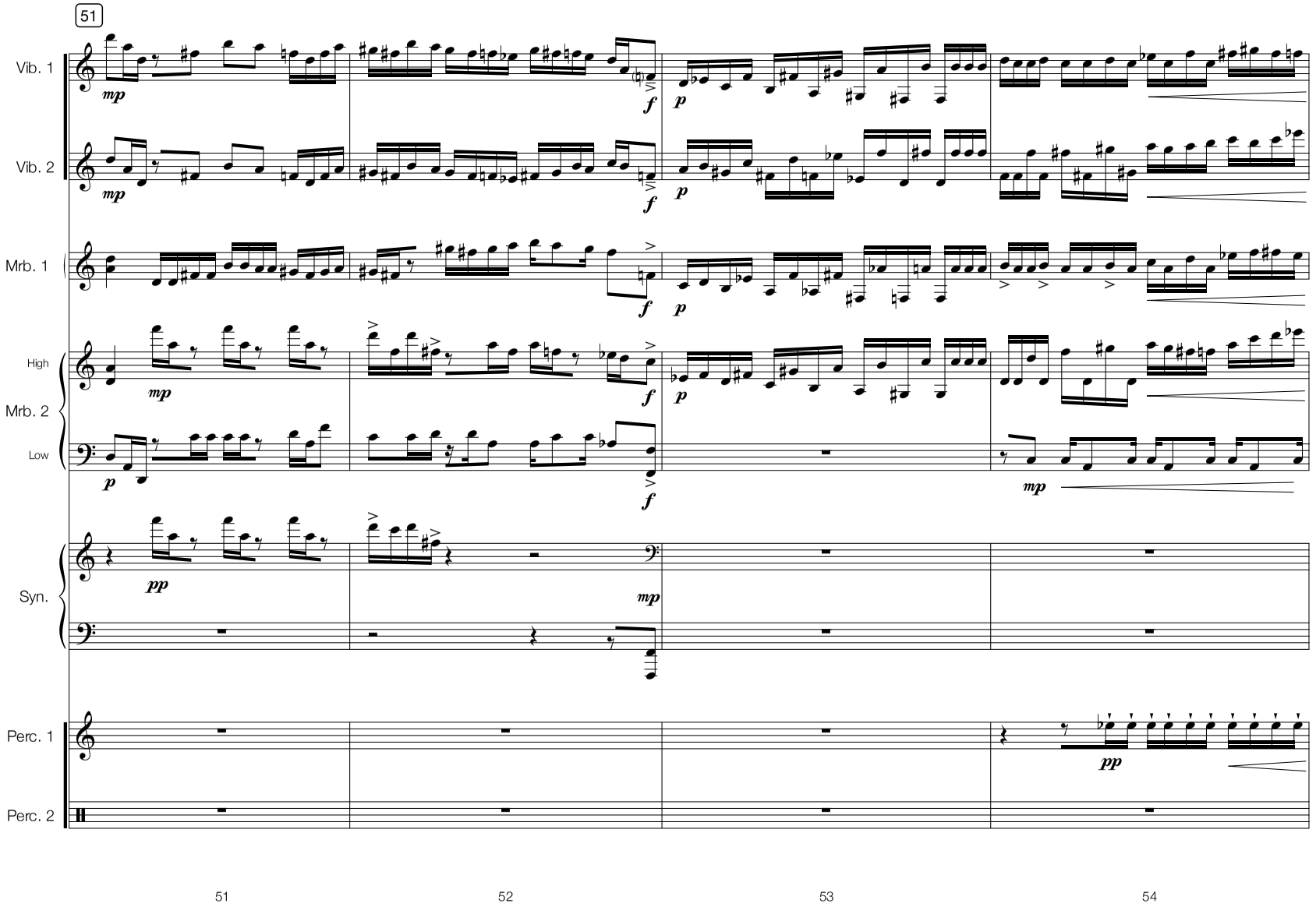

31
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
31
32
33

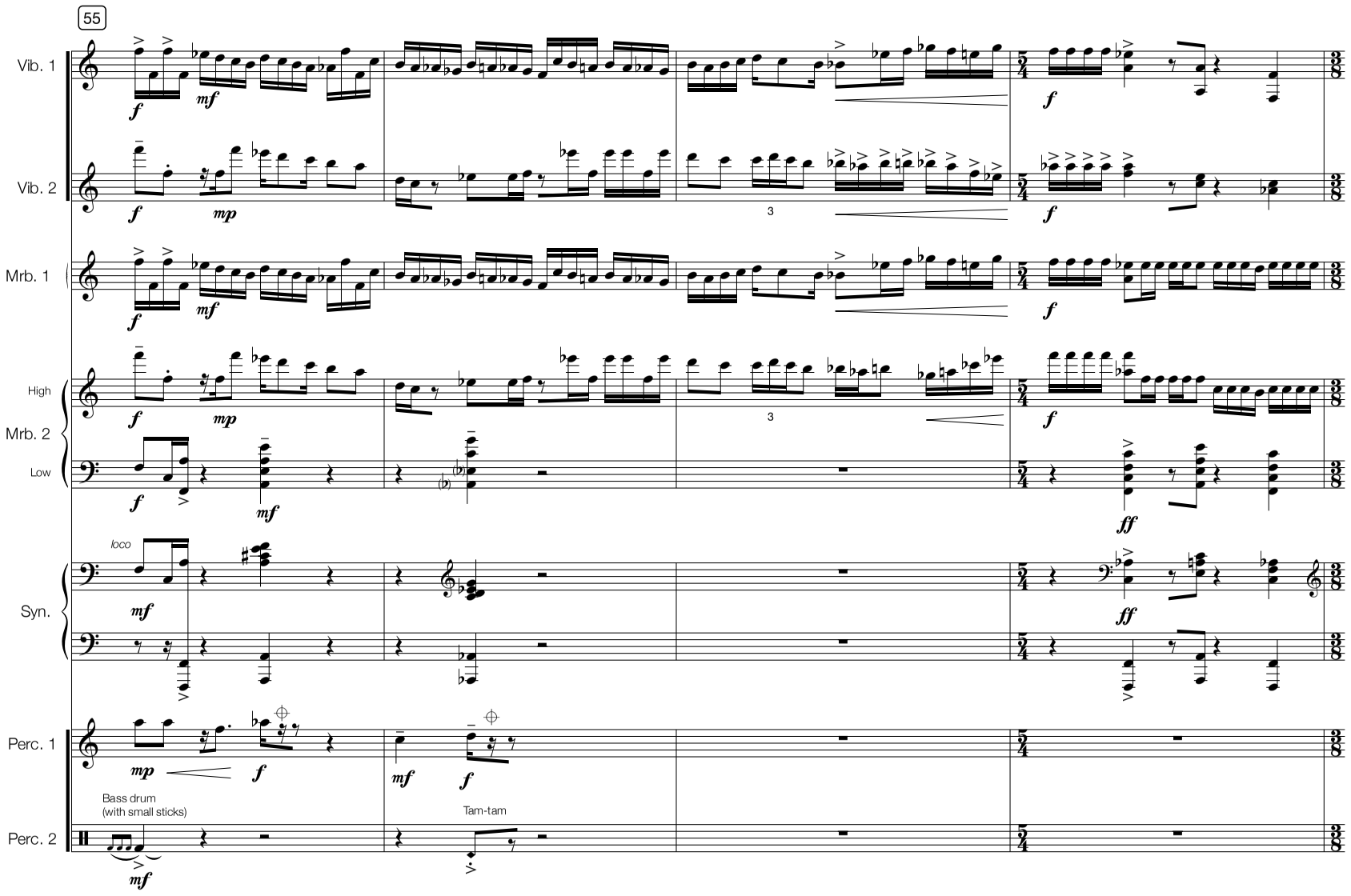

34
36
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Tam-tam
(with coin, scratch with tense,
tiny motions as fast as possible)
Perc. 1
Bass drum
(normal beaters)
Perc. 2
34
35
36
37

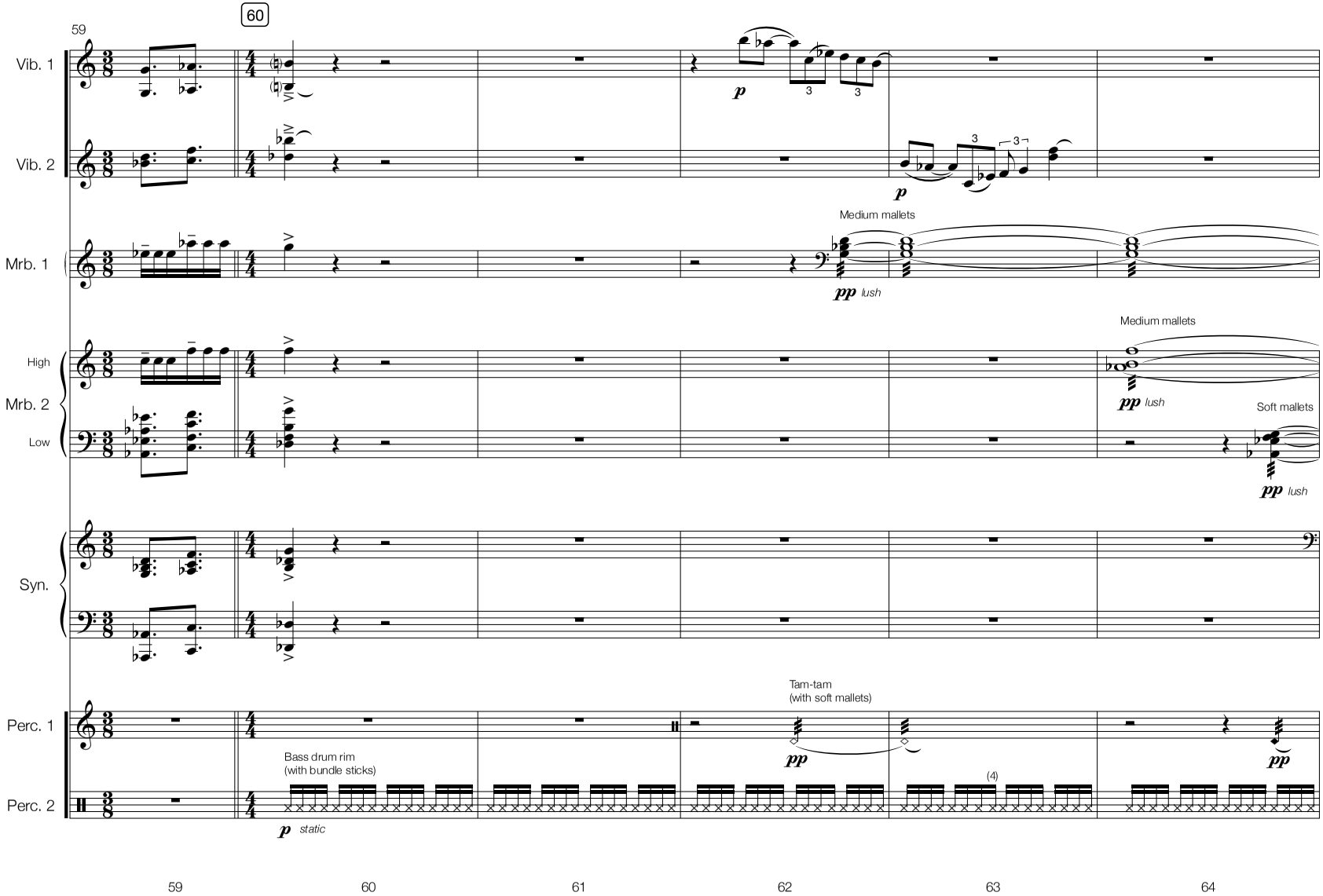

38
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Brake drum
(with small sticks)
Sus. cym.
(with small sticks)
Bass drum
(with small sticks)
38
39
40
41
42

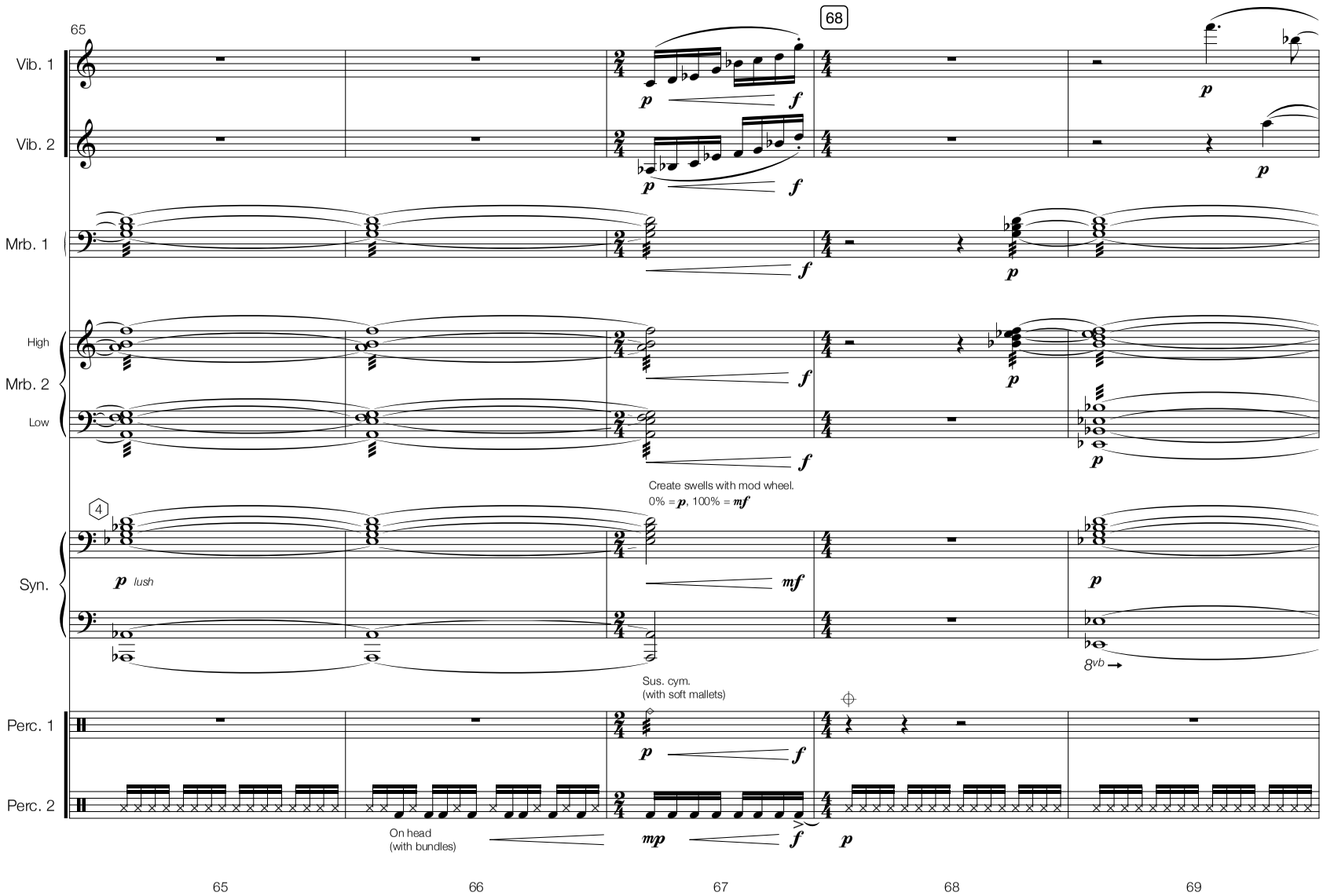

43
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
On rim
43
44
45
46

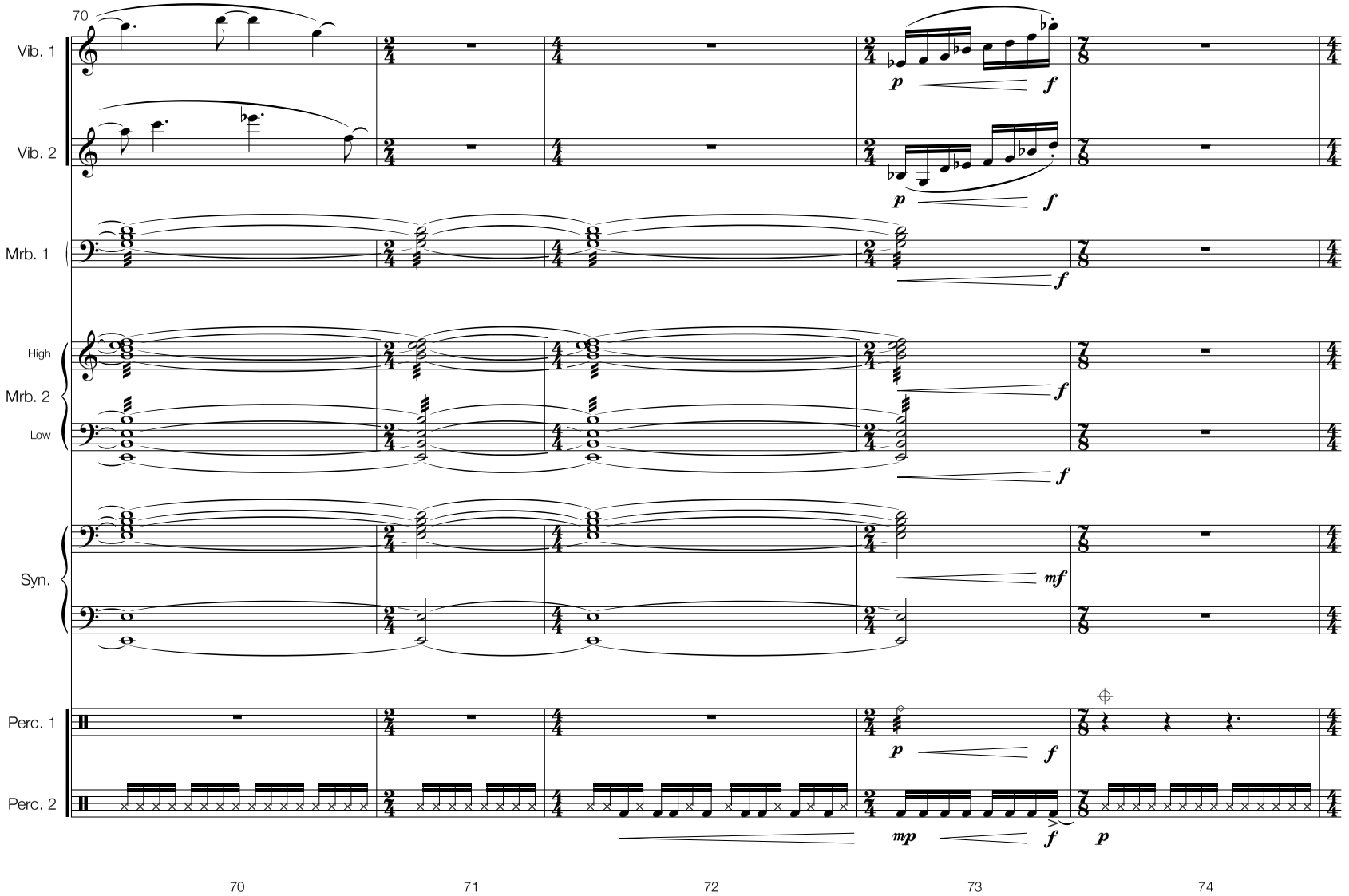

47
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
8va
Crotales (bowed)
Tam-tam
(scrape with coin)
47
48
49
50

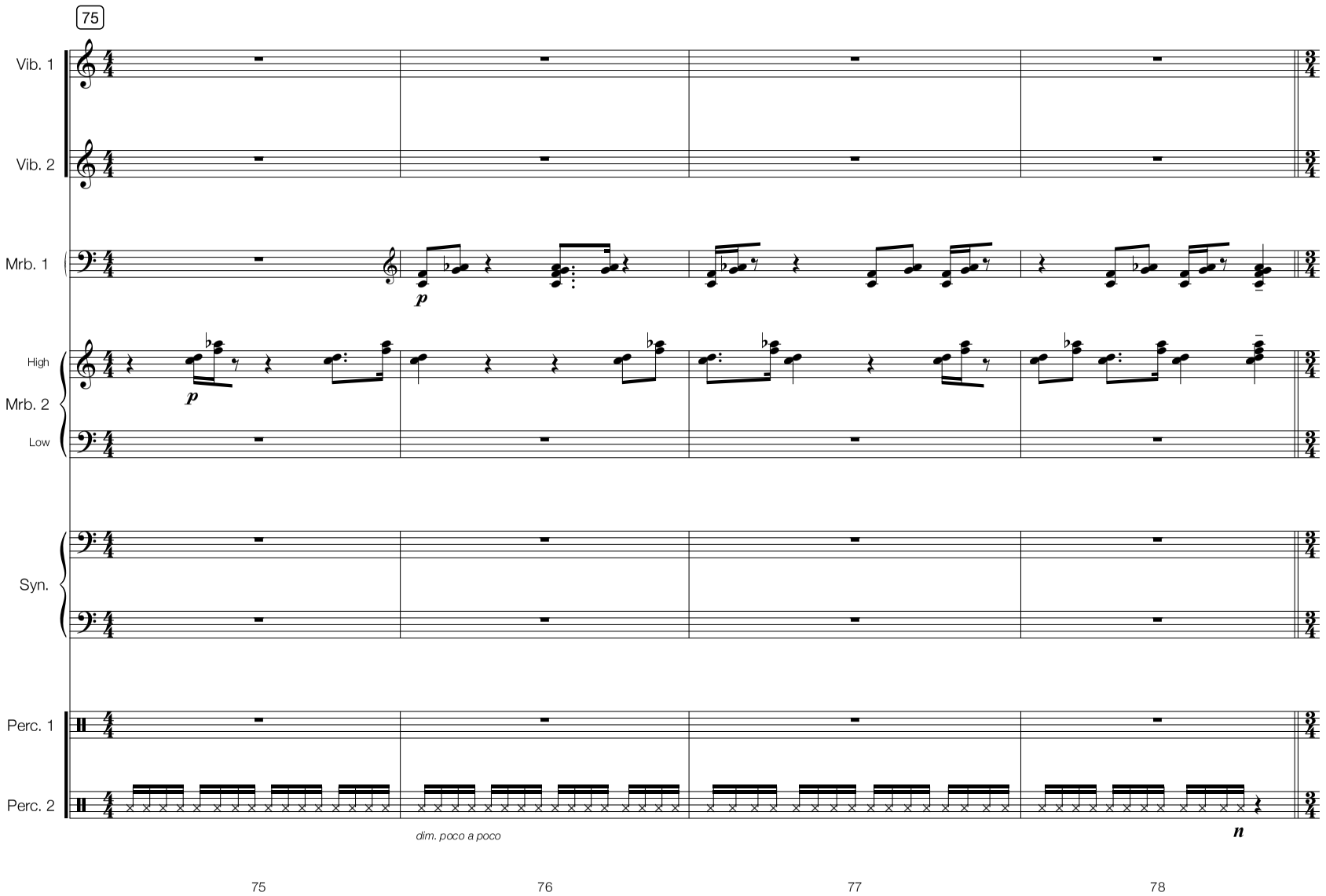

51
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mp
f
p
pp
51
52
53
54

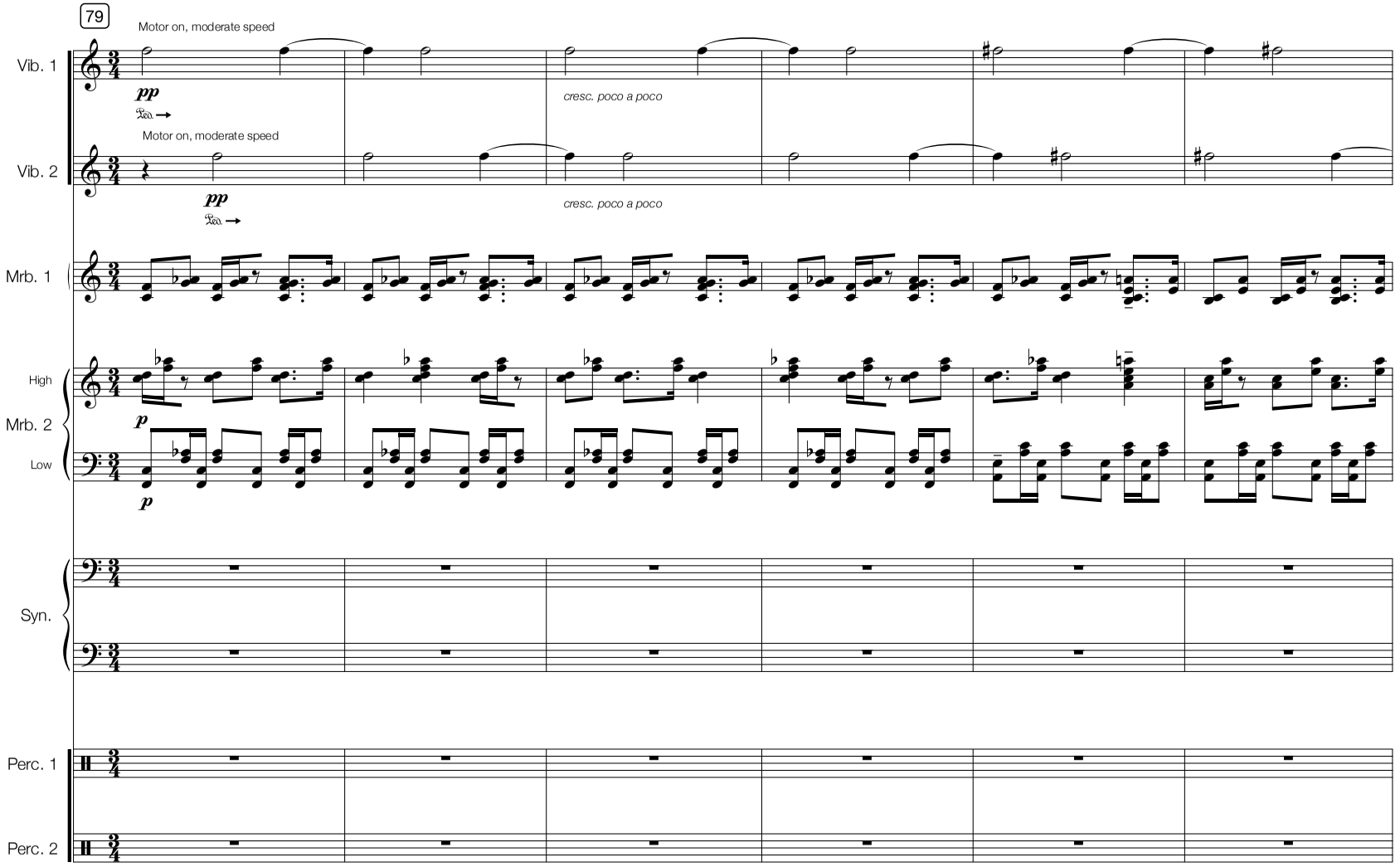

55
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
loco
Bass drum
(with small sticks)
Tam-tam
55
56
57
58

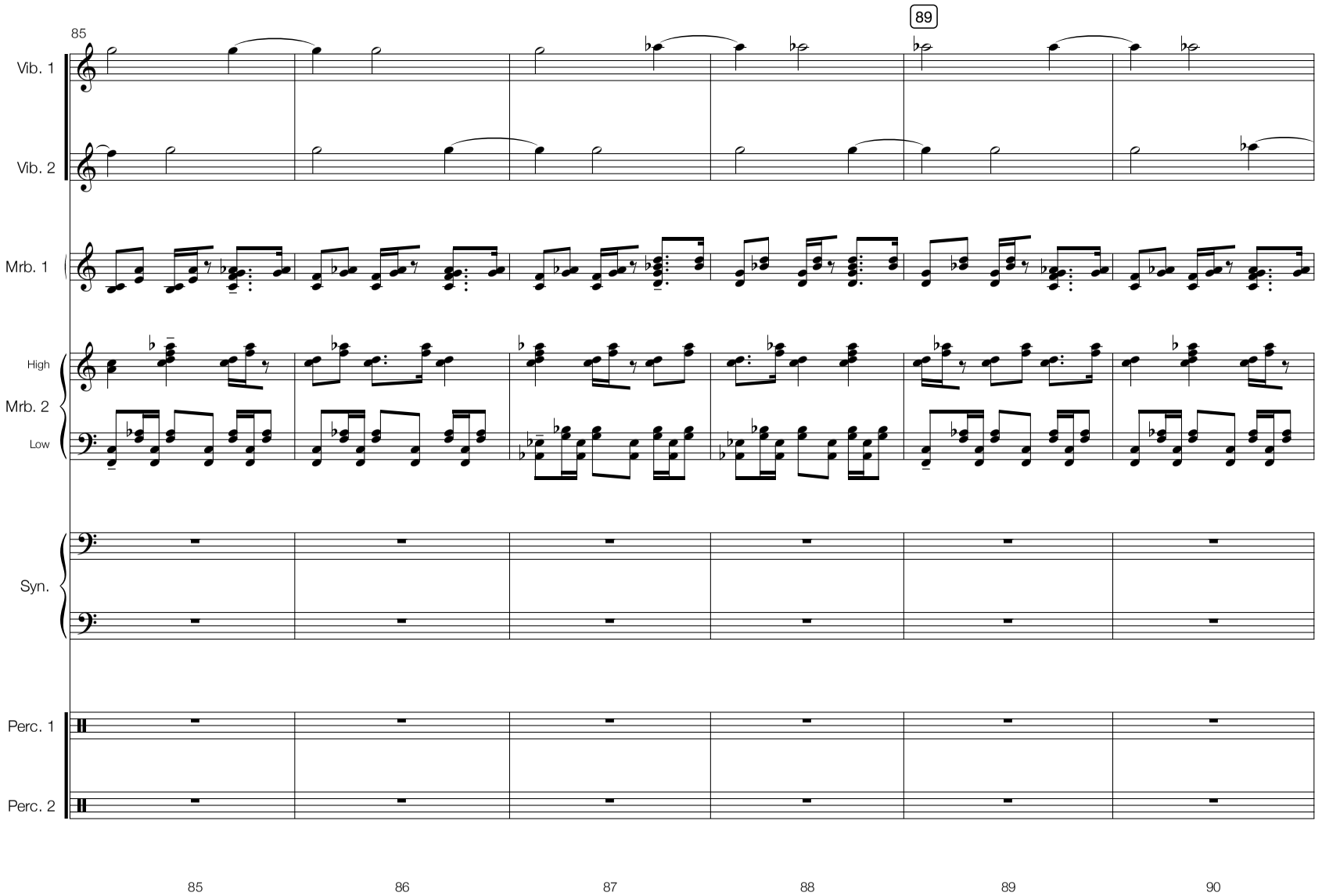

59
60
Vib. 1
Vib. 2
Mrb. 1
Medium mallets
pp lush
High
Mrb. 2
Low
Medium mallets
pp lush
Soft mallets
pp lush
Syn.
Tam-tam
(with soft mallets)
Perc. 1
Bass drum rim
(with bundle sticks)
pp
(4)
pp
Perc. 2
p static
59
60
61
62
63
64

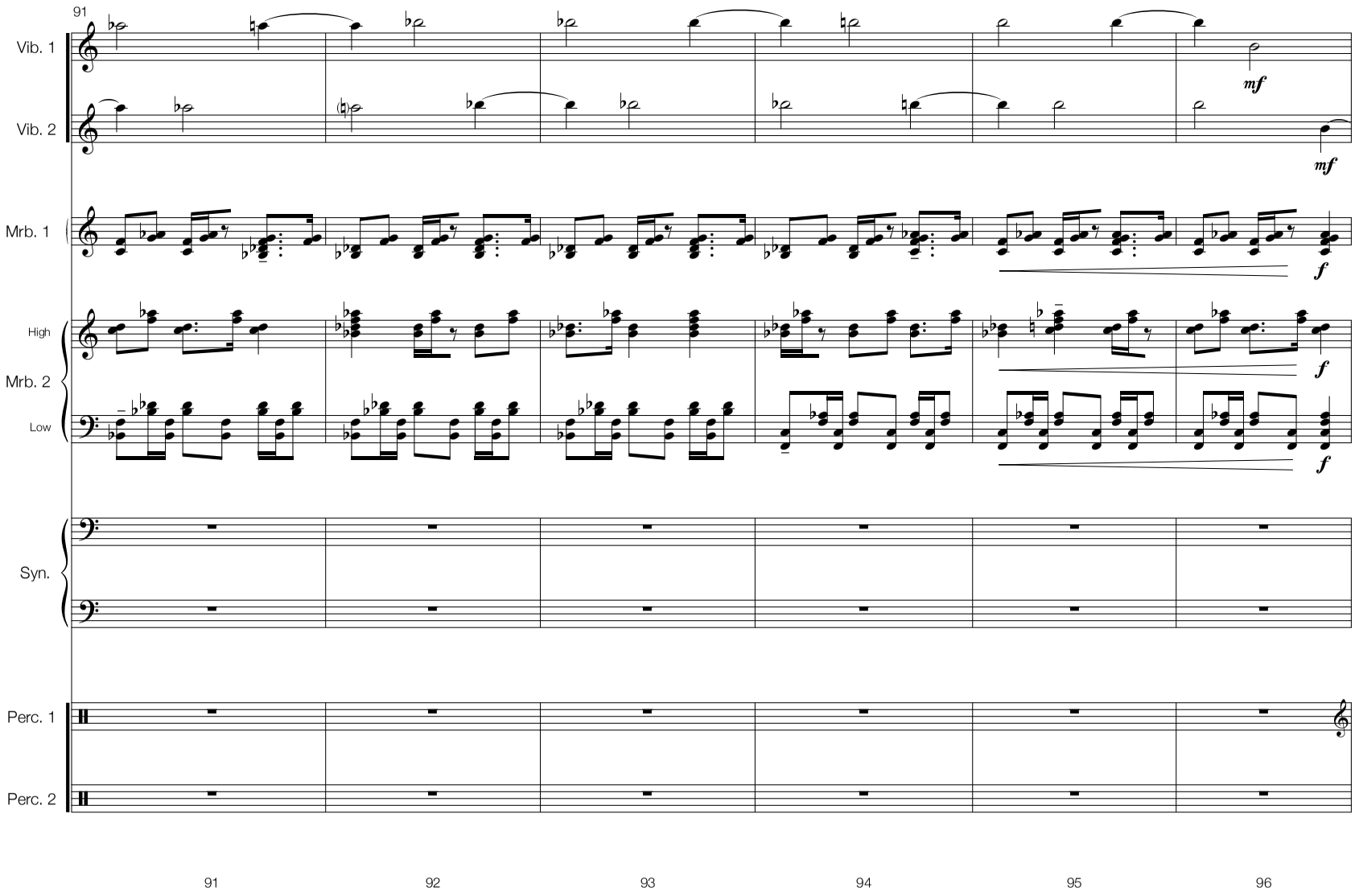

65
68
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Create swells with mod wheel.
0% = p, 100% = mf
4
Syn.
p lush
mf
8vb
Sus. cym.
(with soft mallets)
Perc. 1
Perc. 2
On head
(with bundles)
mp
65
66
67
68
69


70
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
p
f
mf
mp
70
71
72
73
74

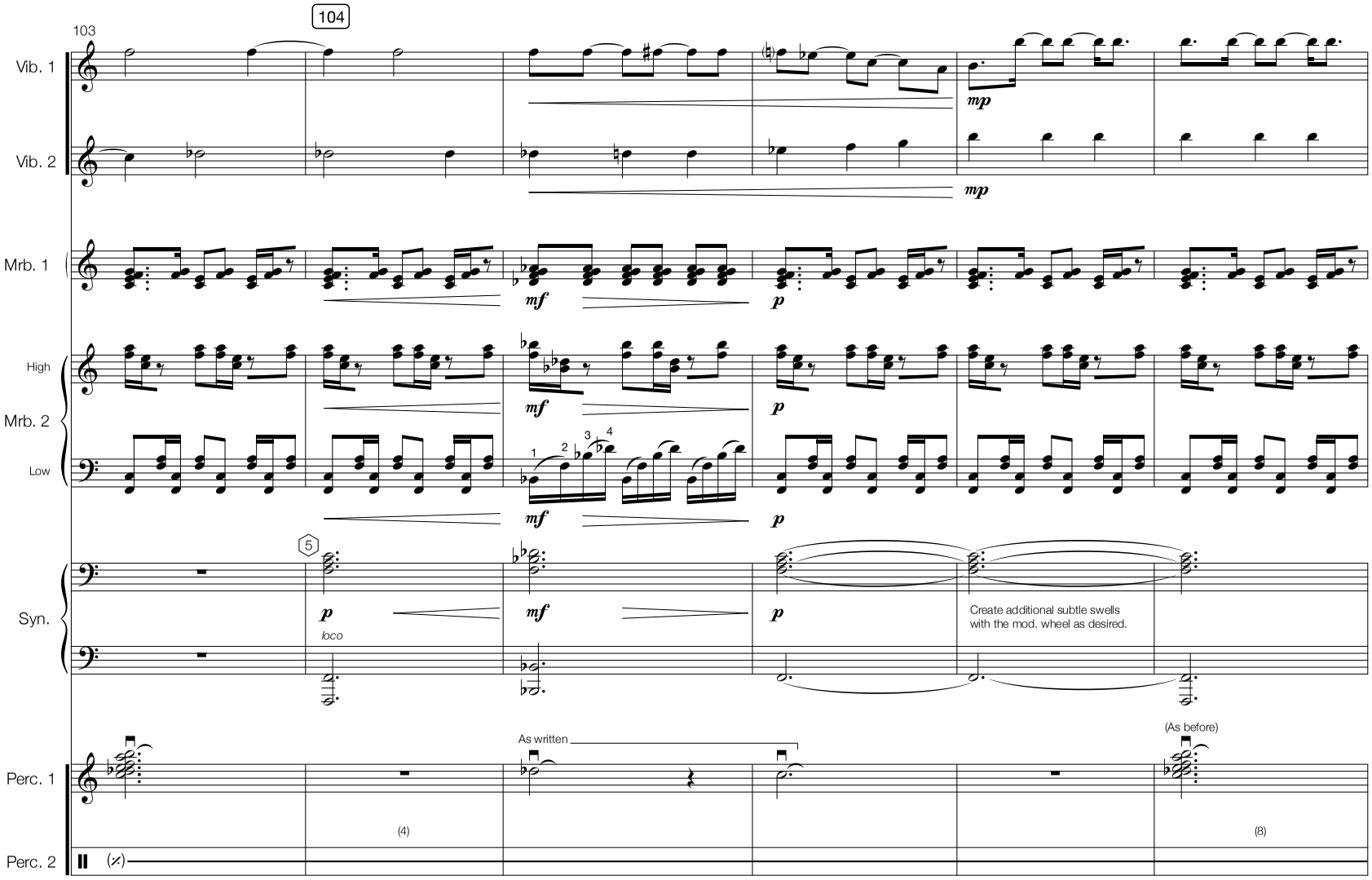

75
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
p
p
dim. poco a poco
n
75
76
77
78

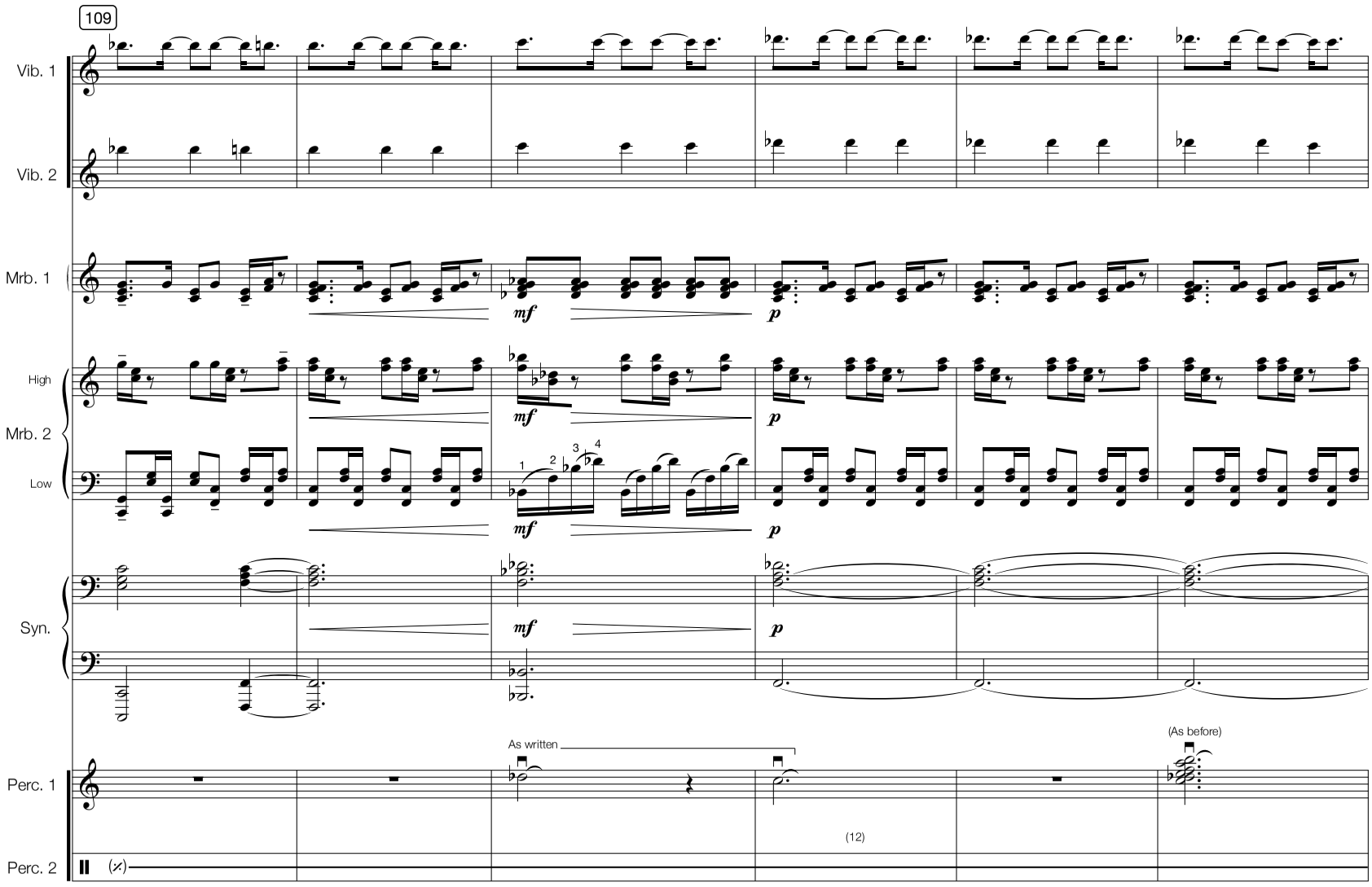

79
Motor on, moderate speed
Vib. 1
pp
cresc. poco a poco
Motor on, moderate speed
Vib. 2
pp
cresc. poco a poco
Mrb. 1
High
Mrb. 2
Low
p
p
Syn.
Perc. 1
Perc. 2
79
80
81
82
83
84

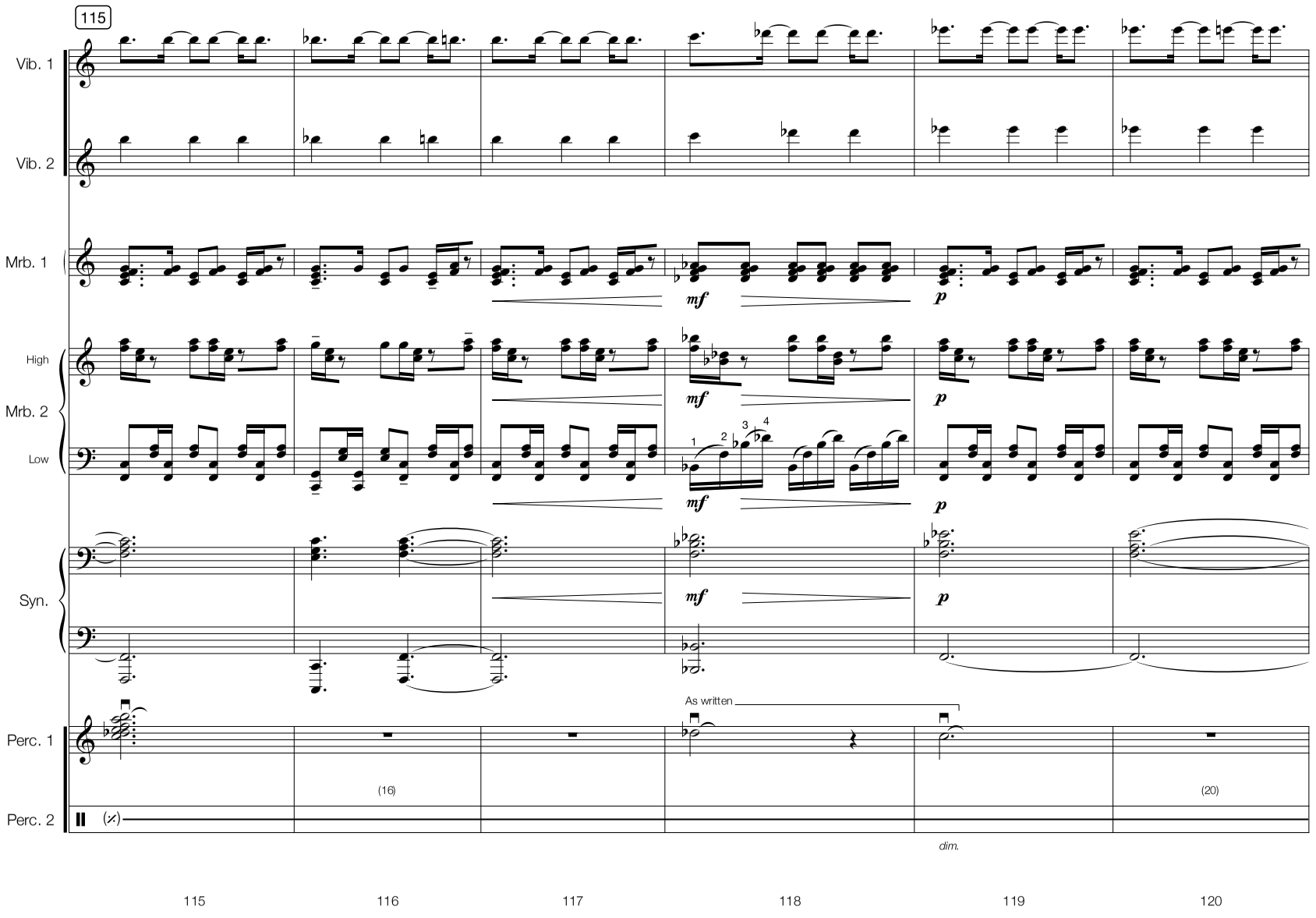

85
89
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
85
86
87
88
89
90

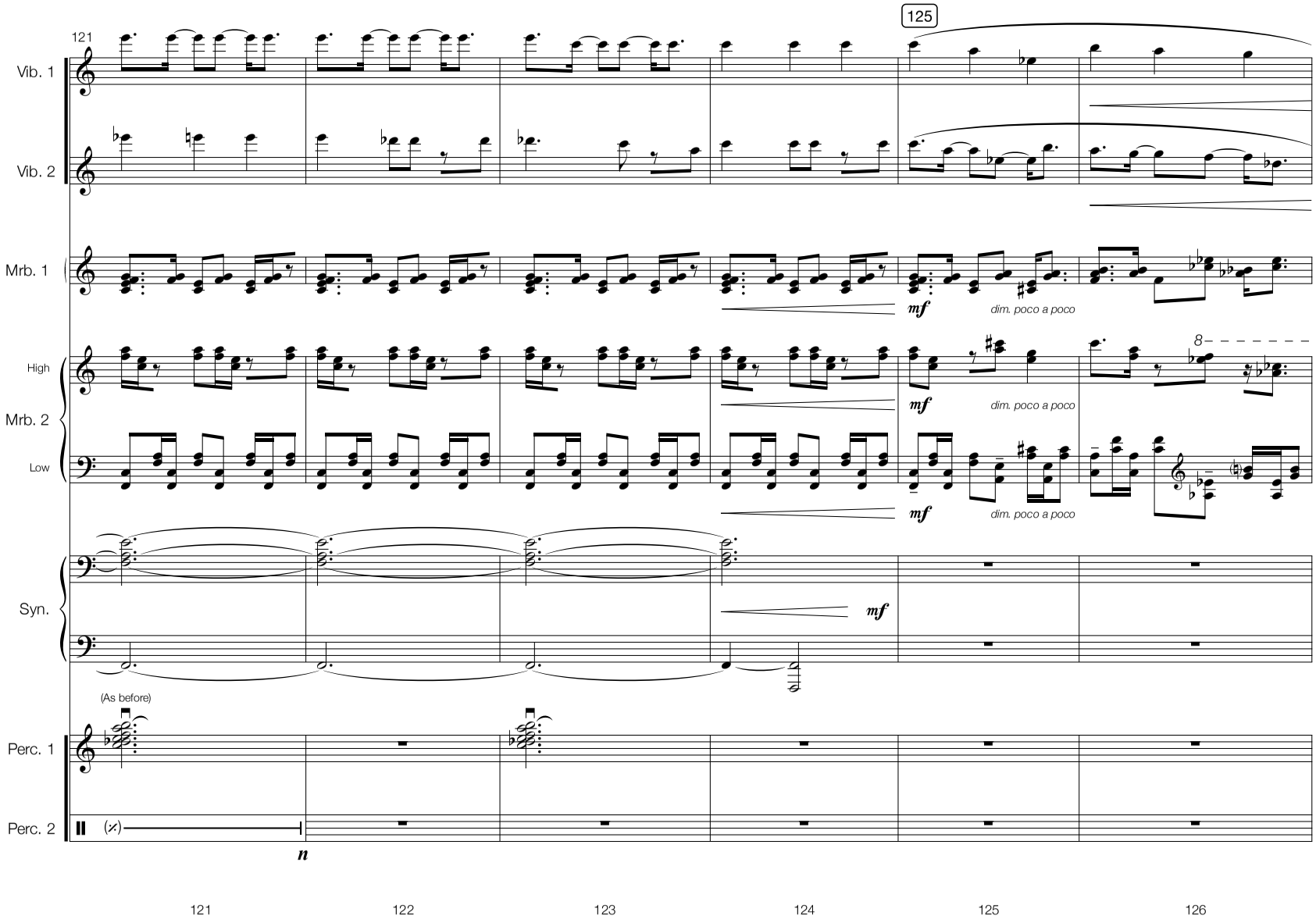

91
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mf
mf
f
f
f
91
92
93
94
95
96

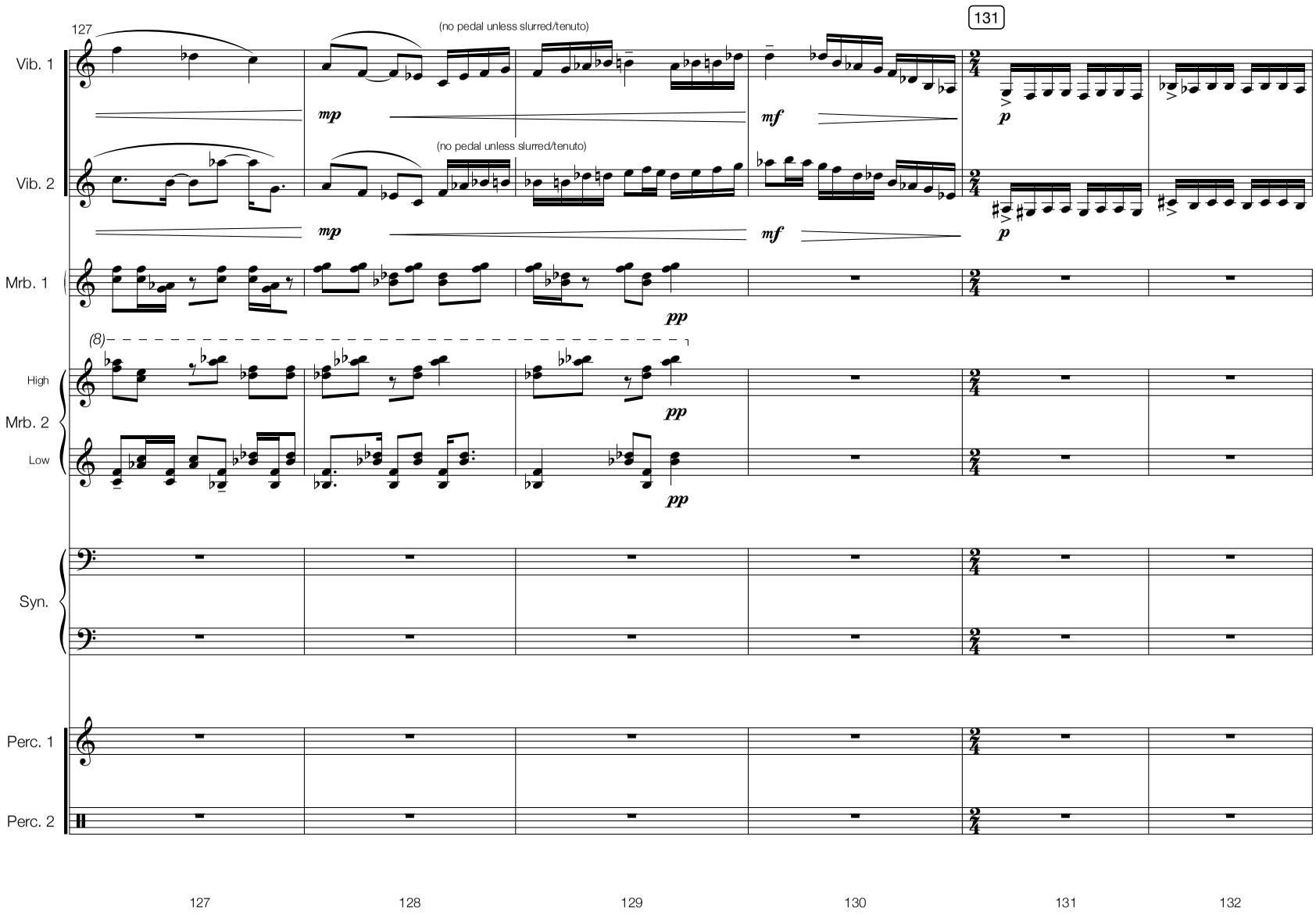

97
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Select a single note from each chord to bow.
Perc. 1
Large caxixi (shake basket-side down)
Improvise a similar light accent pattern. Always running 16th-notes.
Perc. 2
97
98
99
100
101
102

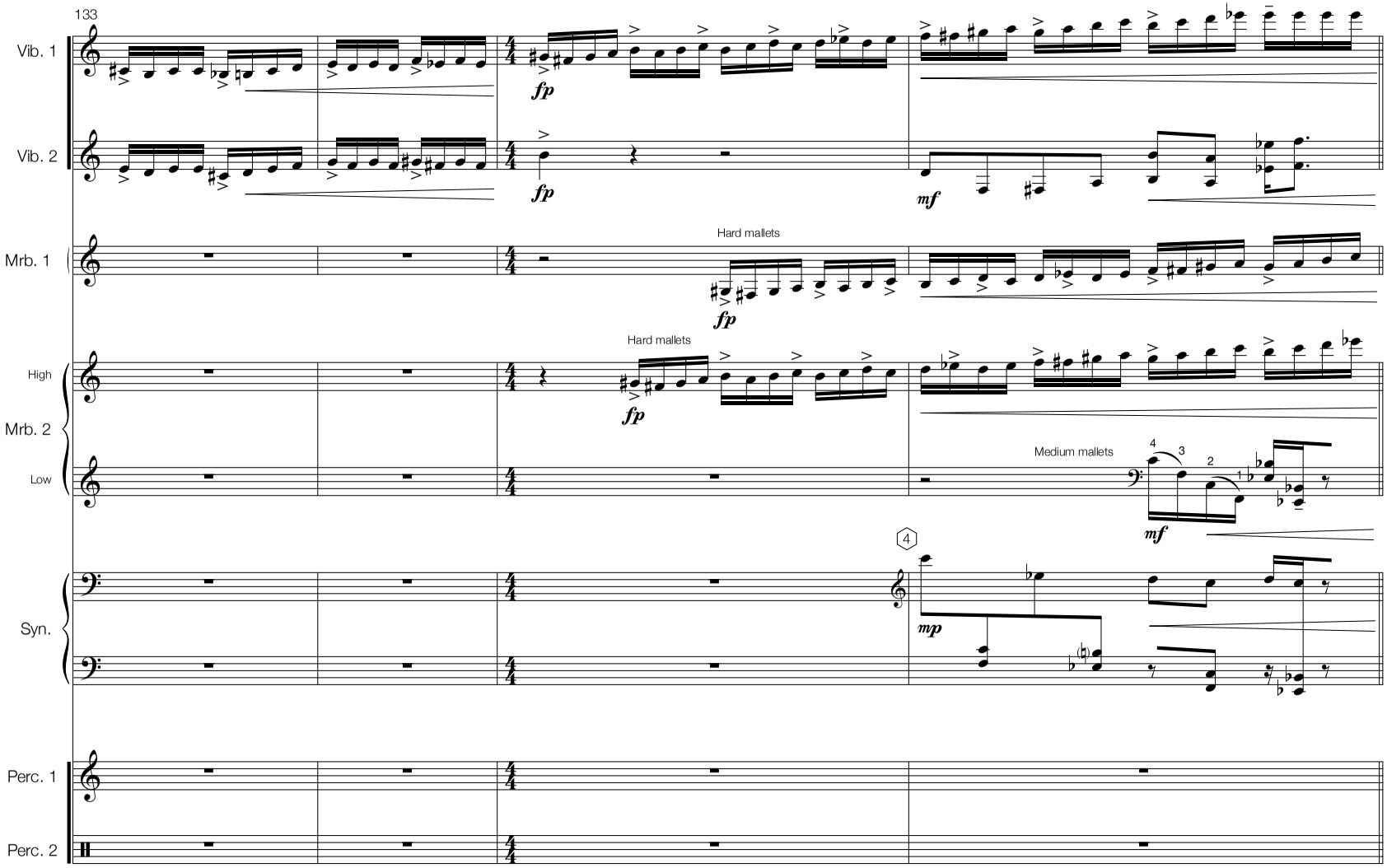

103
104
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mp
mf
p
loco
Create additional subtle swells
with the mod. wheel as desired.
As written
(As before)
(4)
(8)
103
104
105
106
107
108

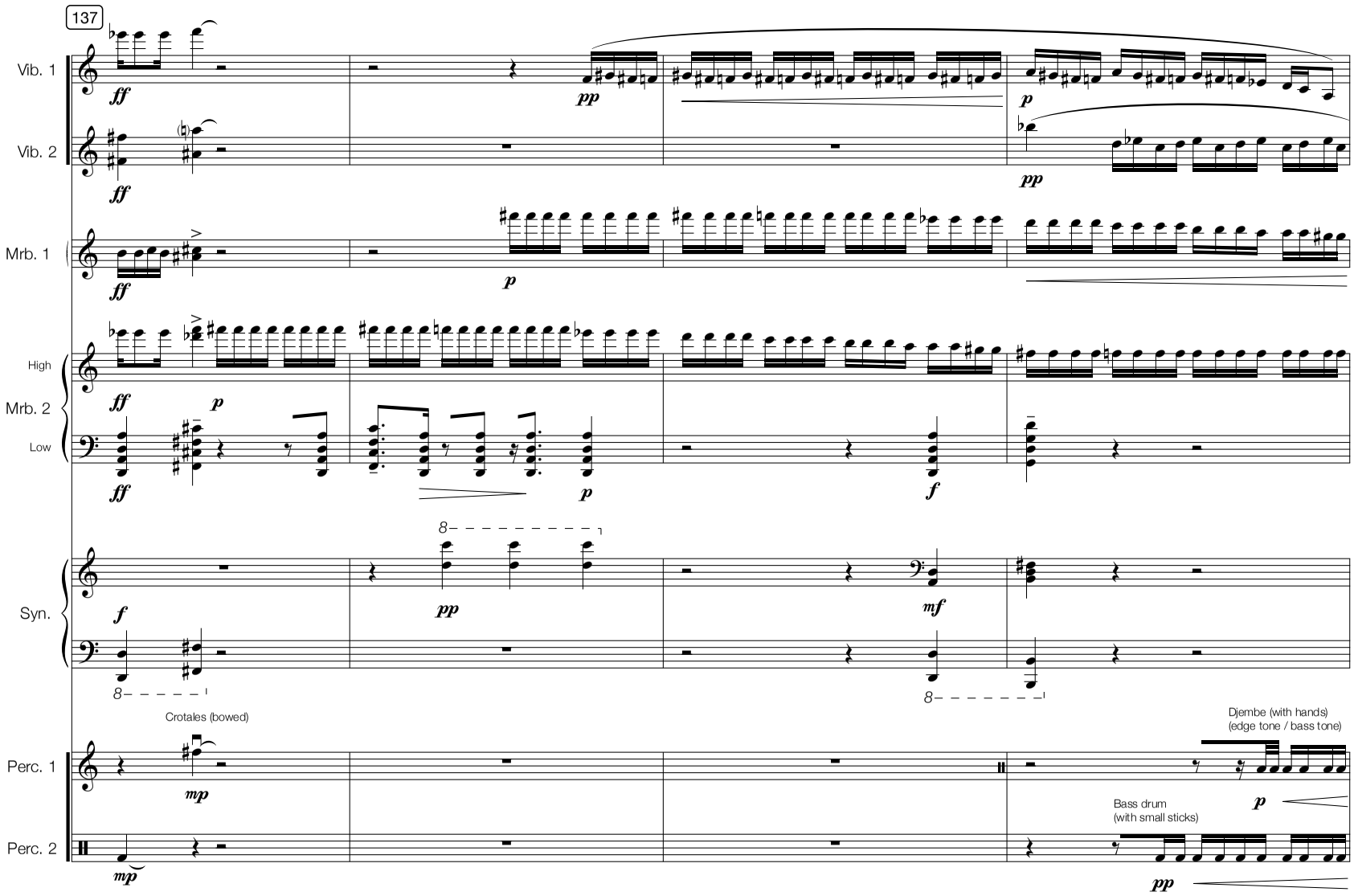

109
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mf
p
As written
(As before)
(12)
109
110
111
112
113
114

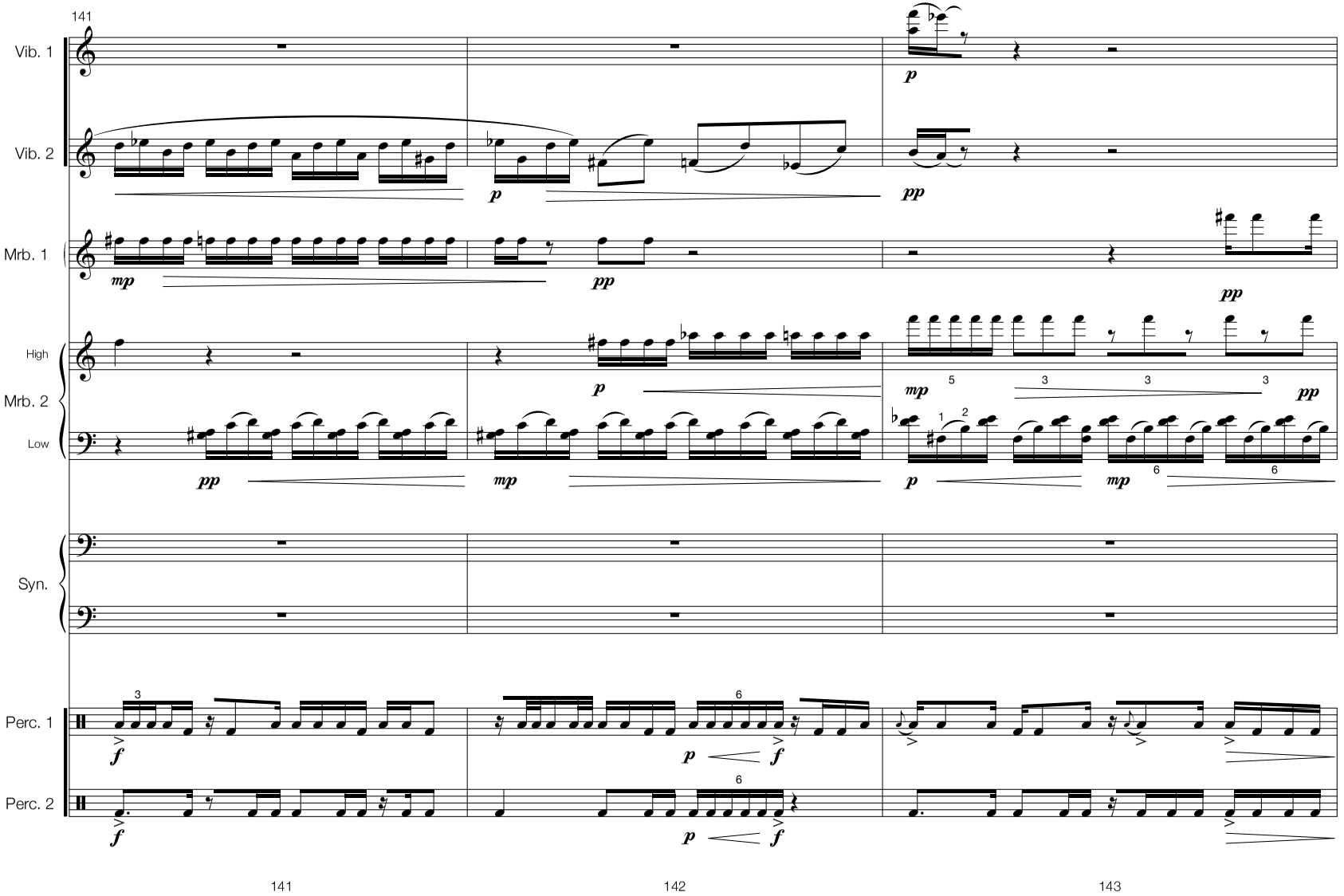

115
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mf
p
As written
(16)
(20)
dim.
115
116
117
118
119
120

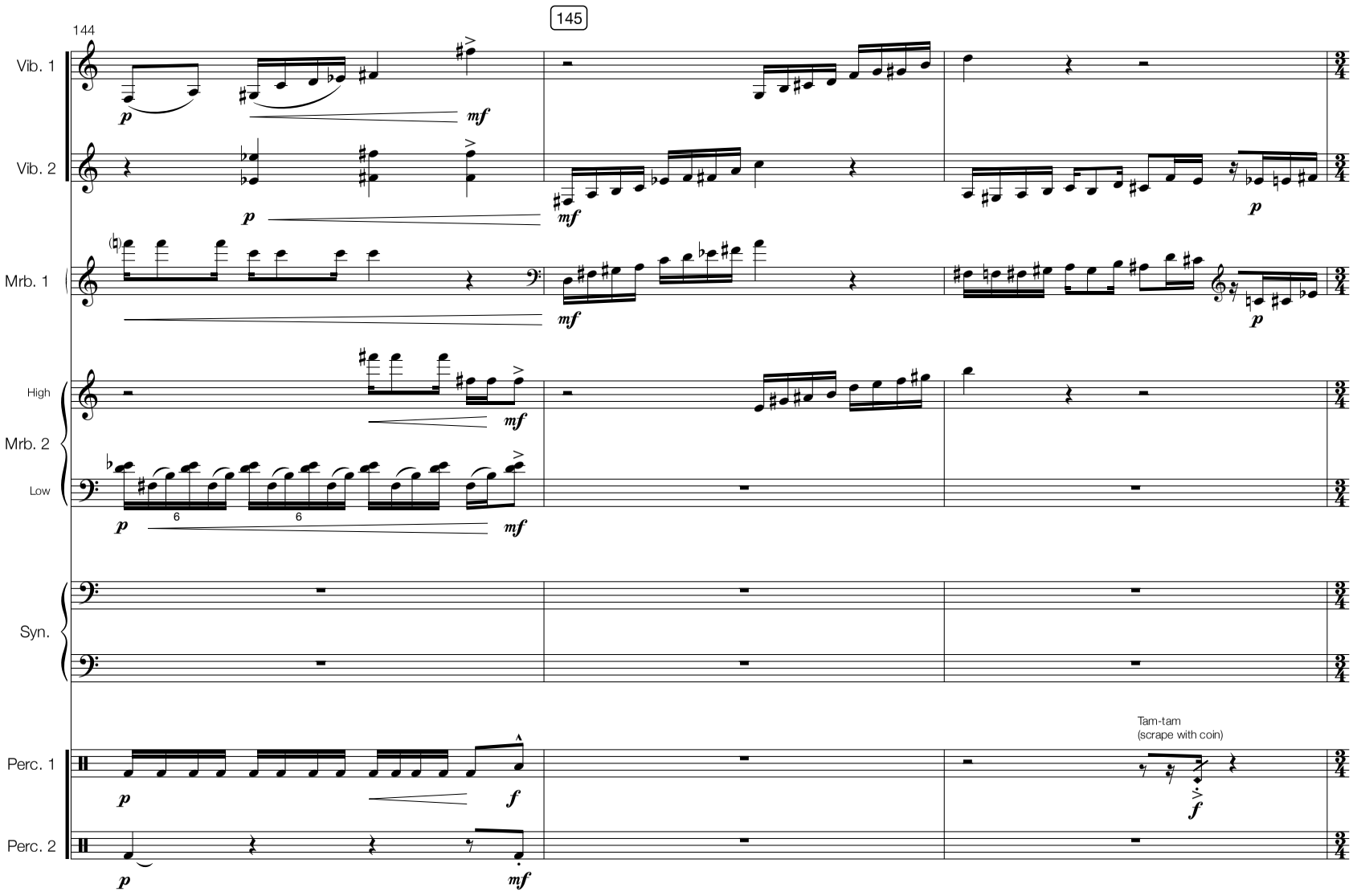

121
125
Vib. 1
Vib. 2
Mrb. 1
mf
dim. poco a poco
High
Mrb. 2
Low
8
Syn.
(As before)
Perc. 1
Perc. 2
n
121
122
123
124
125
126

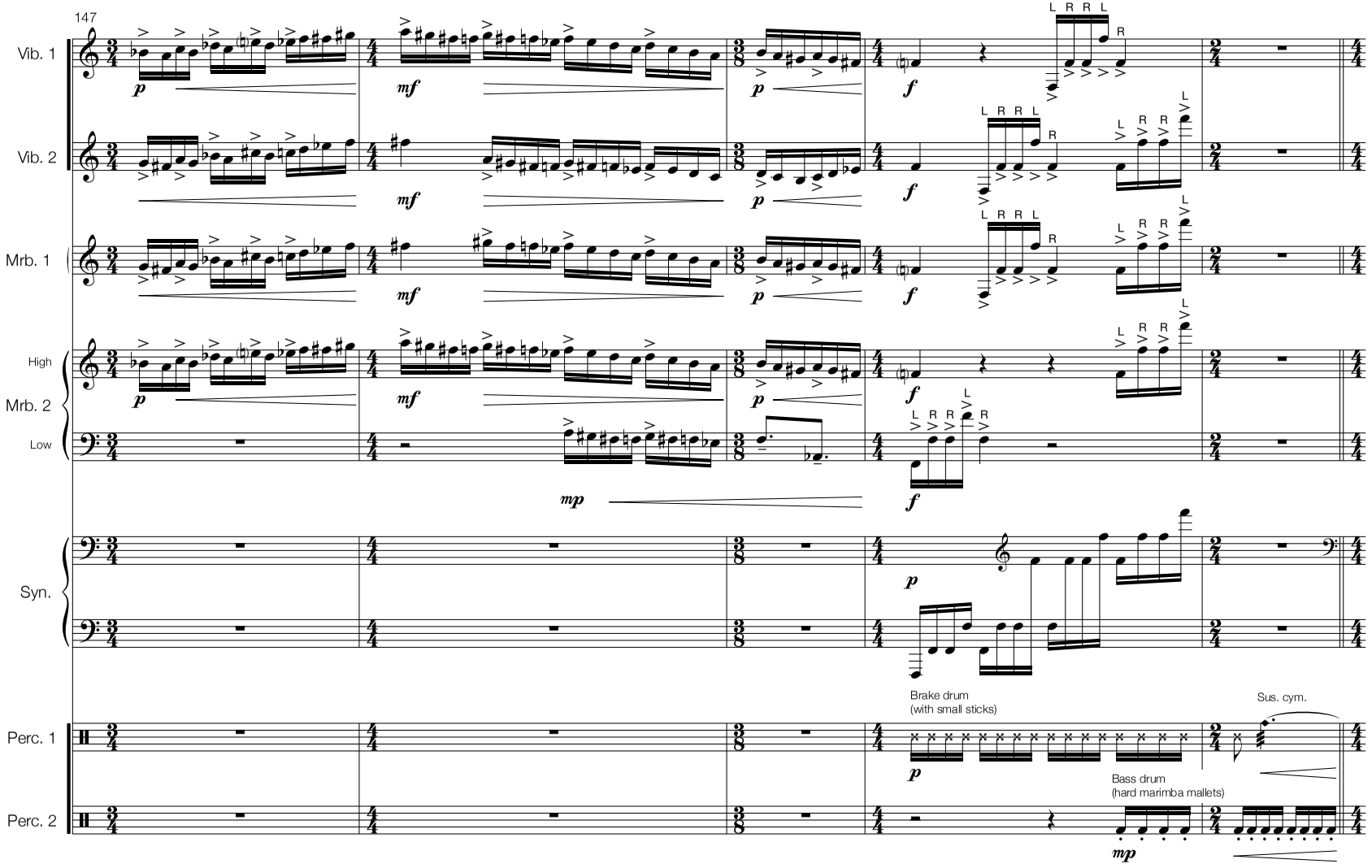

127
131
(no pedal unless slurred/tenuto)
(no pedal unless slurred/tenuto)
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mp
mf
p
pp
(8)
127
128
129
130
131
132

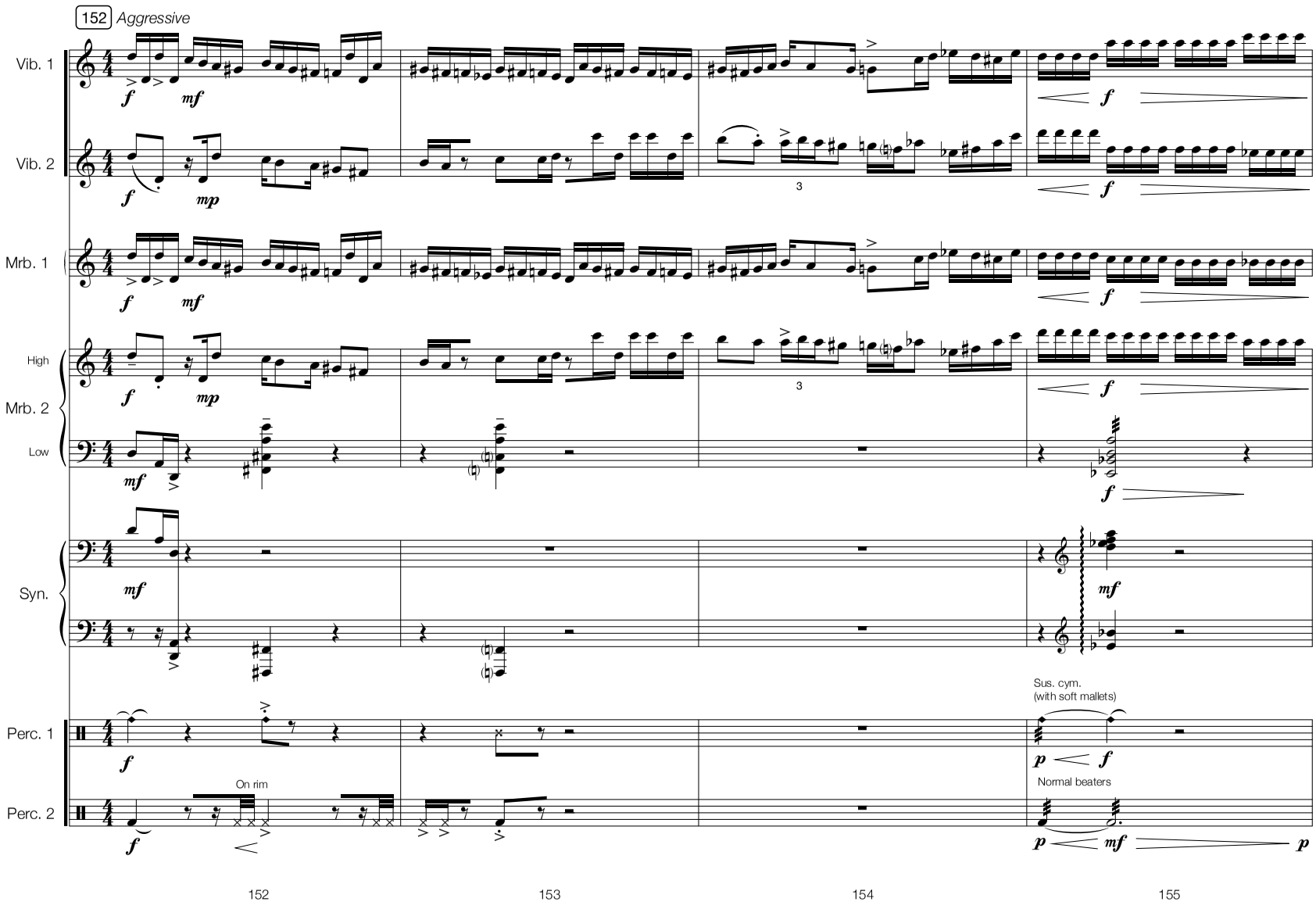

133
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
fp
mf
Hard mallets
Medium mallets
4
mp
133
134
135
136

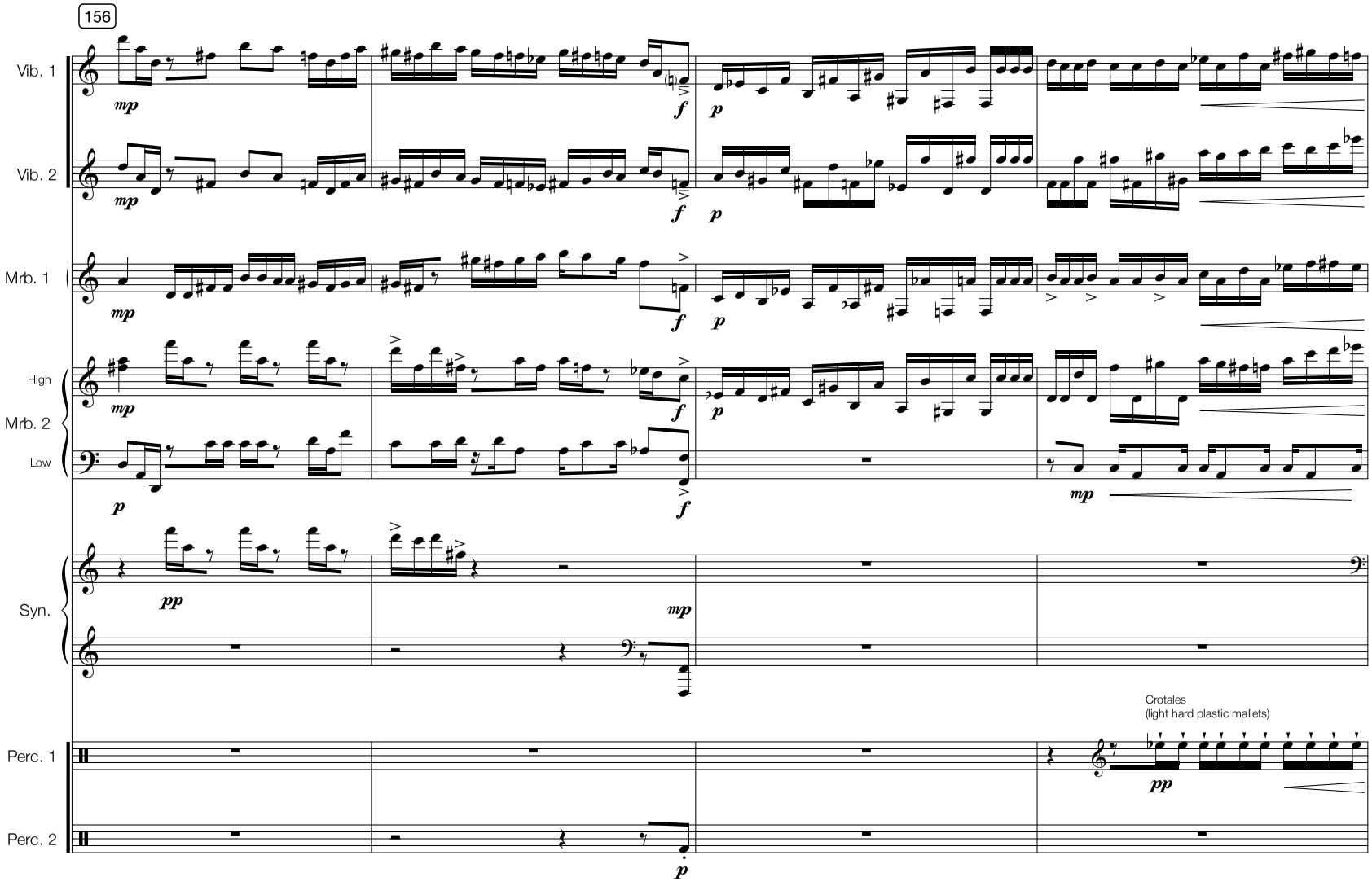

137
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Crotales (bowed)
Djembe (with hands)
(edge tone / bass tone)
Perc. 1
Bass drum
(with small sticks)
Perc. 2
137
138
139
140

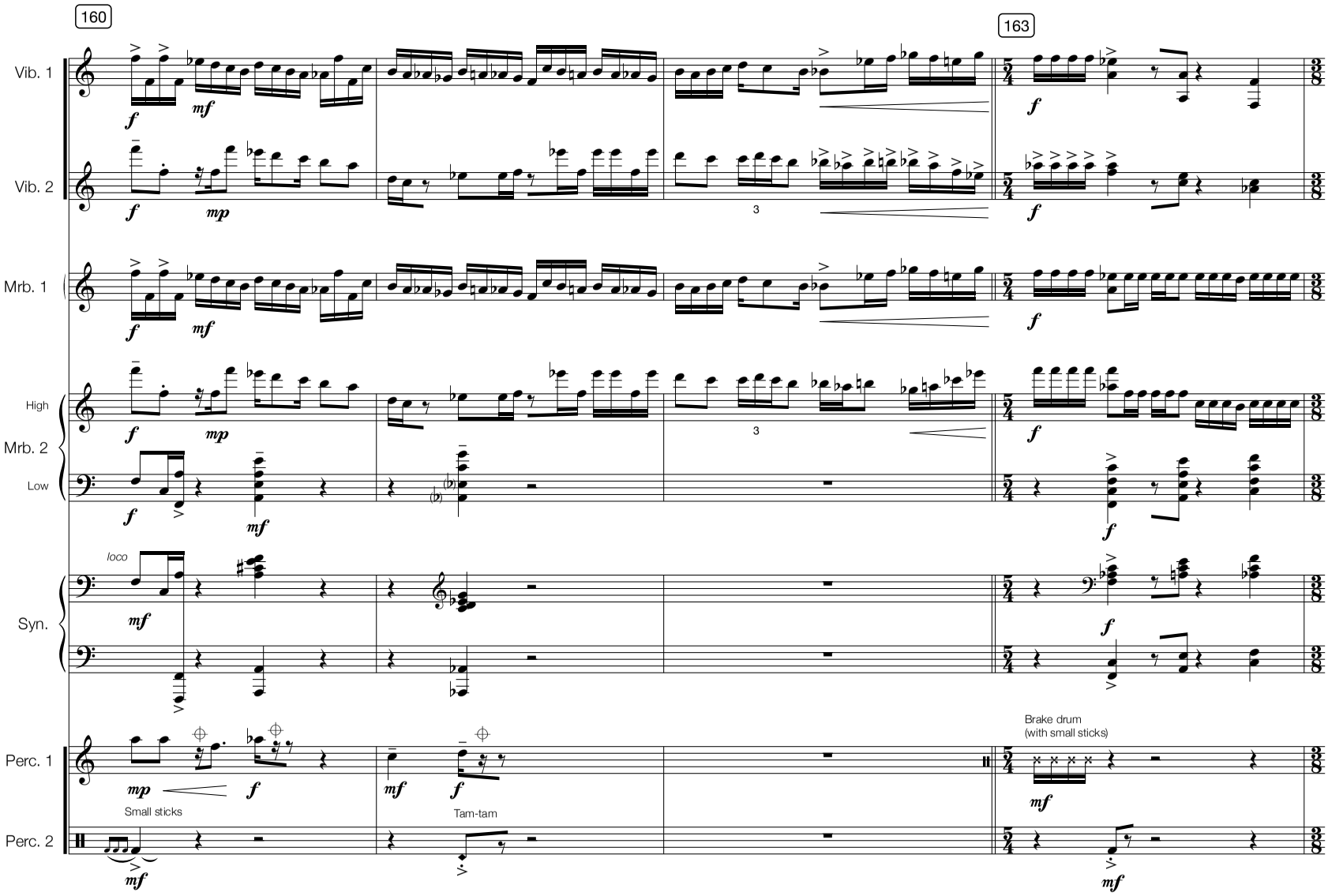

141
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
141
142
143

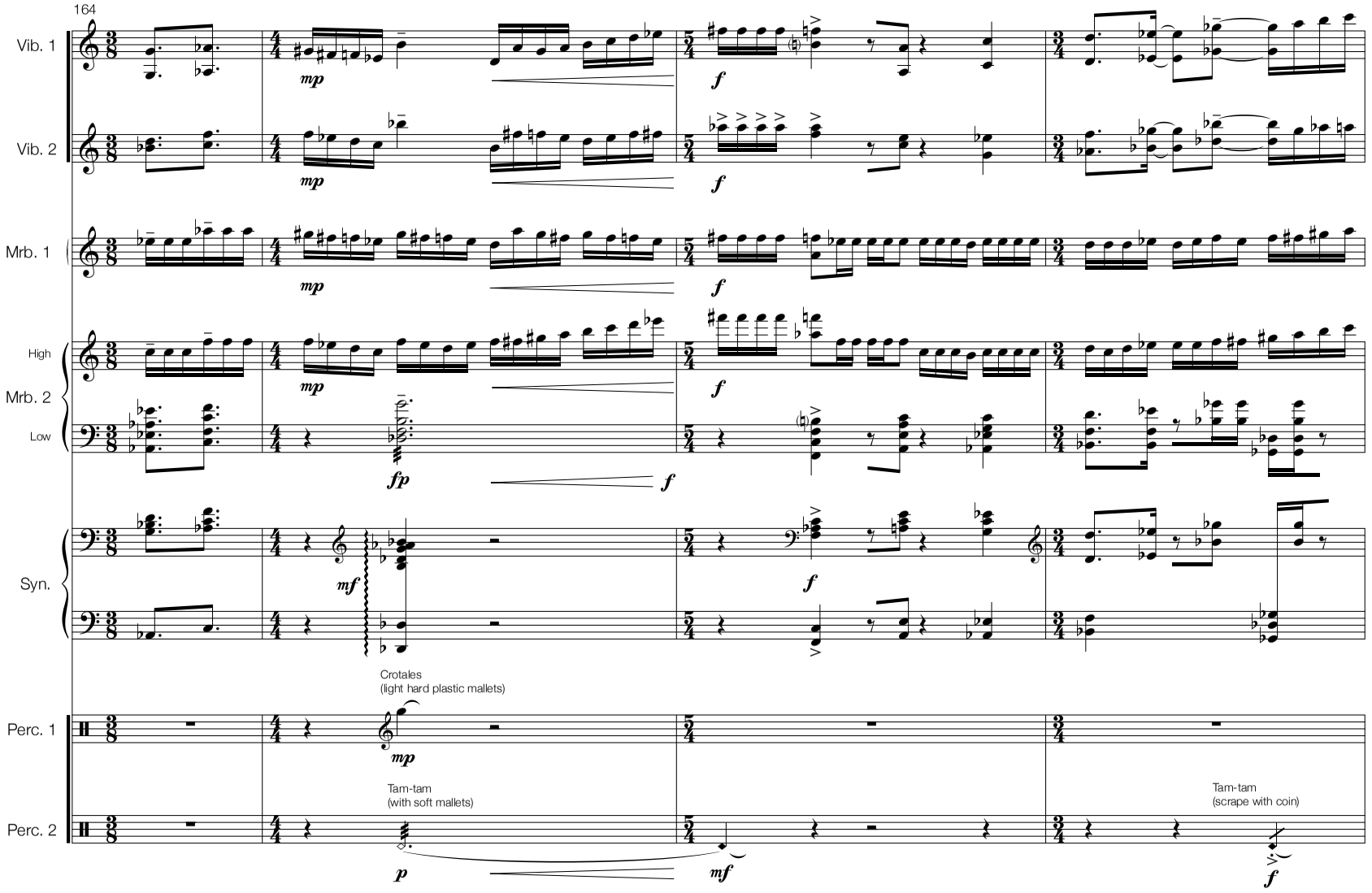

144
145
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Tam-tam
(scrape with coin)
144
145
146

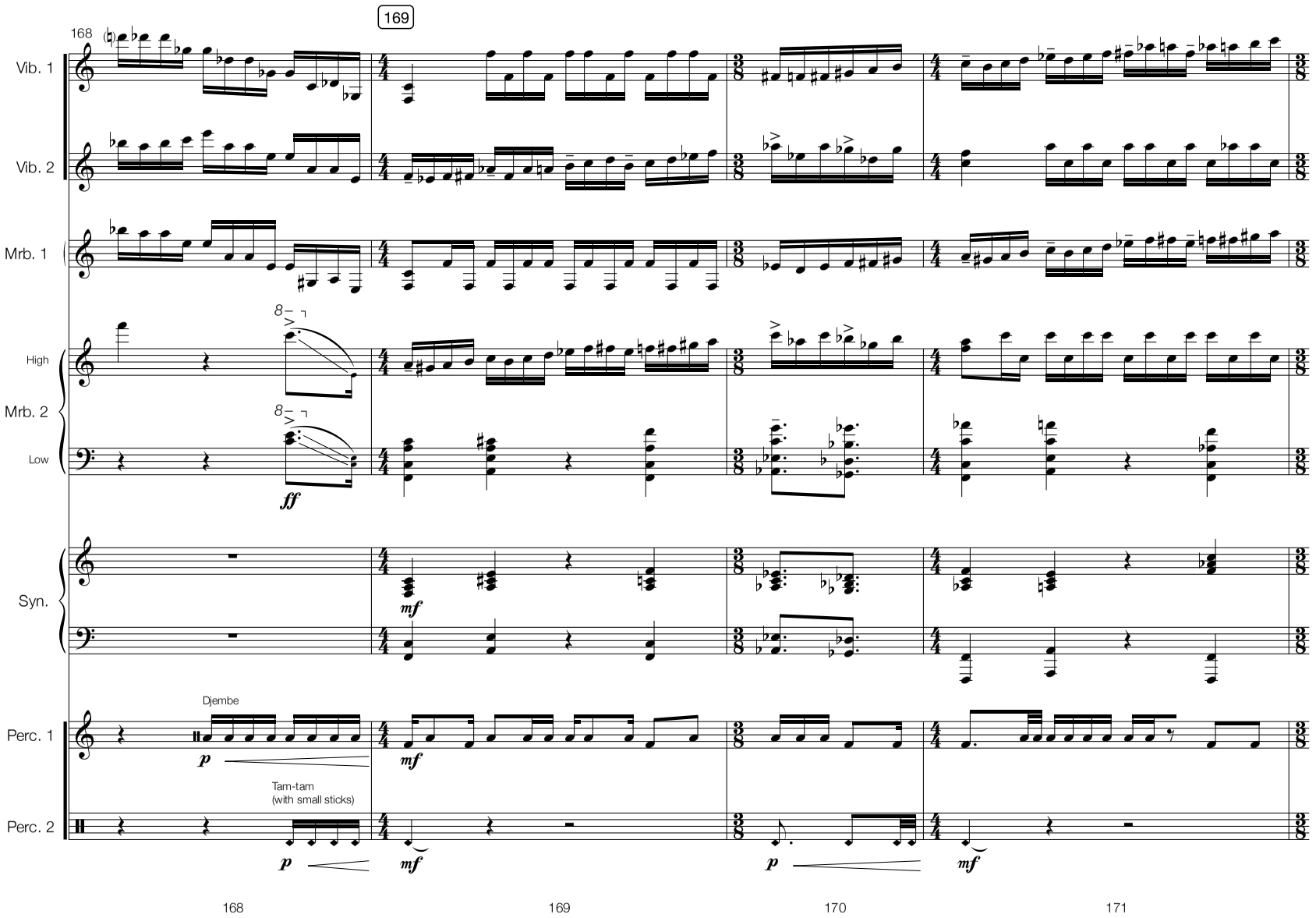

147
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Brake drum
(with small sticks)
Sus. cym.
Bass drum
(hard marimba mallets)
147
148
149
150
151

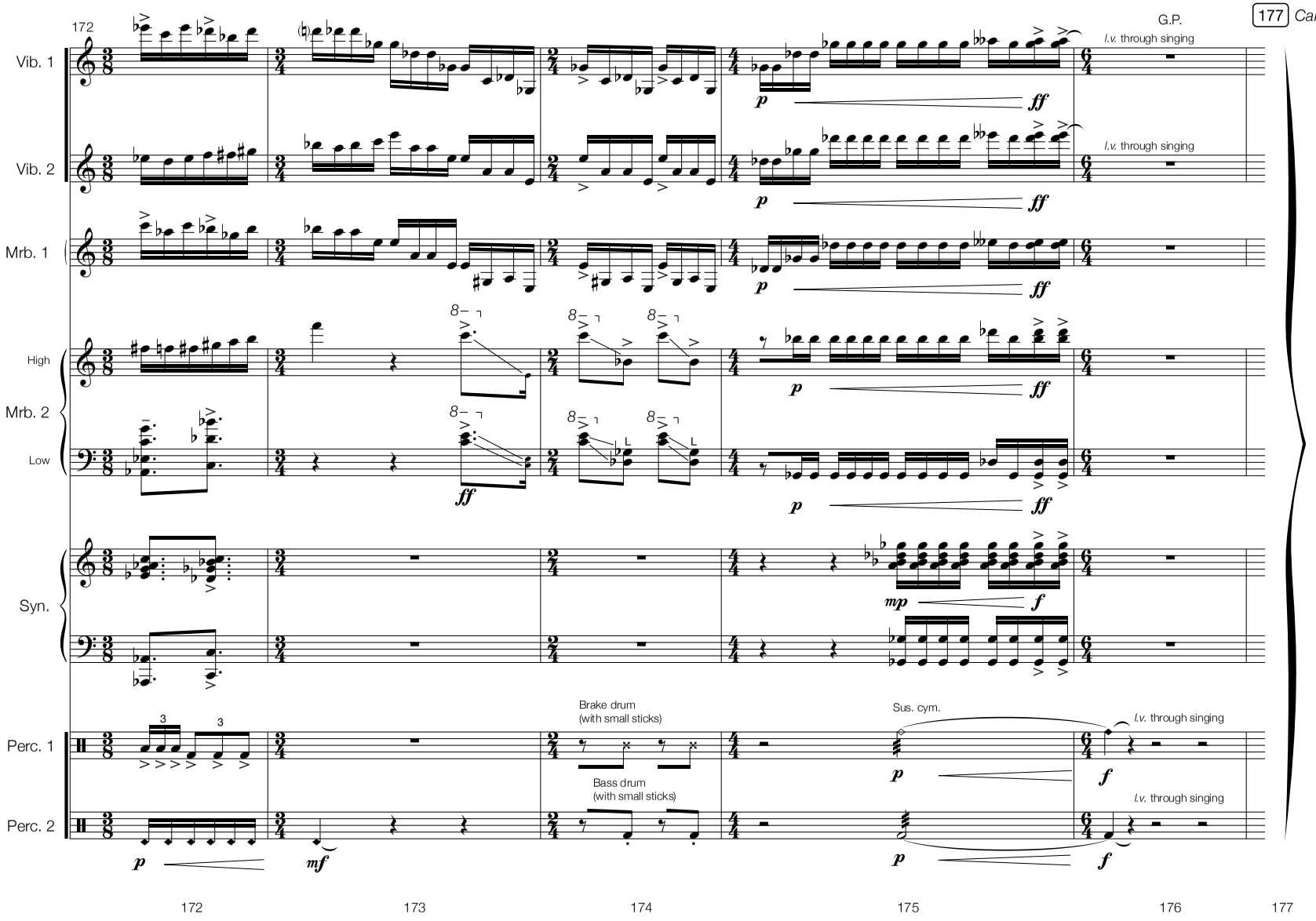

152 Aggressive
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
On rim
Sus. cym.
(with soft mallets)
Normal beaters
152
153
154
155

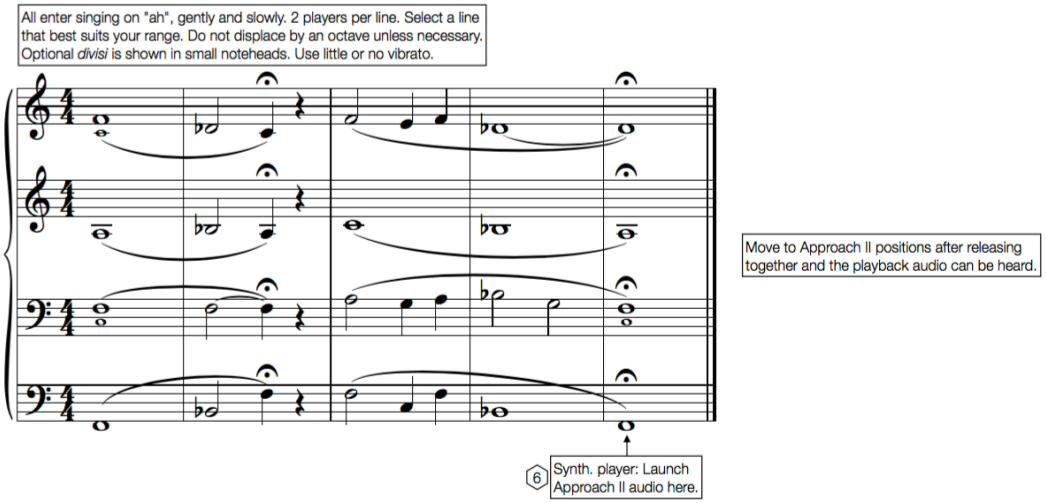

156
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Crotales
(light hard plastic mallets)
156
157
158
159


160
163
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
loco
Small sticks
Tam-tam
Brake drum
(with small sticks)
160
161
162
163


164
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Crotales
(light hard plastic mallets)
Perc. 1
Tam-tam
(with soft mallets)
Tam-tam
(scrape with coin)
Perc. 2
164
165
166
167


168
169
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
ff
Syn.
mf
Djembe
Perc. 1
p
mf
Tam-tam
(with small sticks)
Perc. 2
p
mf
p
mf
168
169
170
171


172
177 Calm
G.P.
Vib. 1
l.v. through singing
Vib. 2
l.v. through singing
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Brake drum
(with small sticks)
Sus. cym.
l.v. through singing
Perc. 2
Bass drum
(with small sticks)
l.v. through singing
172
173
174
175
176
177


All enter singing on "ah", gently and slowly. 2 players per line. Select a line that best suits your range. Do not displace by an octave unless necessary. Optional *divisi* is shown in small noteheads. Use little or no vibrato.
Move to Approach II positions after releasing together and the playback audio can be heard.
6
Synth. player: Launch Approach II audio here.

✧ Approach II

Performance Notes

- Movement duration ≈ 10:00
- Nothing in this movement should be synchronized between players, though they must be within ear-shot of each other. Clear lines of sight between performers are neither required nor desired for this movement.
- Cells may be selected for performance more than once within each part of the movement.
- Whenever a metronome marking range is displayed with the text “you choose”, each player will select their own tempo (within that range) for that particular cell.

Program Notes

Transit time to Saturn: 2 years. Distance from Jupiter: 400 million miles.

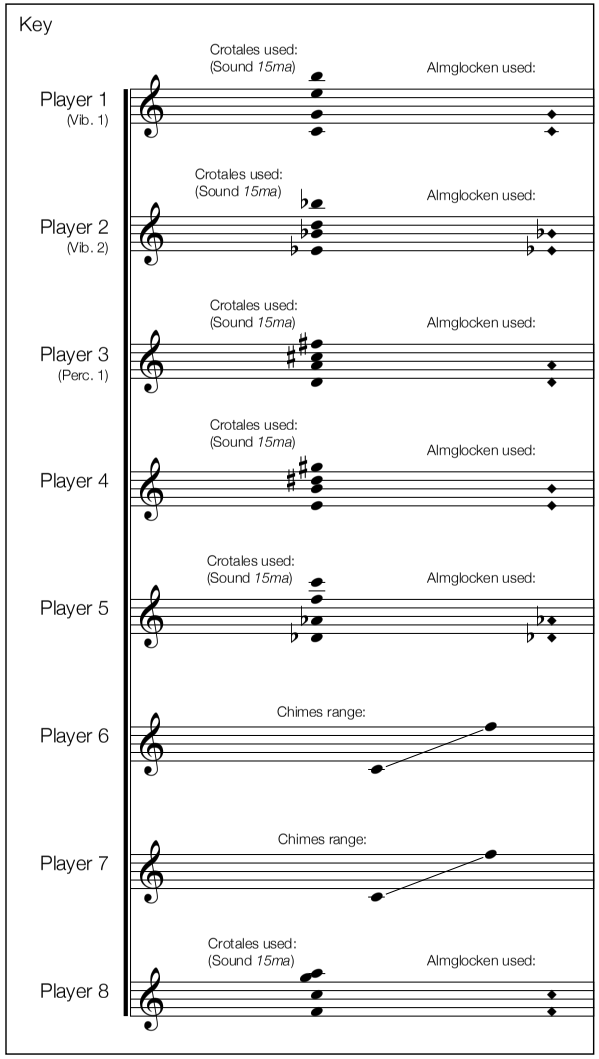
The 2:5 ratio of Saturn to Jupiter’s orbital resonance features prominently in this Approach. The performers select musical cells (short phrases) as desired to complement the overall sonic landscape. Many of the composed rhythms use direct five-against-two patterns and the audio emphasizes the major third interval produced by the ratio. The stacking of this interval results in augmented triads, a symmetrical sonority with an endless, otherworldly flavor. The high squealing and whooshing sounds are actually data taken from the plasma wave instrument package aboard Voyager after being converted into an audio format by simple voltage translation and time compression. The low, bass drum-like tones were picked up by the plasma detectors whenever the cold gas thrusters of the ship’s reaction control system fired for orientation maneuvers. In essence, we are hearing what Voyager picked up as it left Jupiter. The long drones were created by applying extreme stretching to some of the more “tonal” plasma noise, relegating the output to only natural harmonics, and shifting the frequency up or down to get an array of pitches.

Score

Approach II

from Voyager

Ben Justis (2018)

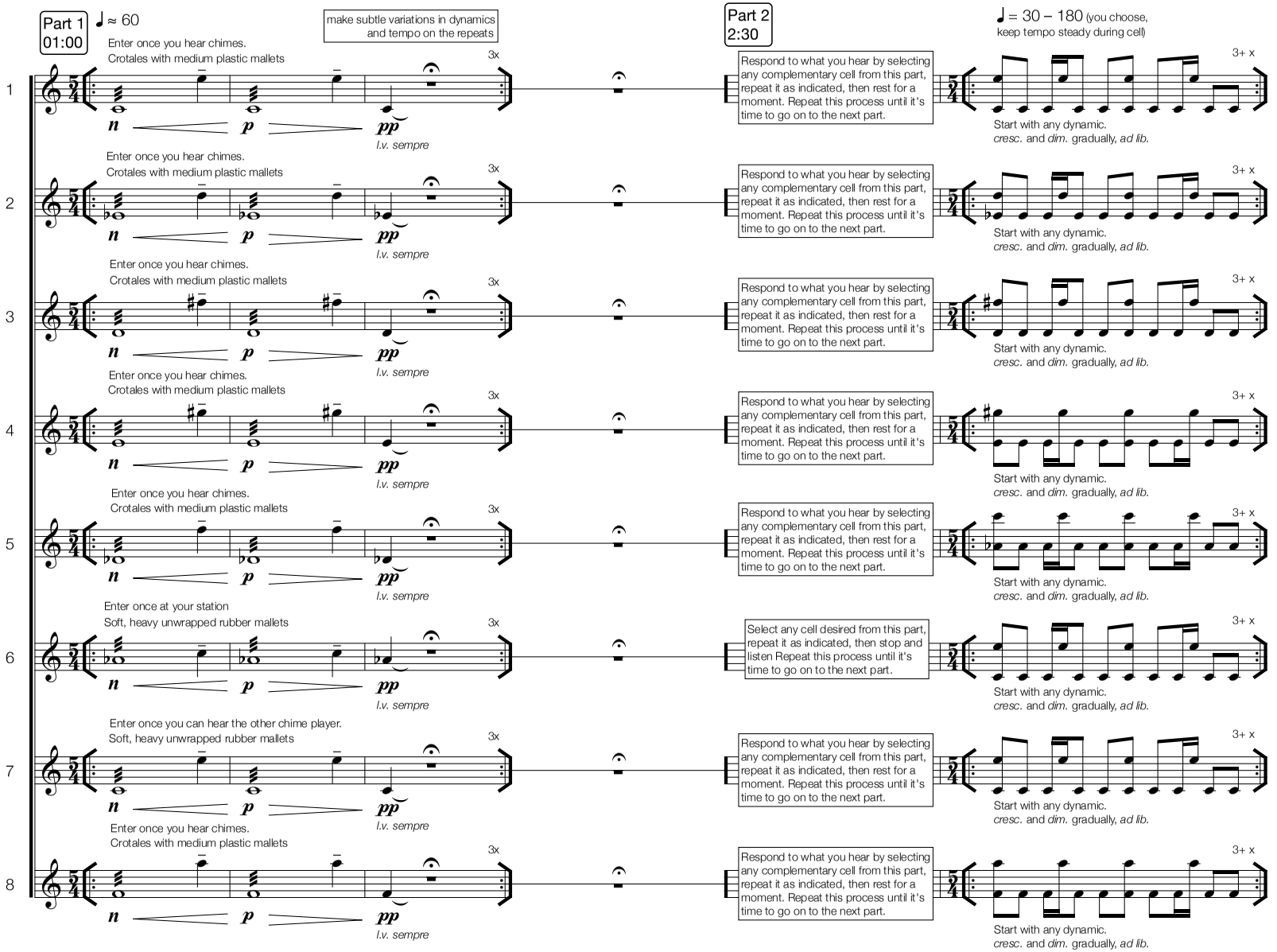


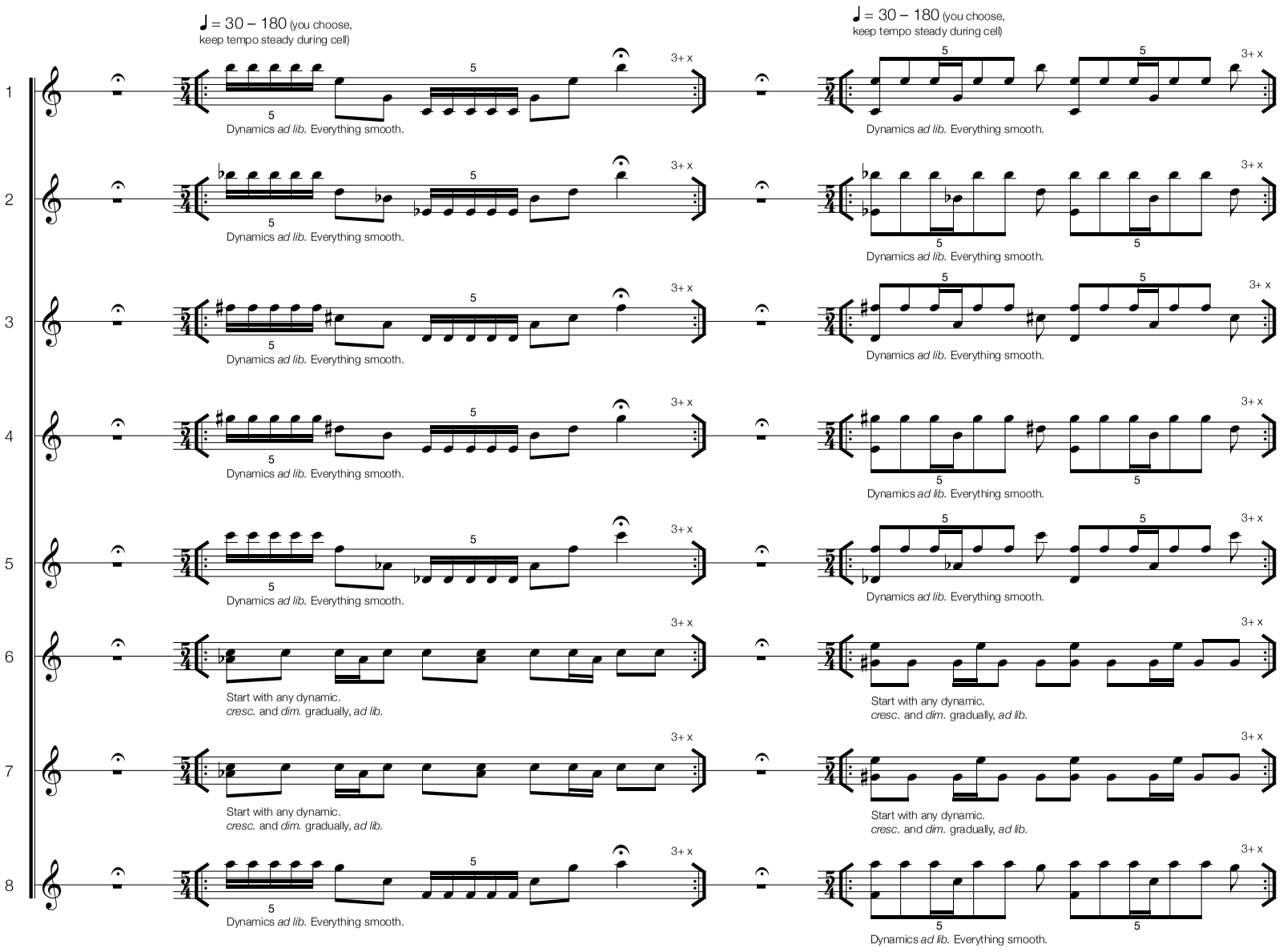
Musical passages separated by spaces (with a rest and fermata) are referred to as "cells".

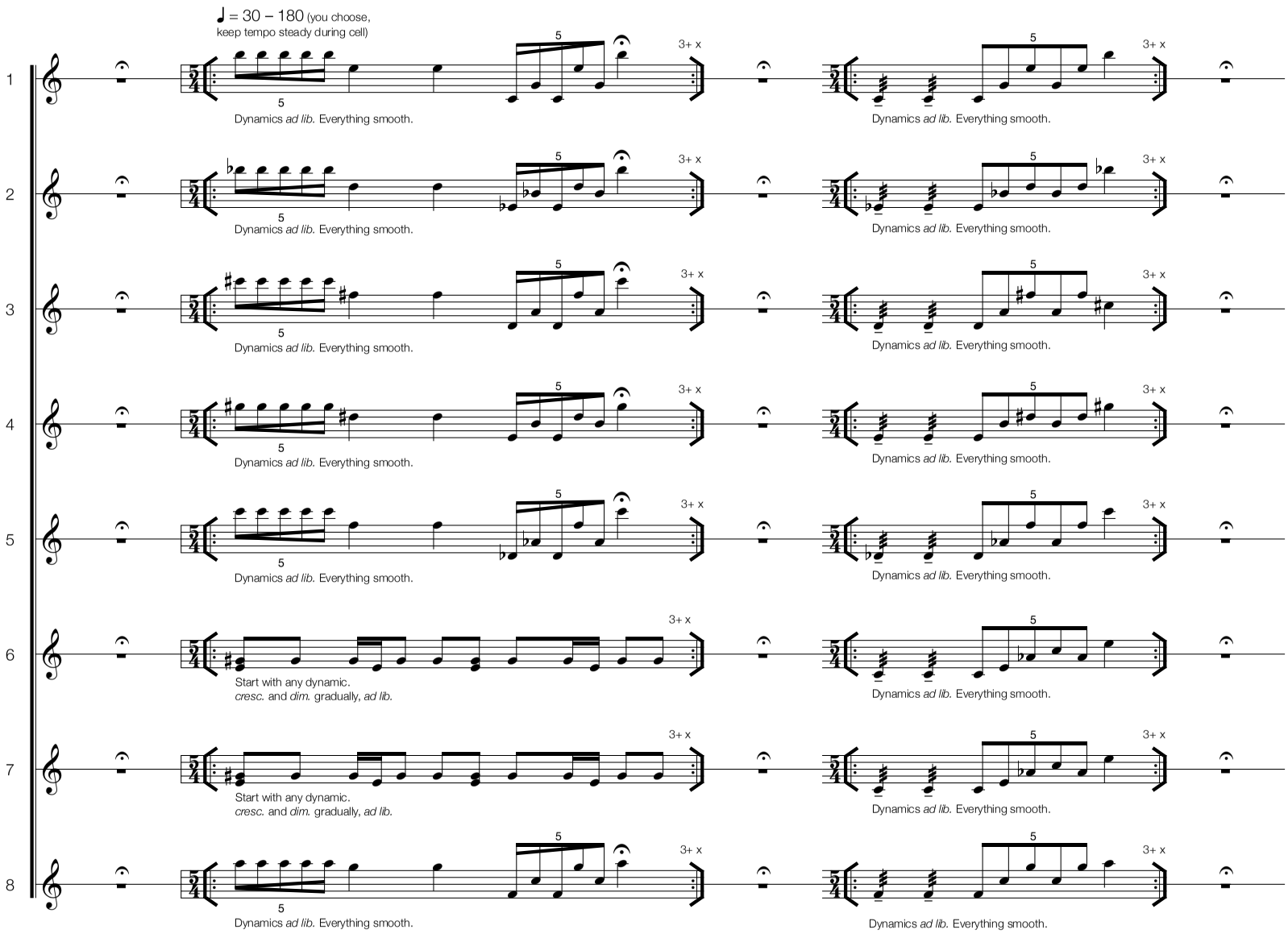
Players should never intentionally synchronize.

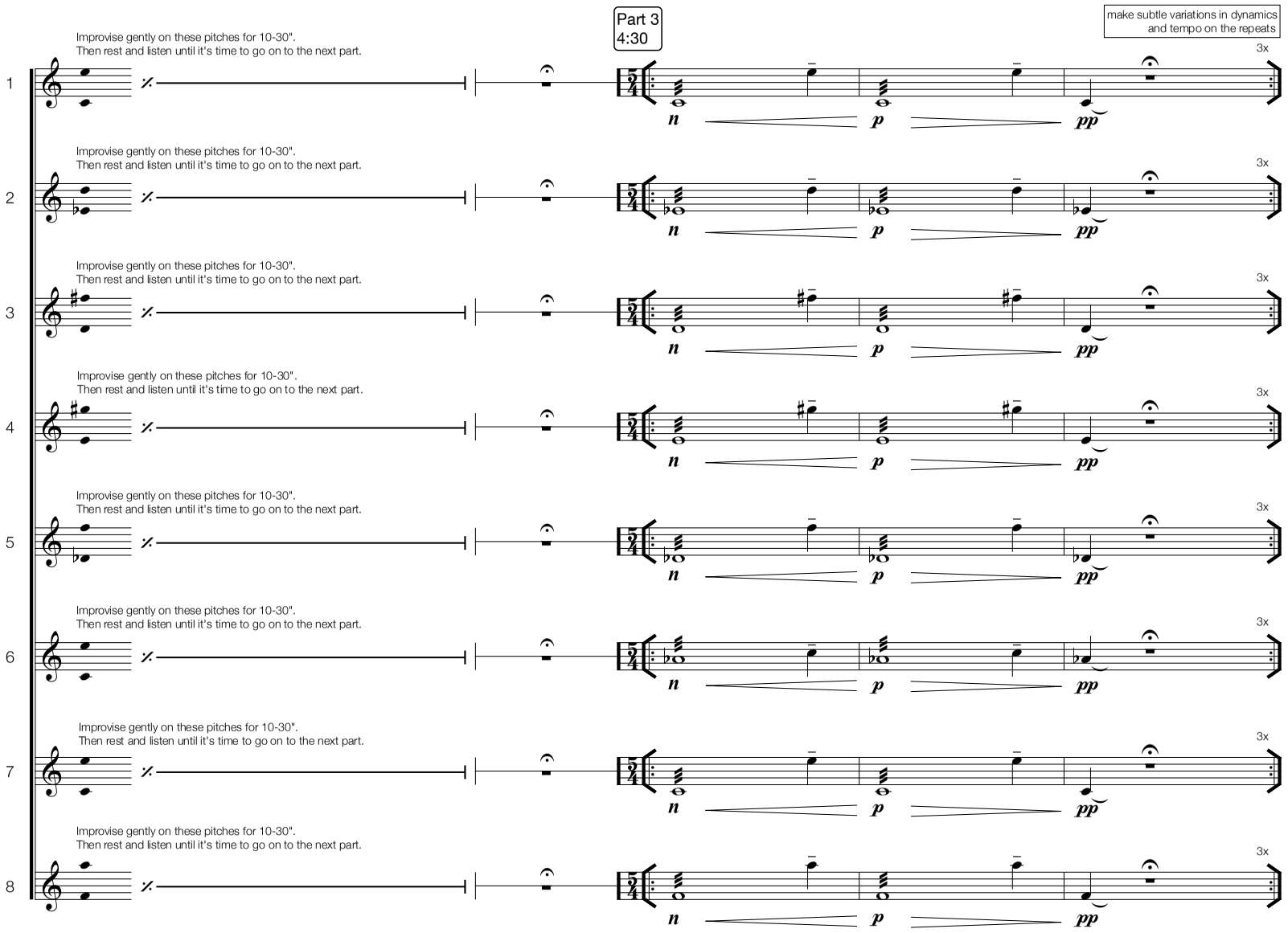
Time stamp shown under part numbers roughly corresponds to the elapsed audio time.

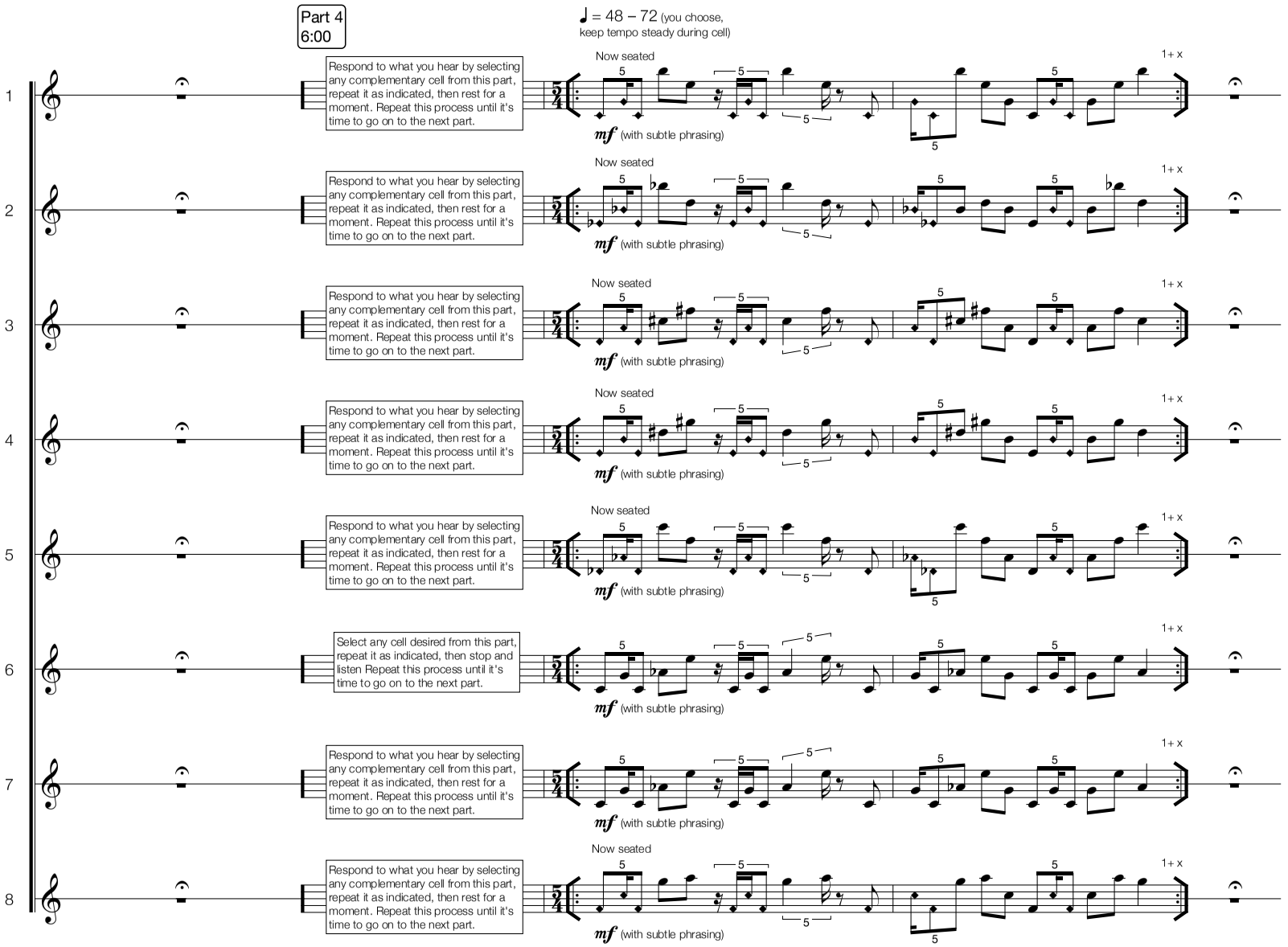
Players should set up a stopwatch on their stand to keep track of their pace.

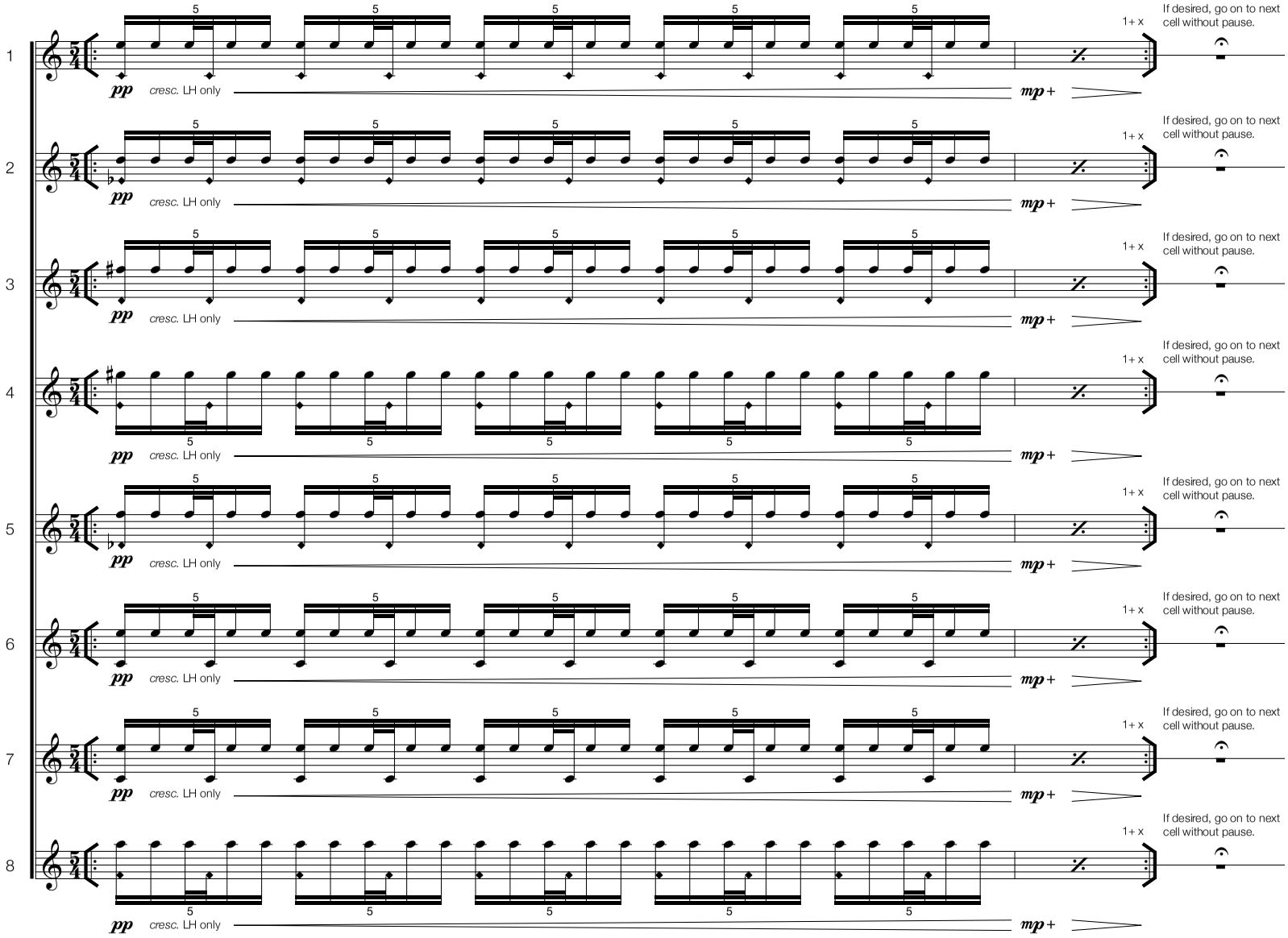

Part 1
01:00
♩≈ 60
make subtle variations in dynamics and tempo on the repeats
Enter once you hear chimes.
Crotales with medium plastic mallets
3x
n
p
pp
l.v. sempre
Enter once you can hear the other chime player.
Soft, heavy unwrapped rubber mallets
Enter once at your station
Soft, heavy unwrapped rubber mallets
Part 2
2:30
♩= 30 – 180 (you choose, keep tempo steady during cell)
Respond to what you hear by selecting any complementary cell from this part, repeat it as indicated, then rest for a moment. Repeat this process until it's time to go on to the next part.
Select any cell desired from this part, repeat it as indicated, then stop and listen Repeat this process until it's time to go on to the next part.
3+ x
Start with any dynamic.
cresc. and dim. gradually, ad lib.

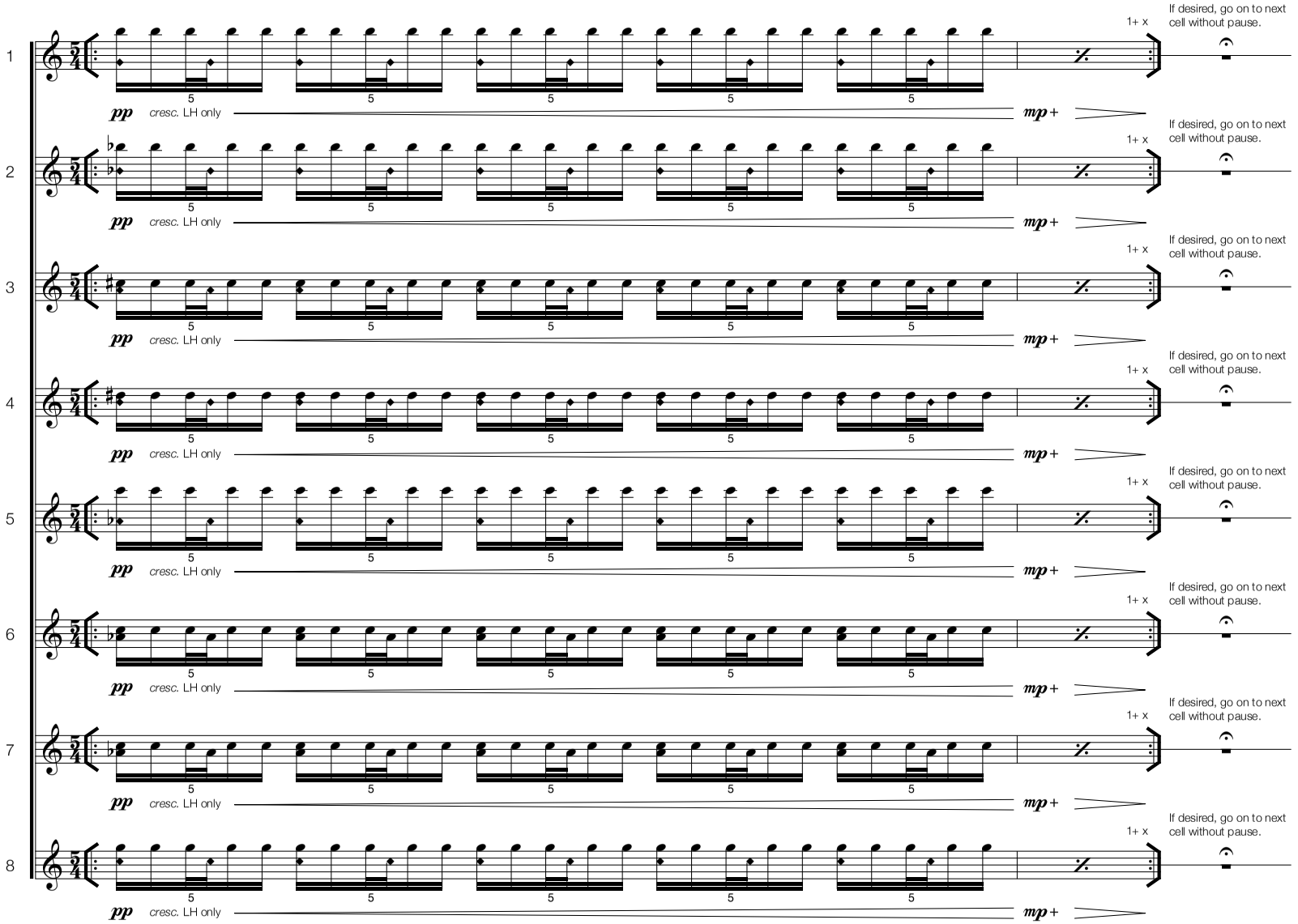

♩ = 30 – 180 (you choose, keep tempo steady during cell)
♩ = 30 – 180 (you choose, keep tempo steady during cell)
1
2
3
4
5
6
7
8
3+ x
Dynamics ad lib. Everything smooth.
Start with any dynamic.
cresc. and dim. gradually, ad lib.

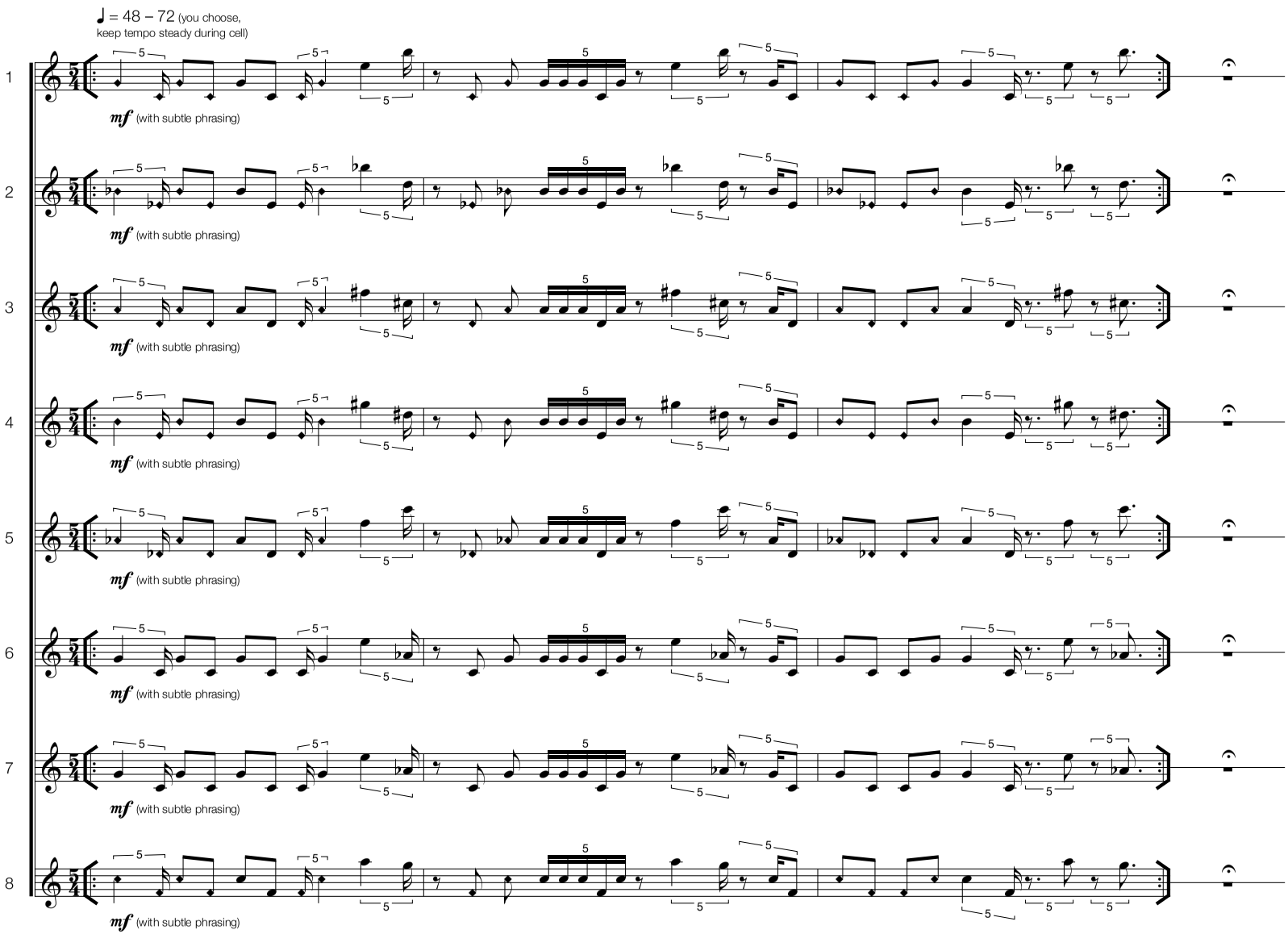

♩ = 30 – 180 (you choose, keep tempo steady during cell)
1
2
3
4
5
6
7
8
5
3+ x
Dynamics *ad lib.* Everything smooth.
Start with any dynamic.
cresc. and *dim.* gradually, *ad lib.*

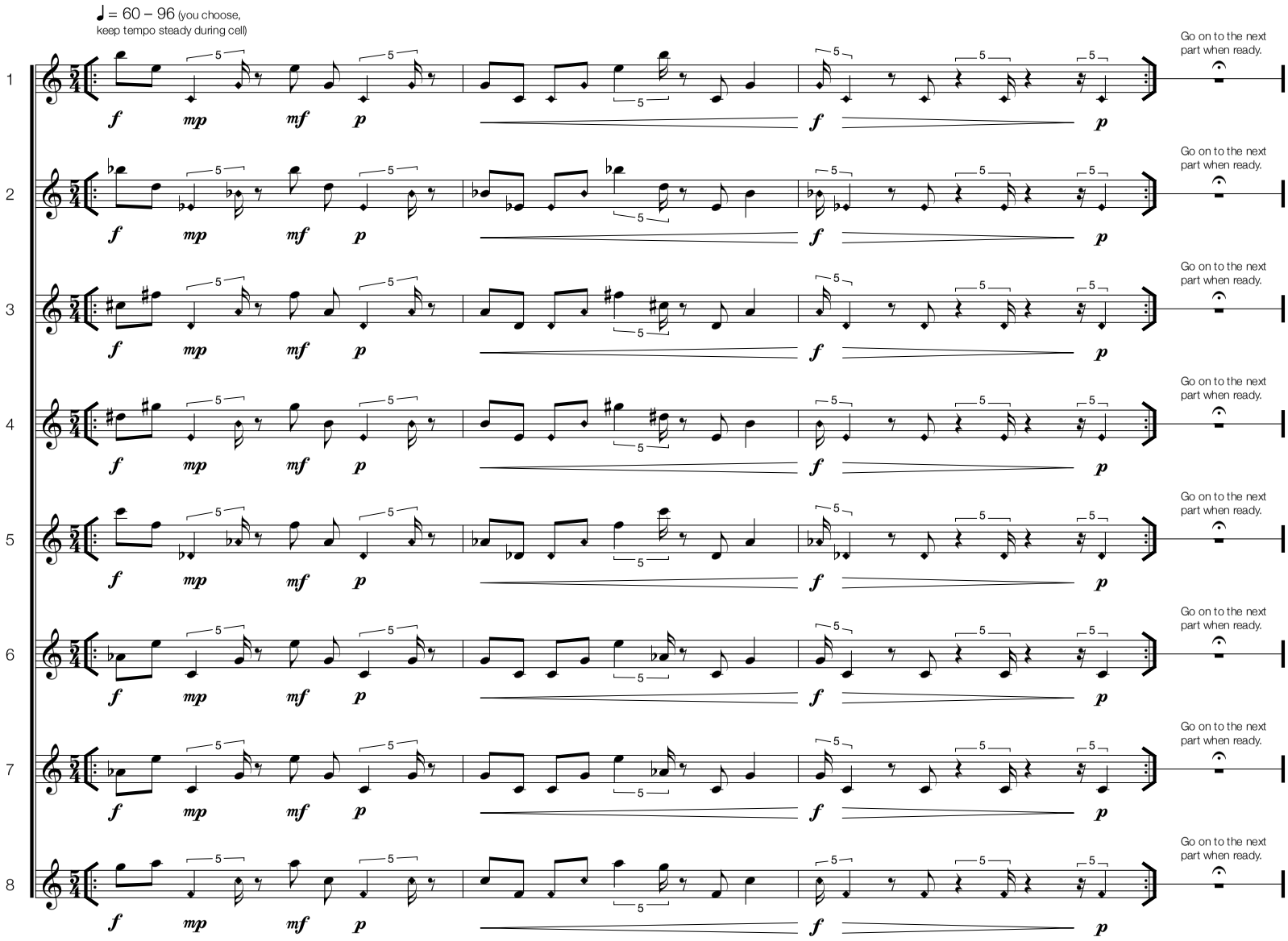

Part 3
4:30
make subtle variations in dynamics
and tempo on the repeats
1
2
3
4
5
6
7
8
Improvise gently on these pitches for 10-30".
Then rest and listen until it's time to go on to the next part.
3x
n
p
pp

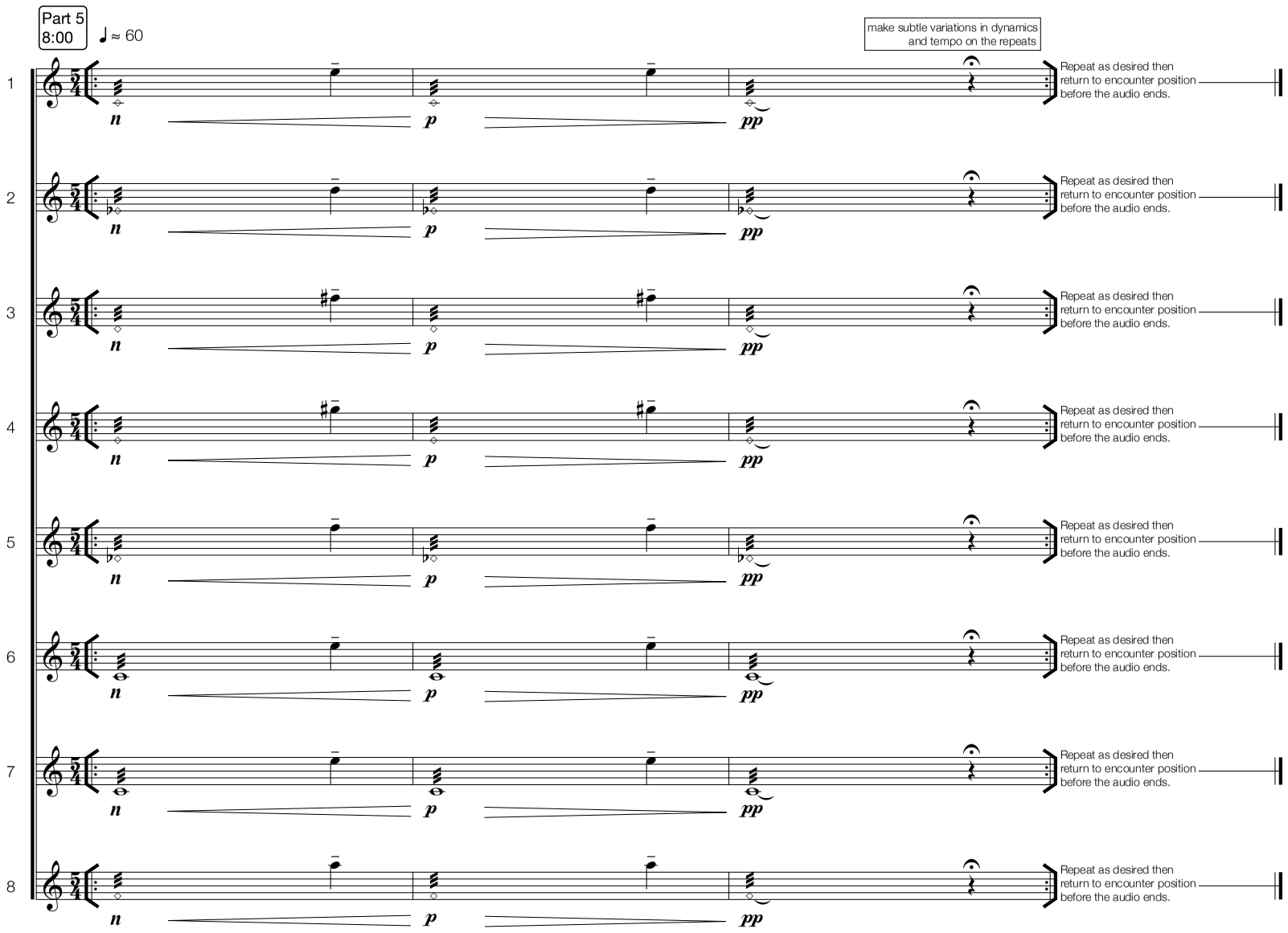

Part 4
6:00
♩ = 48 – 72 (you choose, keep tempo steady during cell)
1
2
3
4
5
6
7
8
Now seated
1+ x
Respond to what you hear by selecting any complementary cell from this part, repeat it as indicated, then rest for a moment. Repeat this process until it's time to go on to the next part.
Select any cell desired from this part, repeat it as indicated, then stop and listen Repeat this process until it's time to go on to the next part.
mf (with subtle phrasing)


1
2
3
4
5
6
7
8
pp
cresc. LH only
mp +
1+ x
If desired, go on to next cell without pause.


1
2
3
4
5
6
7
8
pp
cresc. LH only
mp+
1+ x
If desired, go on to next cell without pause.


♩ = 48 – 72 (you choose, keep tempo steady during cell)
1
2
3
4
5
6
7
8
mf (with subtle phrasing)


♩ = 60 – 96 (you choose, keep tempo steady during cell)
1
2
3
4
5
6
7
8
Go on to the next part when ready.
f mp mf p
f p


Part 5
8:00
♩≈ 60
make subtle variations in dynamics
and tempo on the repeats
1
2
3
4
5
6
7
8
n
p
pp
Repeat as desired then
return to encounter position
before the audio ends.

♄ Encounter III: World of Rings and Hexes

Performance Notes

- Movement duration ≈ 7:30
- At measure 80, the speed of the 16th-note sextuplet becomes the speed of the 16ths.
- Starting at measure 93, when a stemless chord is followed by slashes (and little headless 16th-notes), the performer should continue playing running 16th notes on those pitches by improvising new patterns for the duration of the slashes. Most chords last one or two measures. Notes can be played more than once in a row, but all of them should be used at some point during the improvisation. Occasional 16th-note rests may be interpolated as desired. Chord symbols are added as a convenience.
- At measure 173, the speed of the dotted eighth-note becomes the speed of the eighth-note, making the quarter-note 92 BPM.
- The synth. player should launch the Approach III audio track on beat one of the last bar. Players may move to their Approach III positions when ready.

Program Notes

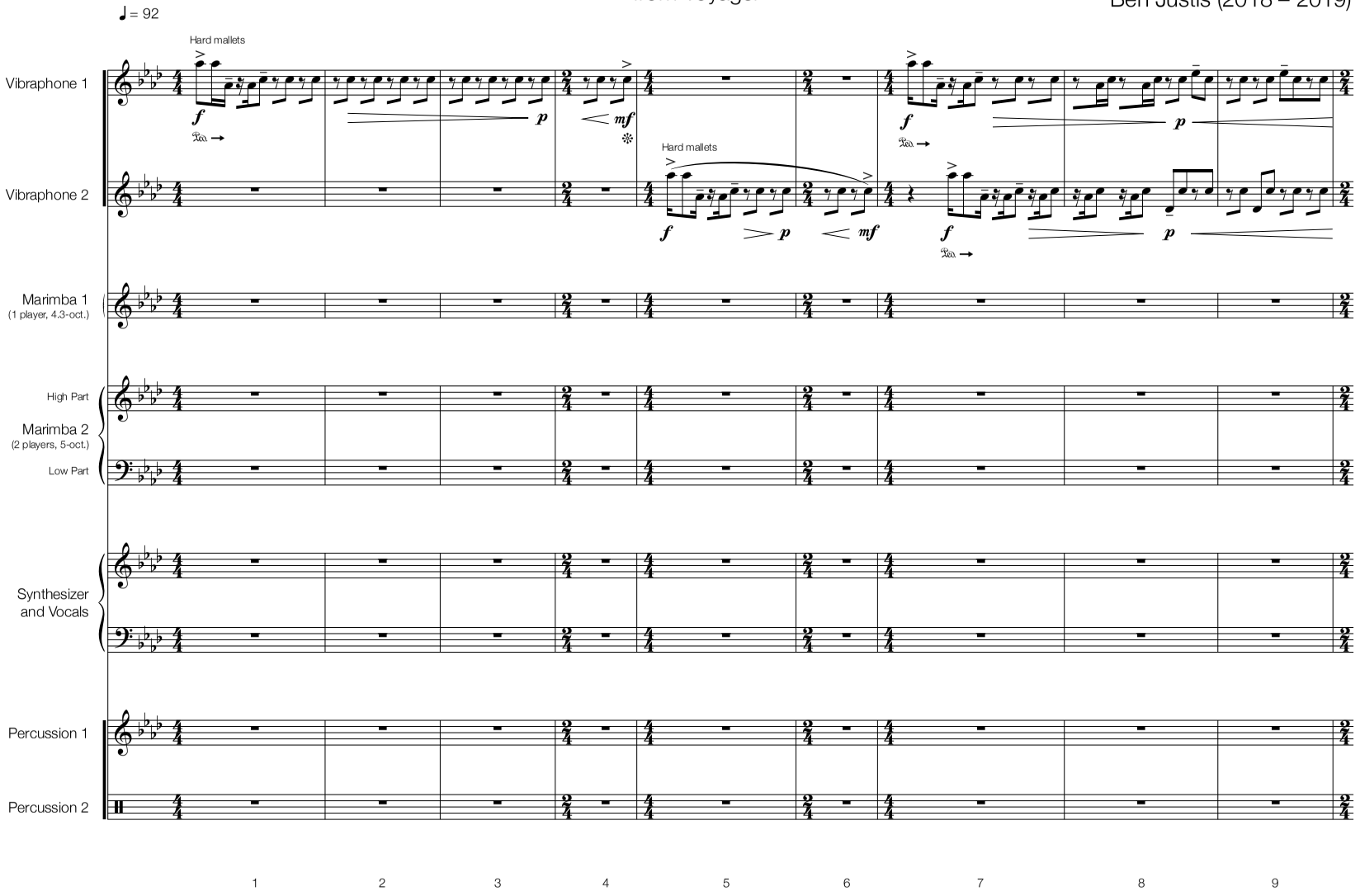
Saturn. Crown jewel of our cosmic neighborhood. After the tenderness of Earth and the ferocity of Jupiter, a movement with a sweeter was desirable. Patterns of syncopated 16th-notes interlock and sparkle as little motives are passed between players. Due to the particular setup of the instruments, the imitation is continually passed in a ring shape that both hints at Saturn's iconic adornment and provides a moving point of interest. This develops until the texture thins to only the vibraphones, who use a metric modulation (basically, a faster note value becoming a slower one which has the effect of making the tempo proportionally quicker) to increase the speed. Now, chords in a flurry of constant 16th-notes in patterns improvised by the performers dominate as a melody creeps in underneath. The rigid passing of upward fills strikes me as more hexagonal movement than elliptical. Such a hexagon is clearly seen at Saturn's north pole. How this regular geometric shape formed within otherwise turbulent cloud layers eludes scientist to this day. Once all players are in, the vocoder carries the lyrical tune as the phrase repeats, sometimes with new harmonies. After a key change, the energy builds to a climax and another metric modulation down-shifts us into a recapitulation. As the imitation continues, notes are strategically removed from the independent lines to thin out the counterpoint and let the music evaporate.

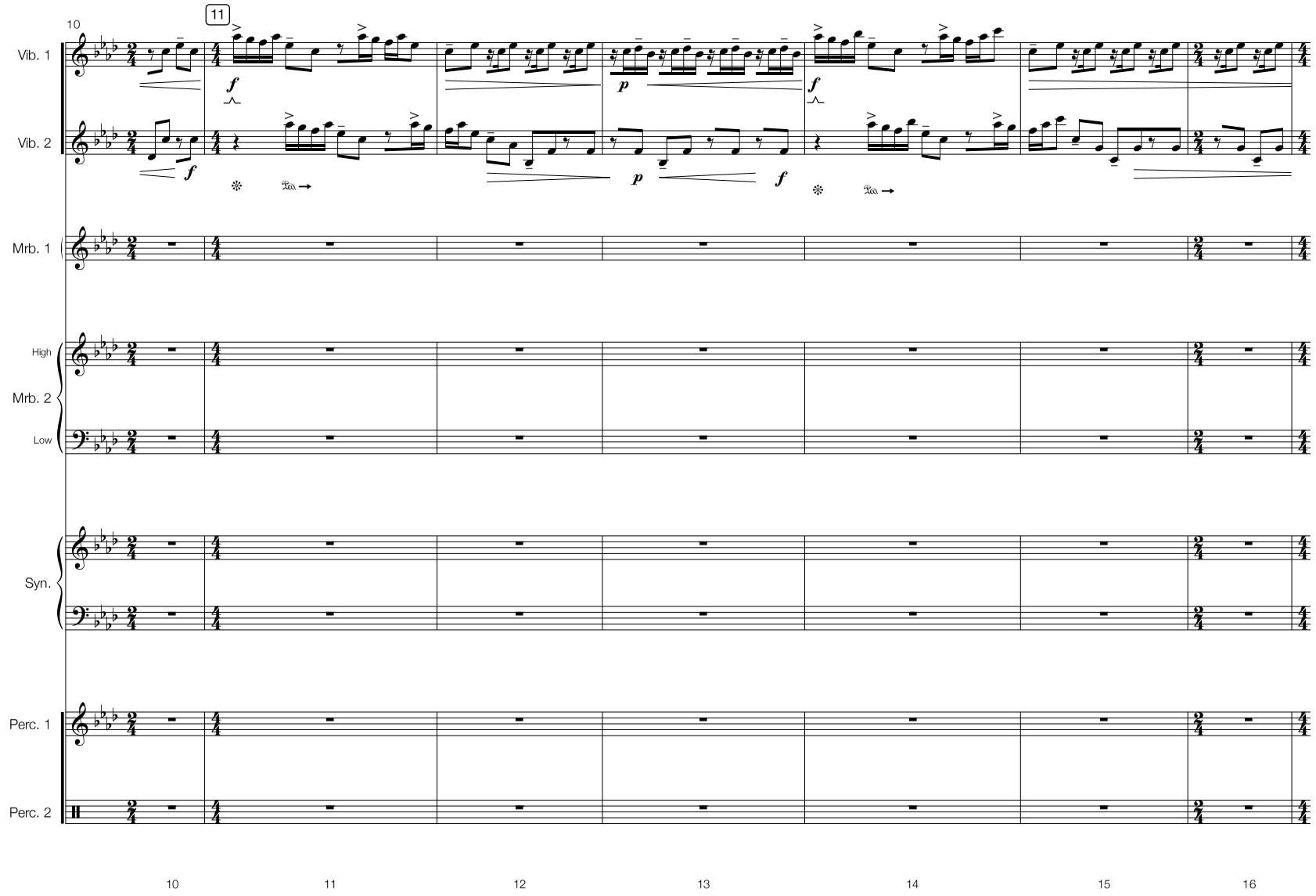
Score

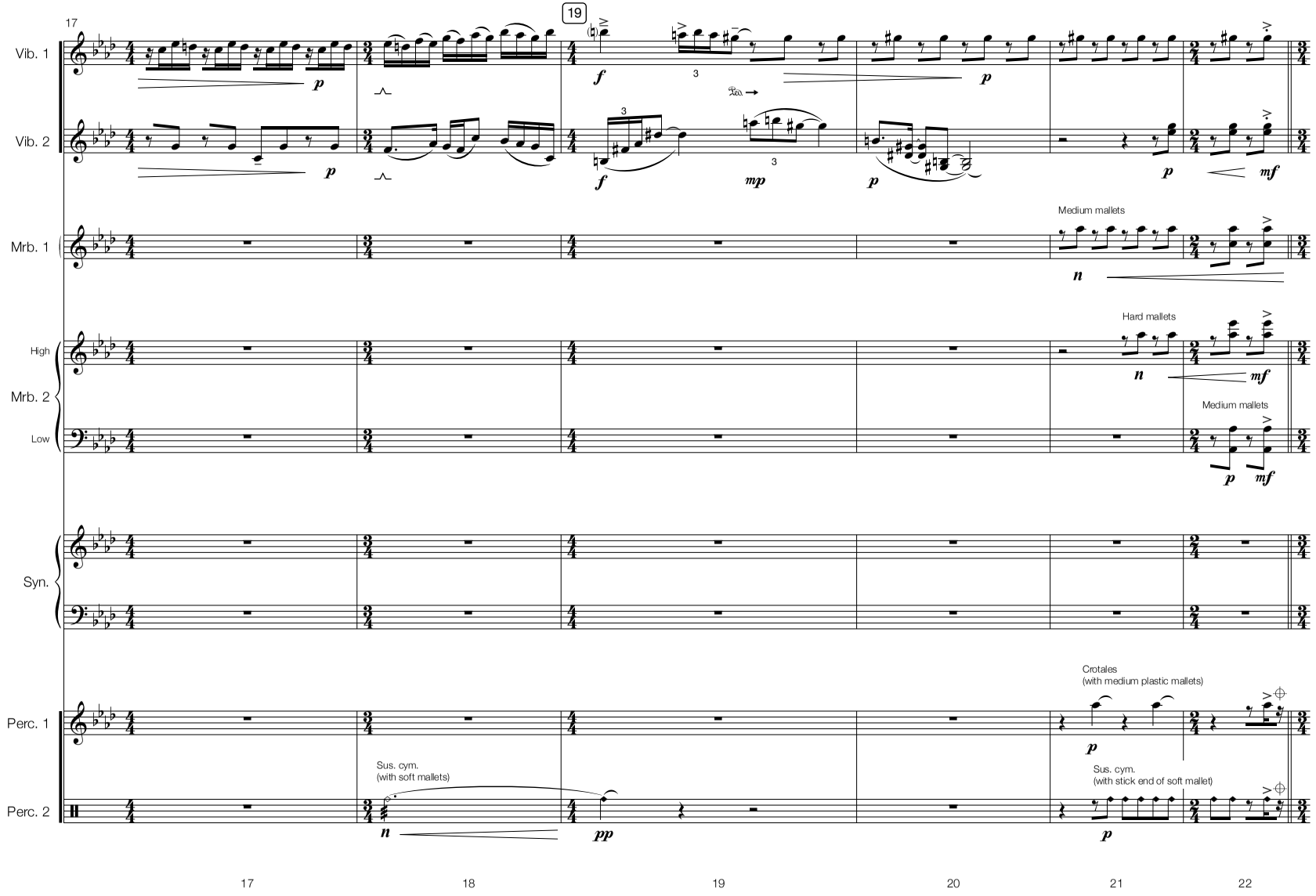
Encounter III: World of Rings and Hexes

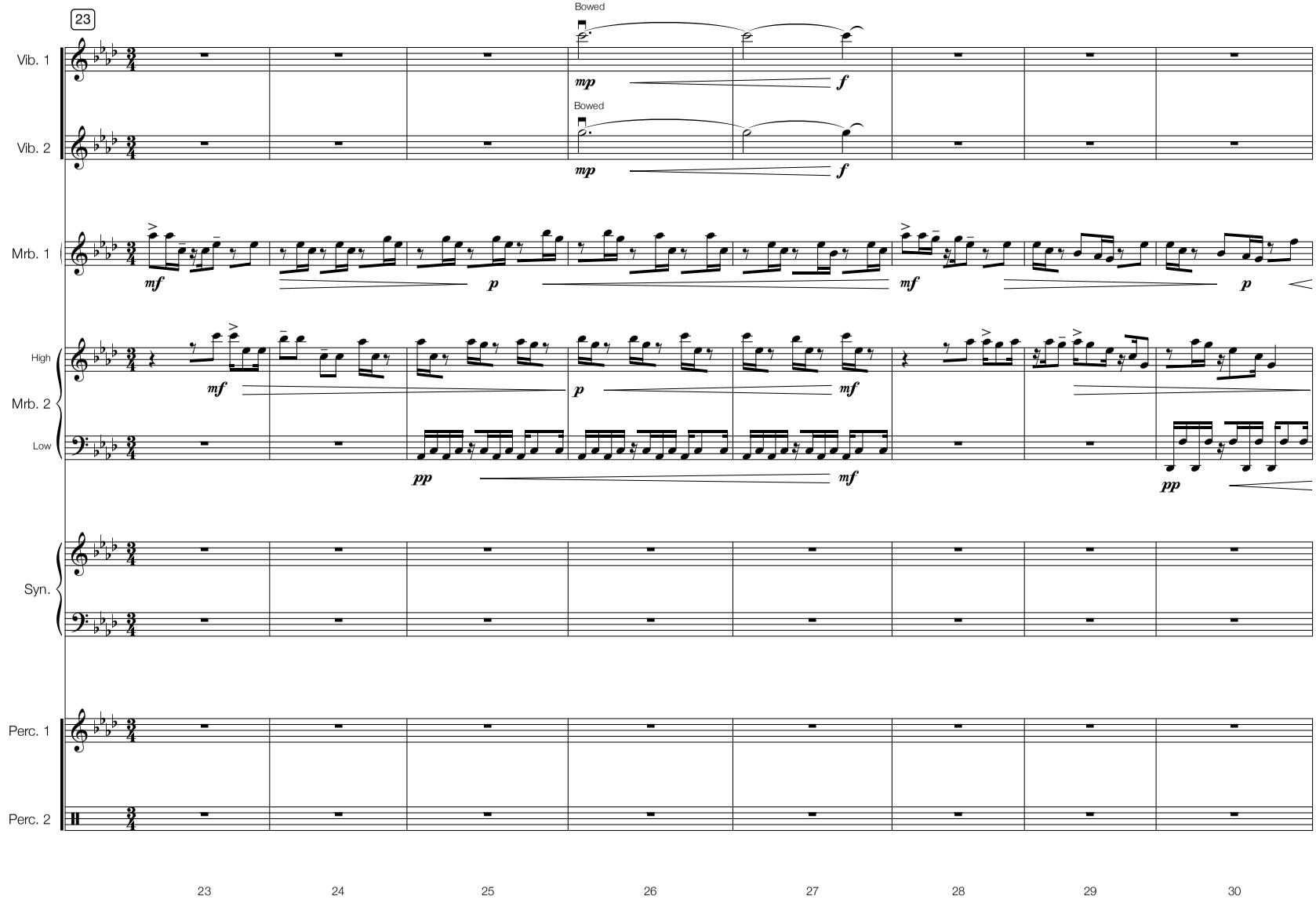
from Voyager

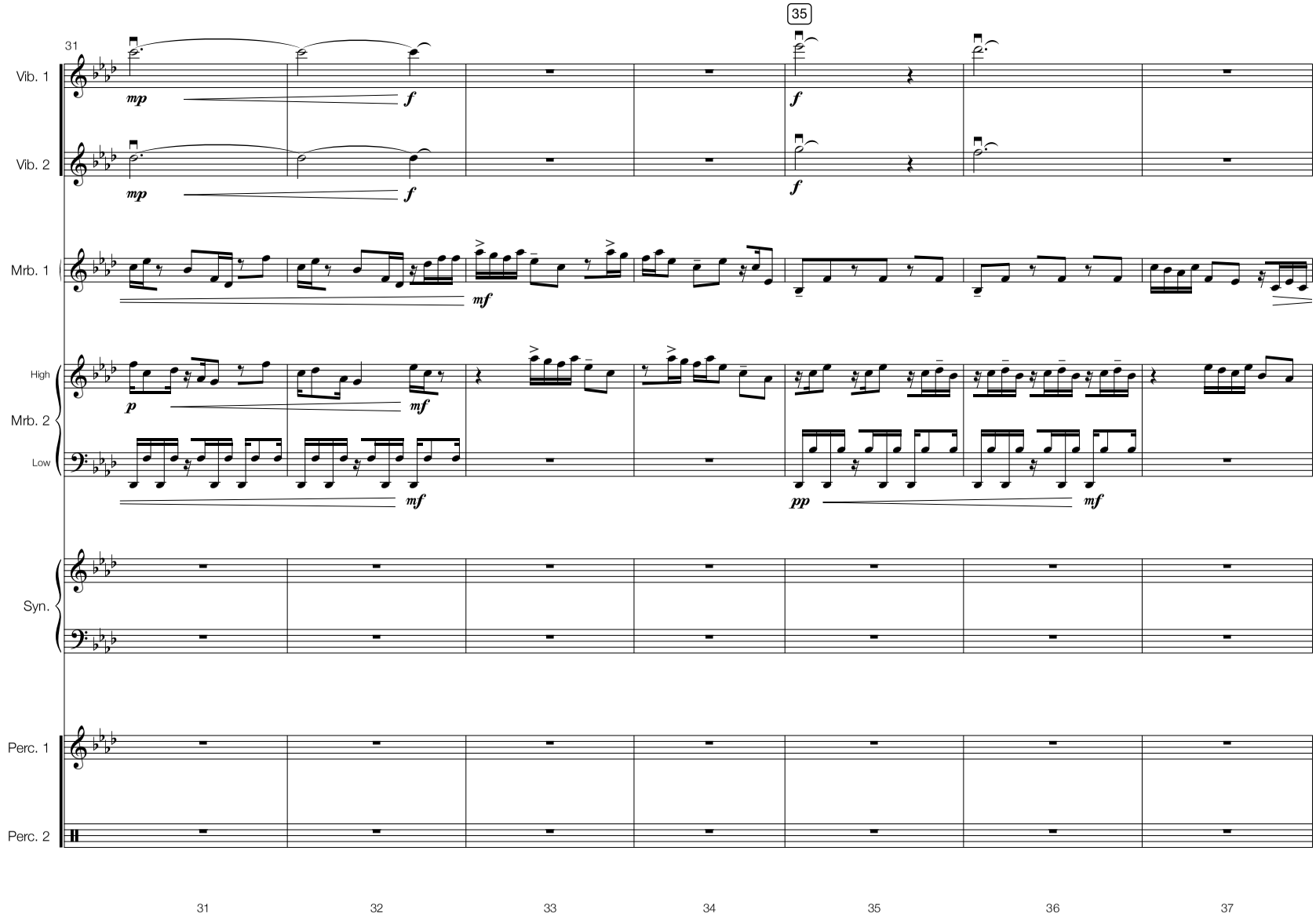
Ben Justis (2018 – 2019)

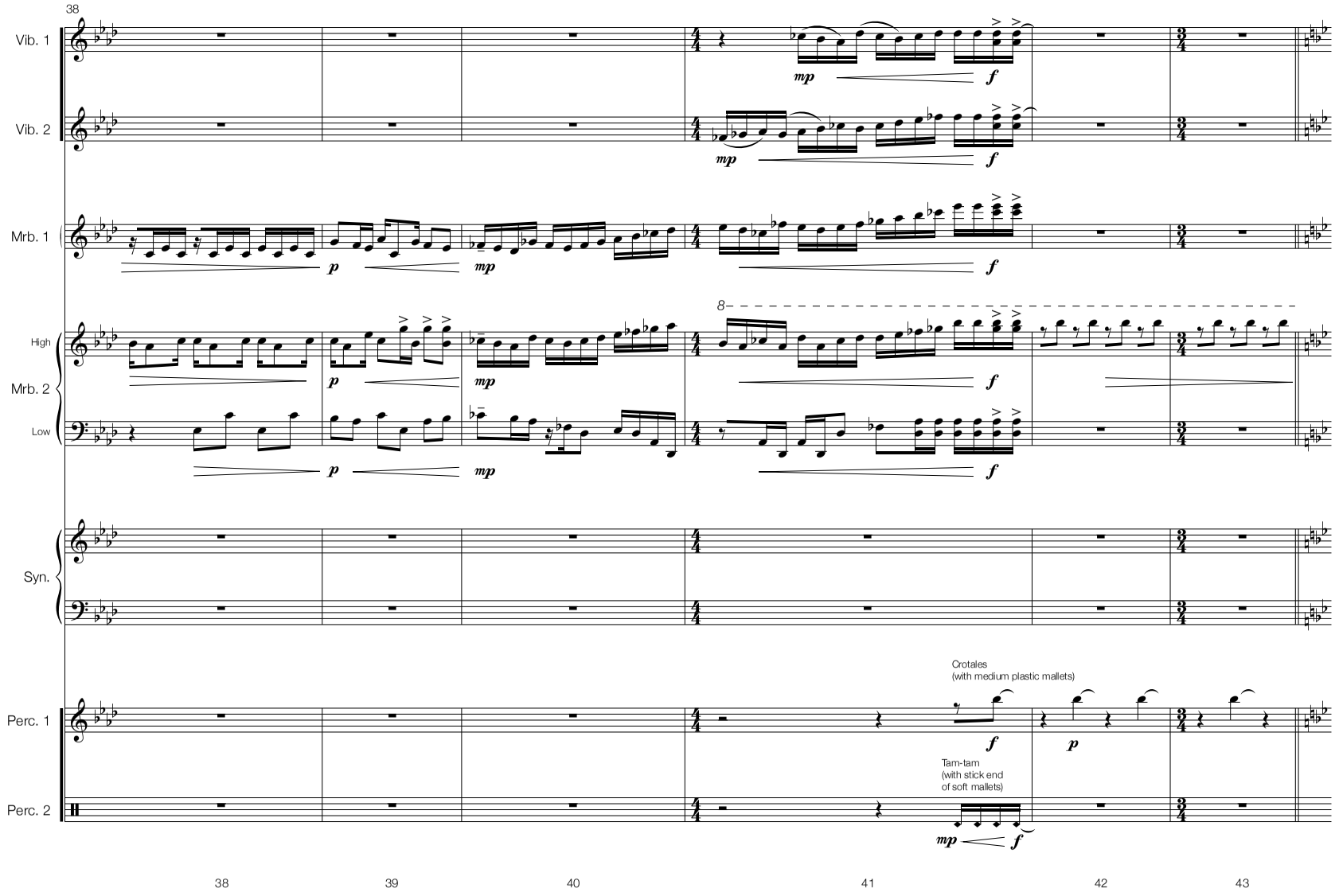


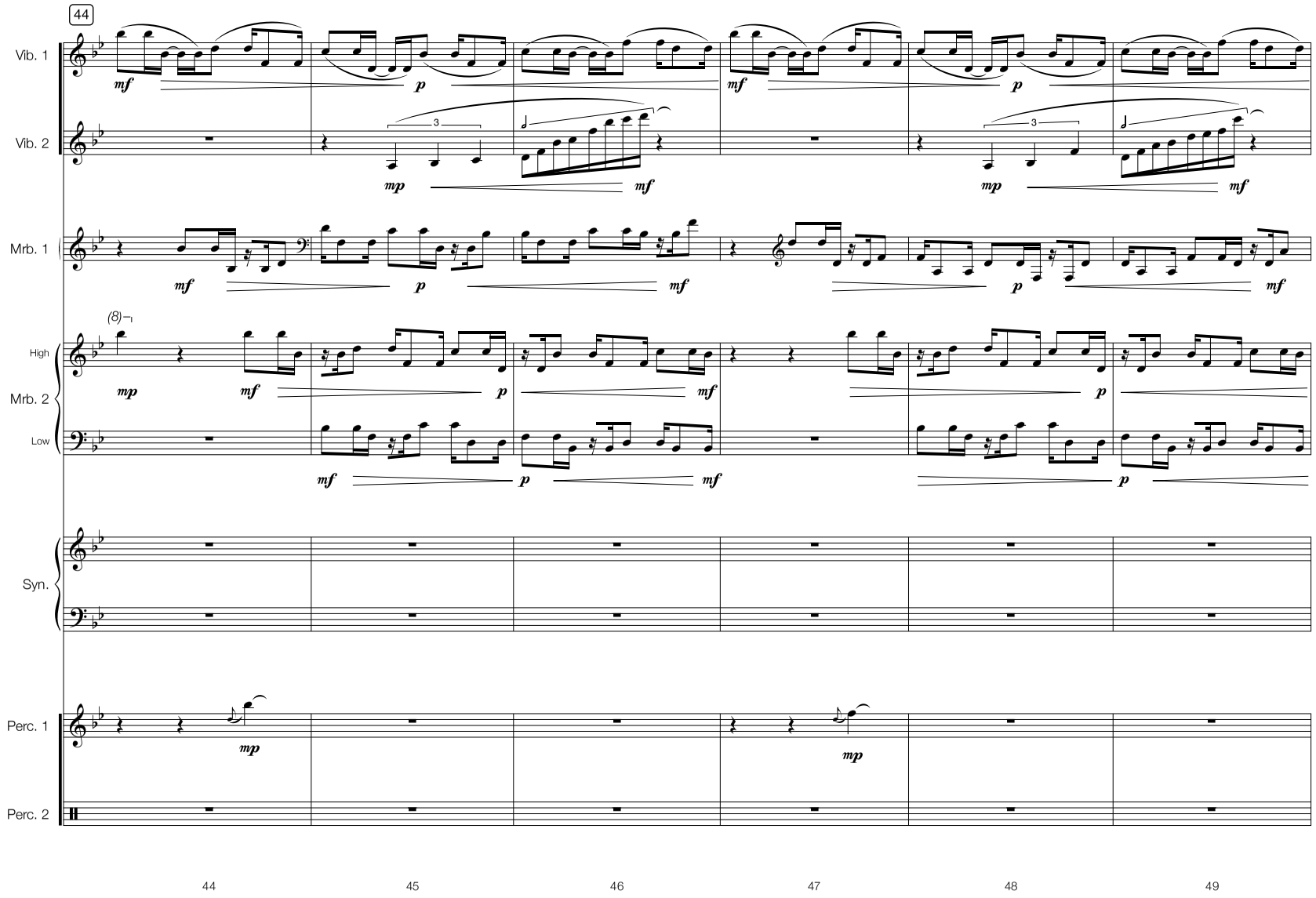

10
11
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
10
11
12
13
14
15
16

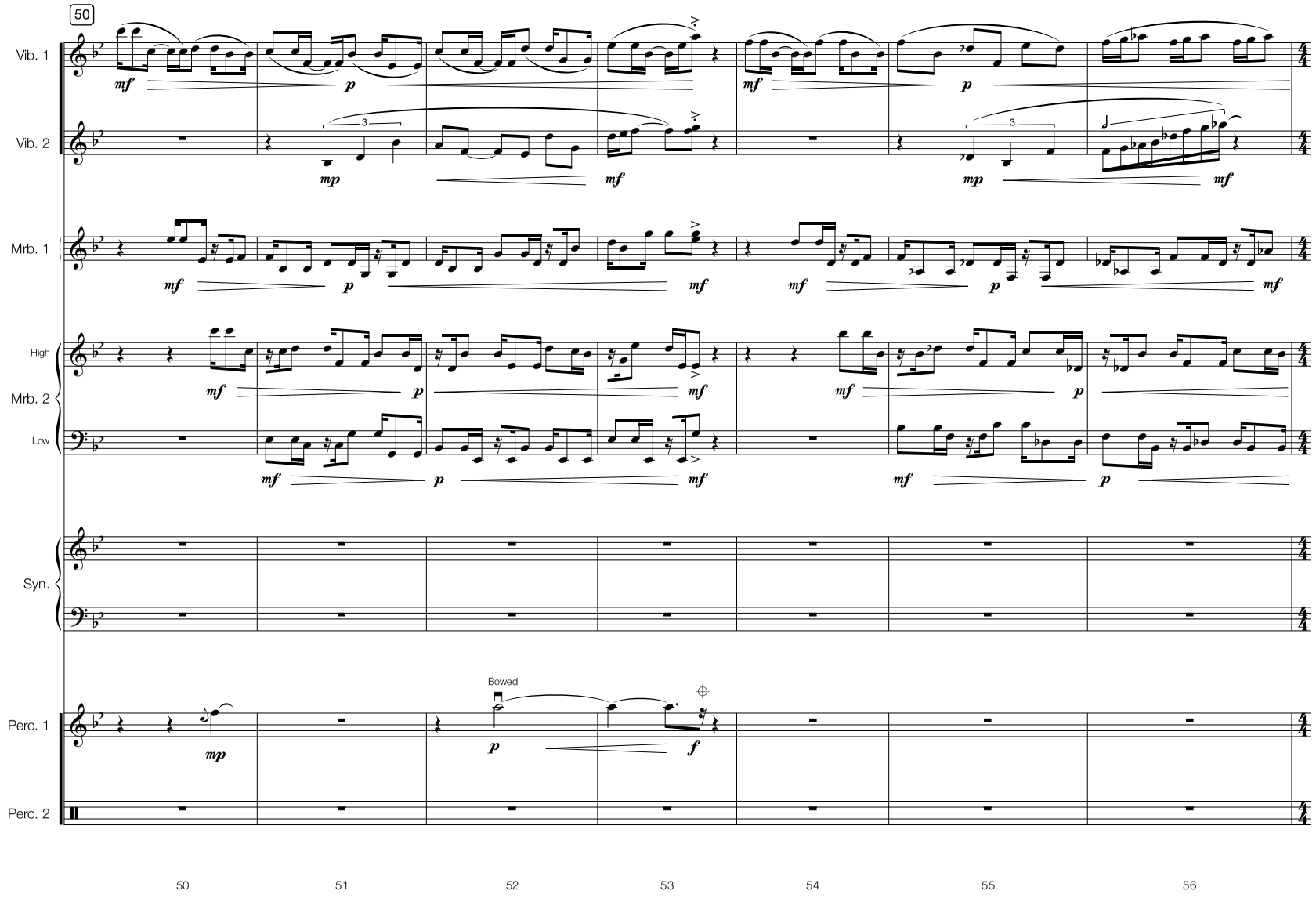

17
19
Vib. 1
Vib. 2
Mrb. 1
Medium mallets
High
Mrb. 2
Low
Hard mallets
Medium mallets
Syn.
Perc. 1
Crotales
(with medium plastic mallets)
Perc. 2
Sus. cym.
(with soft mallets)
Sus. cym.
(with stick end of soft mallet)
17
18
19
20
21
22

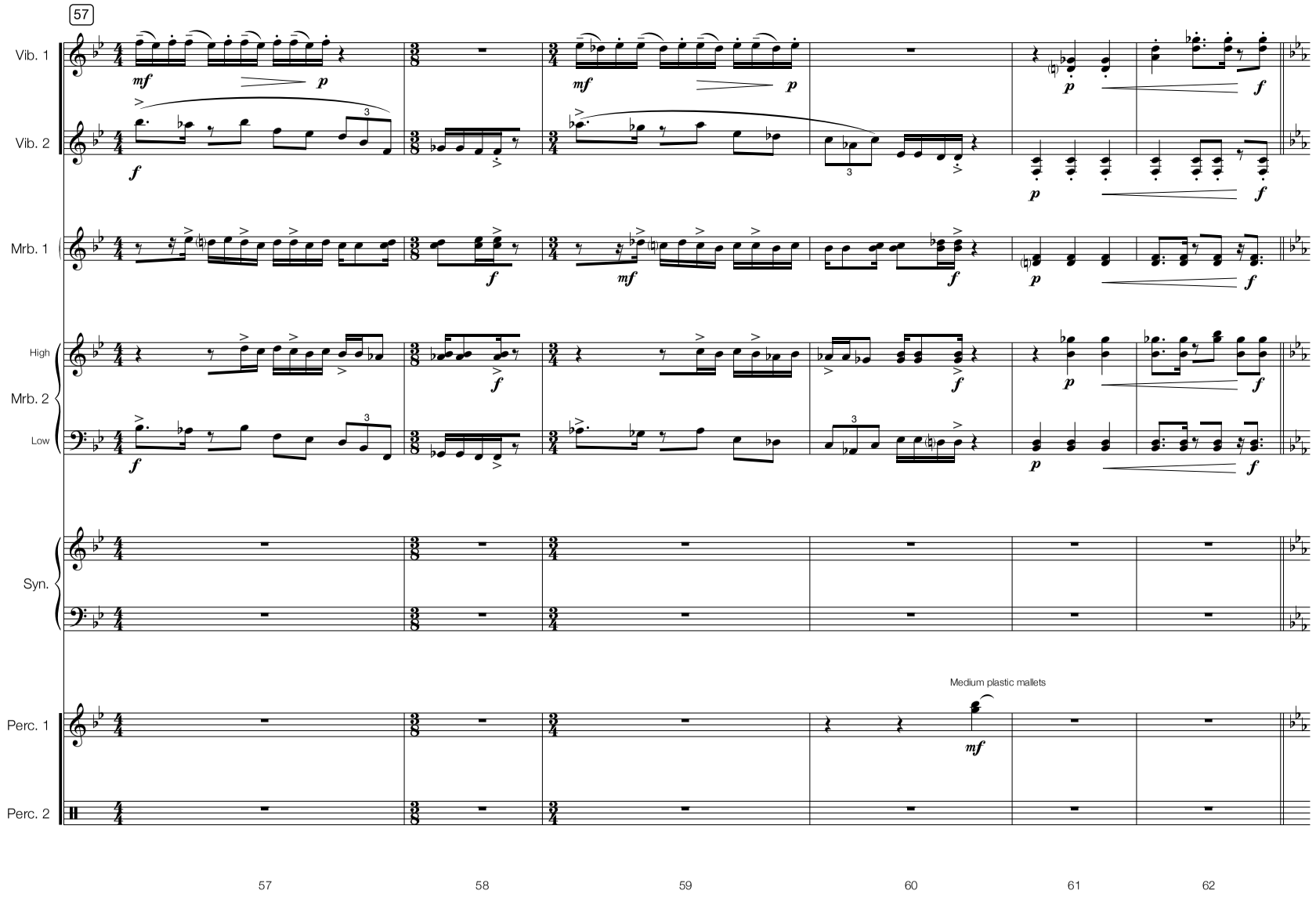

23
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Bowed
Bowed
mp
f
mf
p
pp
23
24
25
26
27
28
29
30

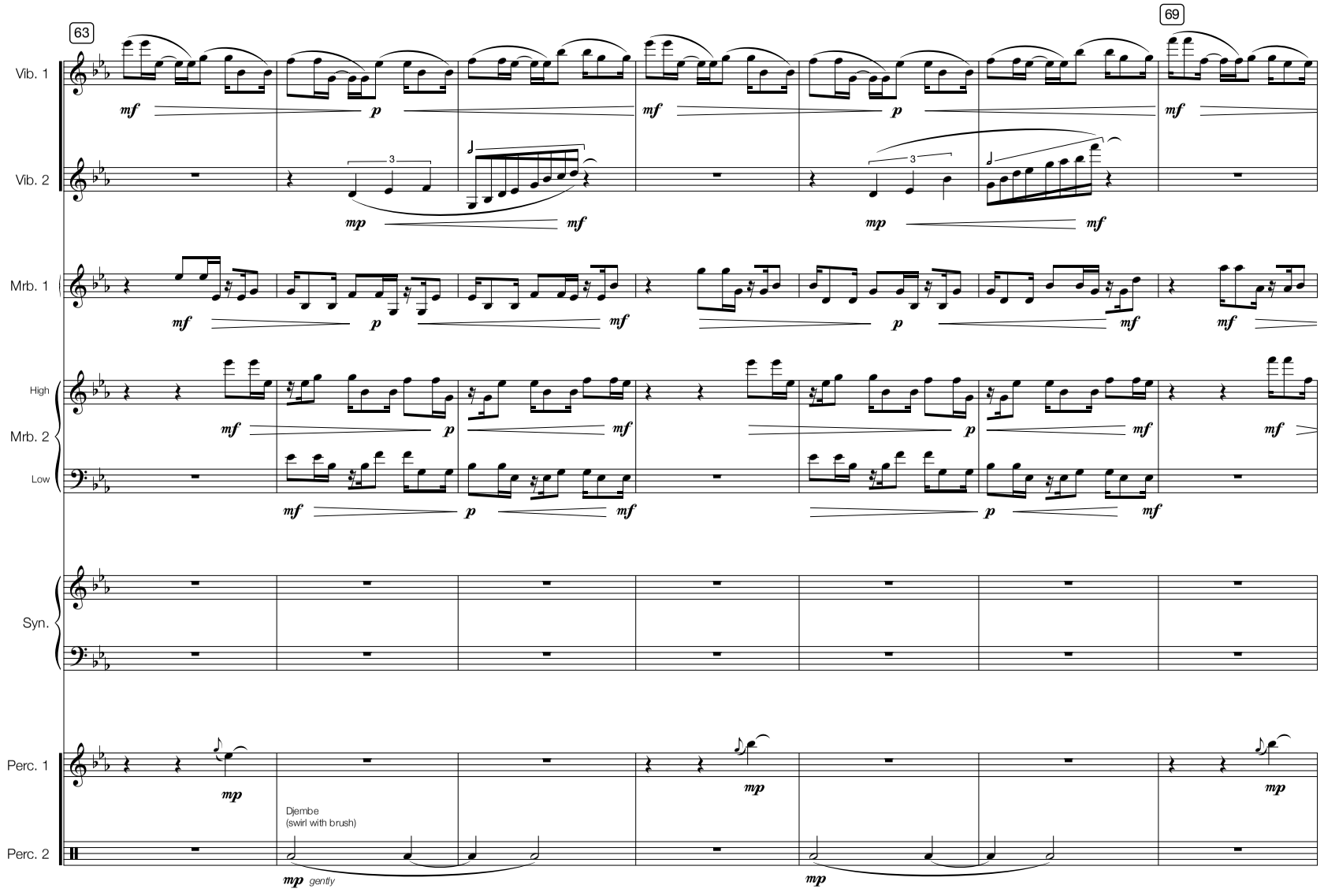

31
35
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mp
f
mf
p
pp
31
32
33
34
35
36
37

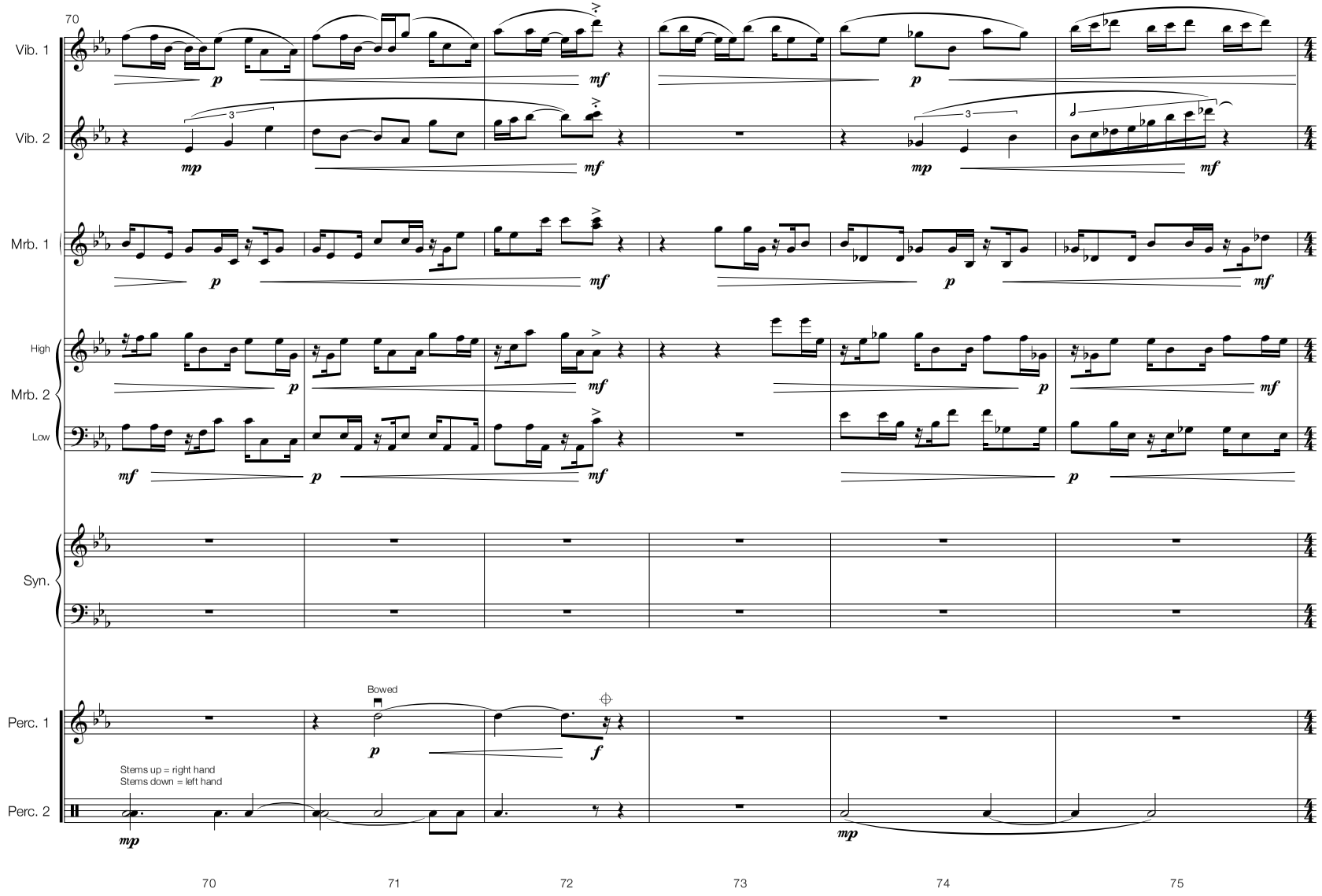

38
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Crotales
(with medium plastic mallets)
Tam-tam
(with stick end
of soft mallets)
38
39
40
41
42
43

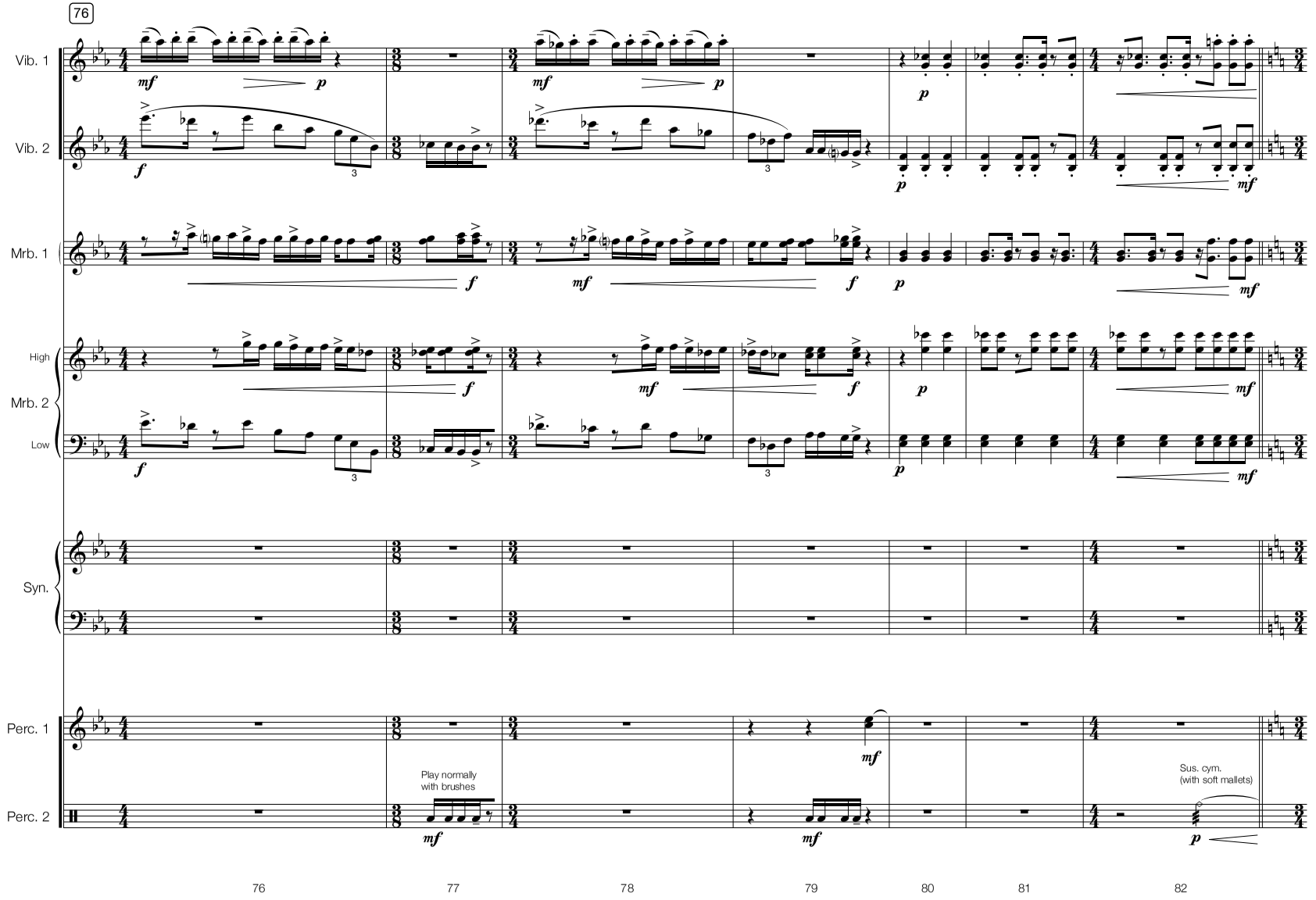

44
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
(8)
mf
mp
p
3
44
45
46
47
48
49

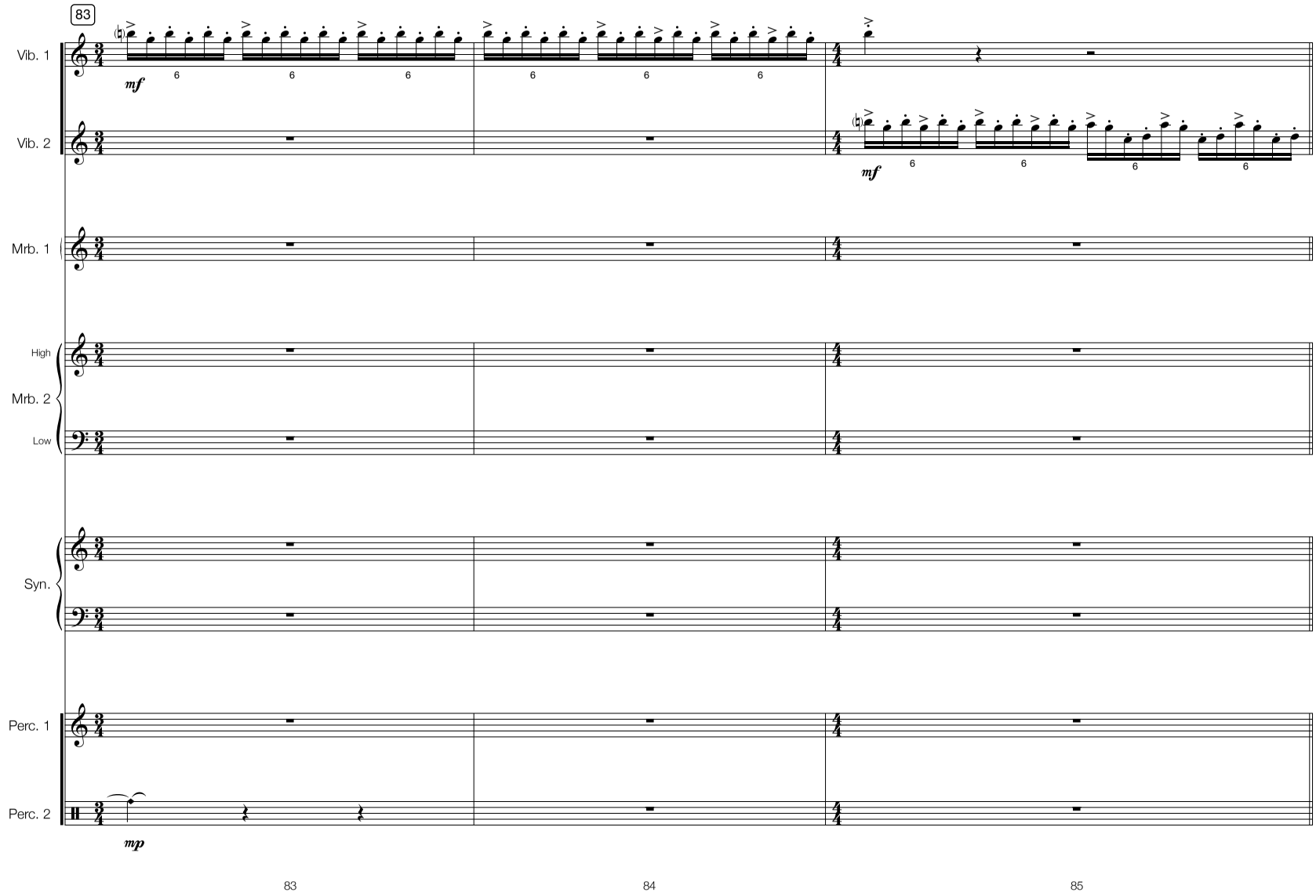

50
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Bowed
50
51
52
53
54
55
56

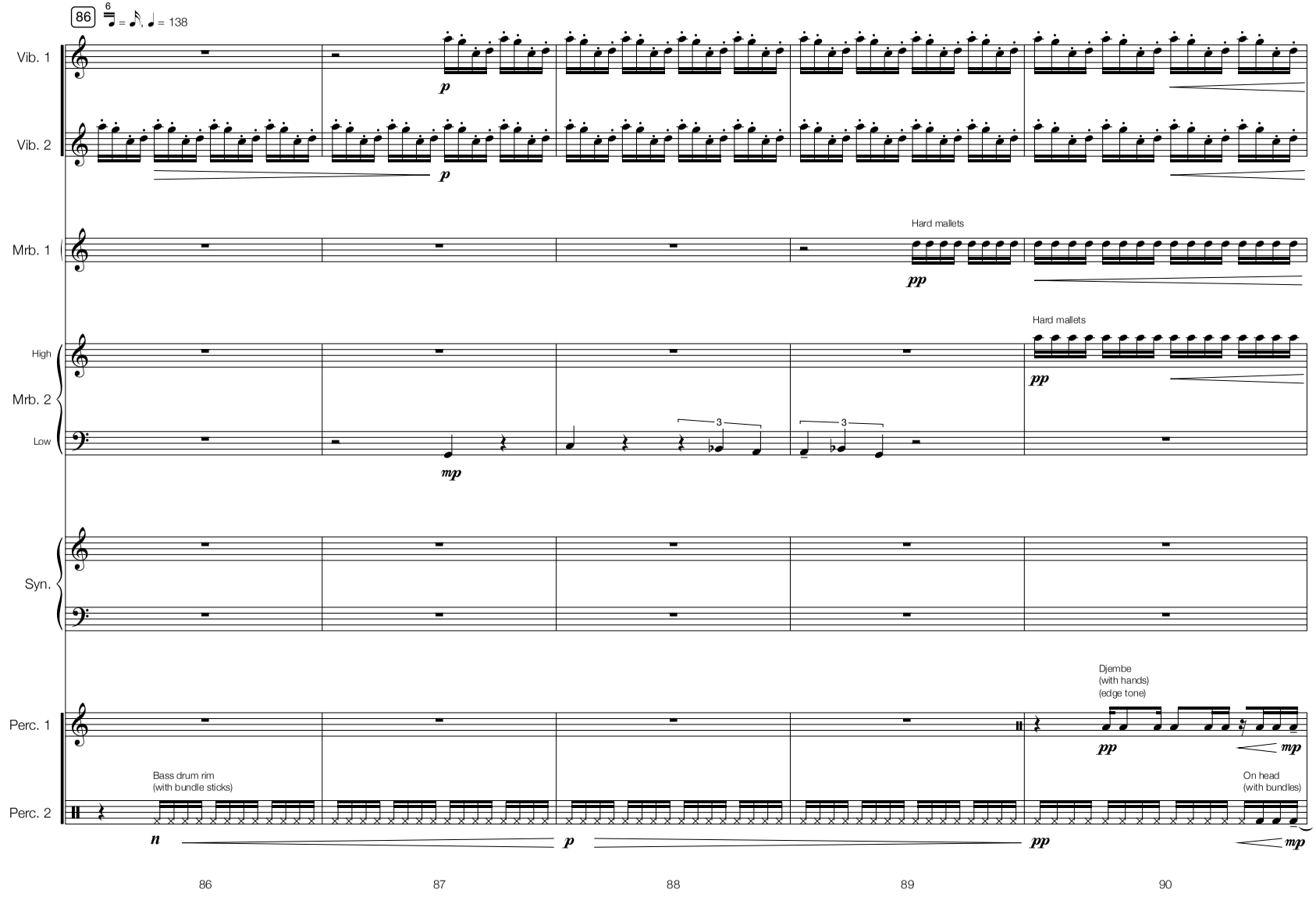

57
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Medium plastic mallets
57
58
59
60
61
62

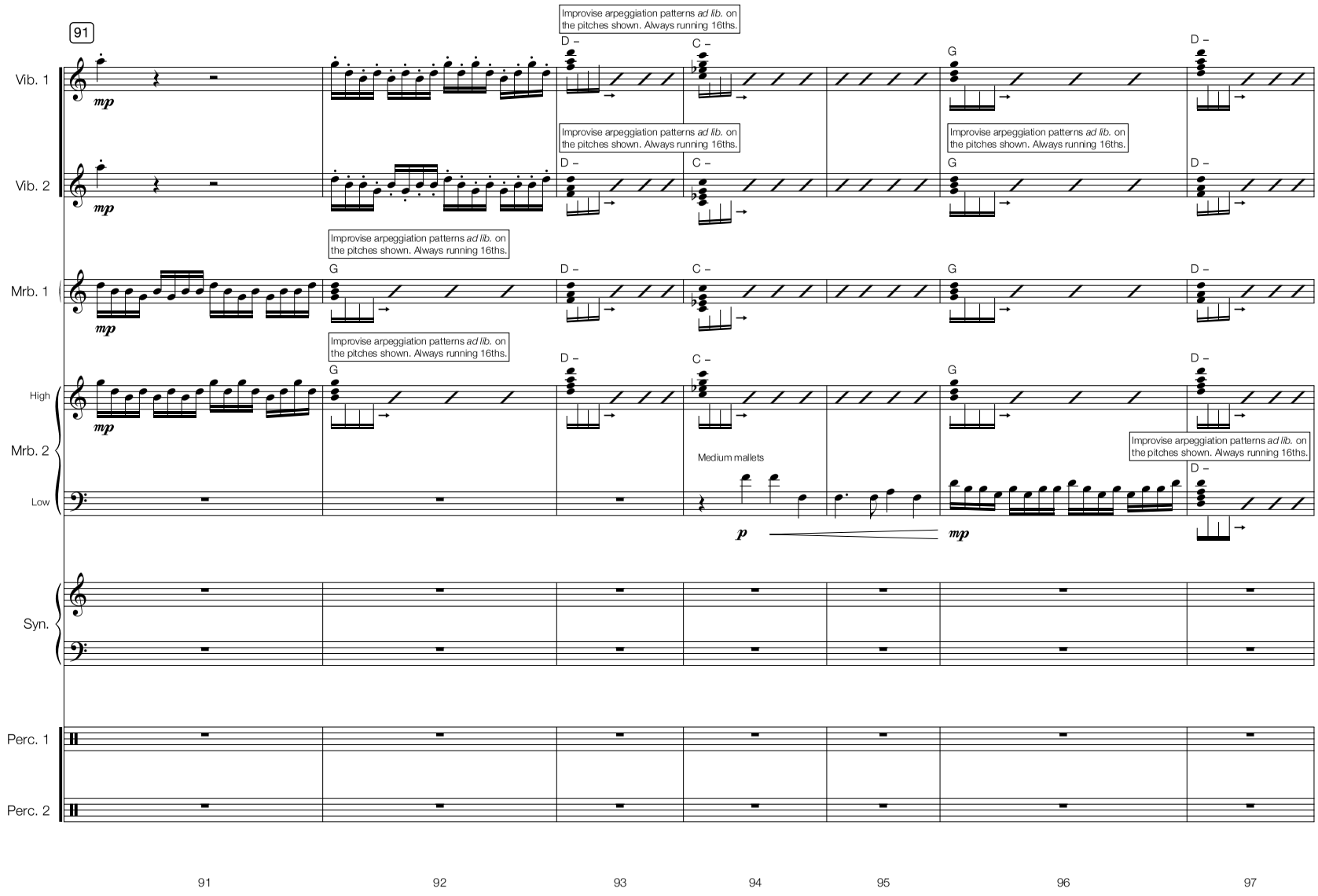

63
69
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Djembe
(swirl with brush)
Perc. 2
mf
p
mp
gently
3
63
64
65
66
67
68
69

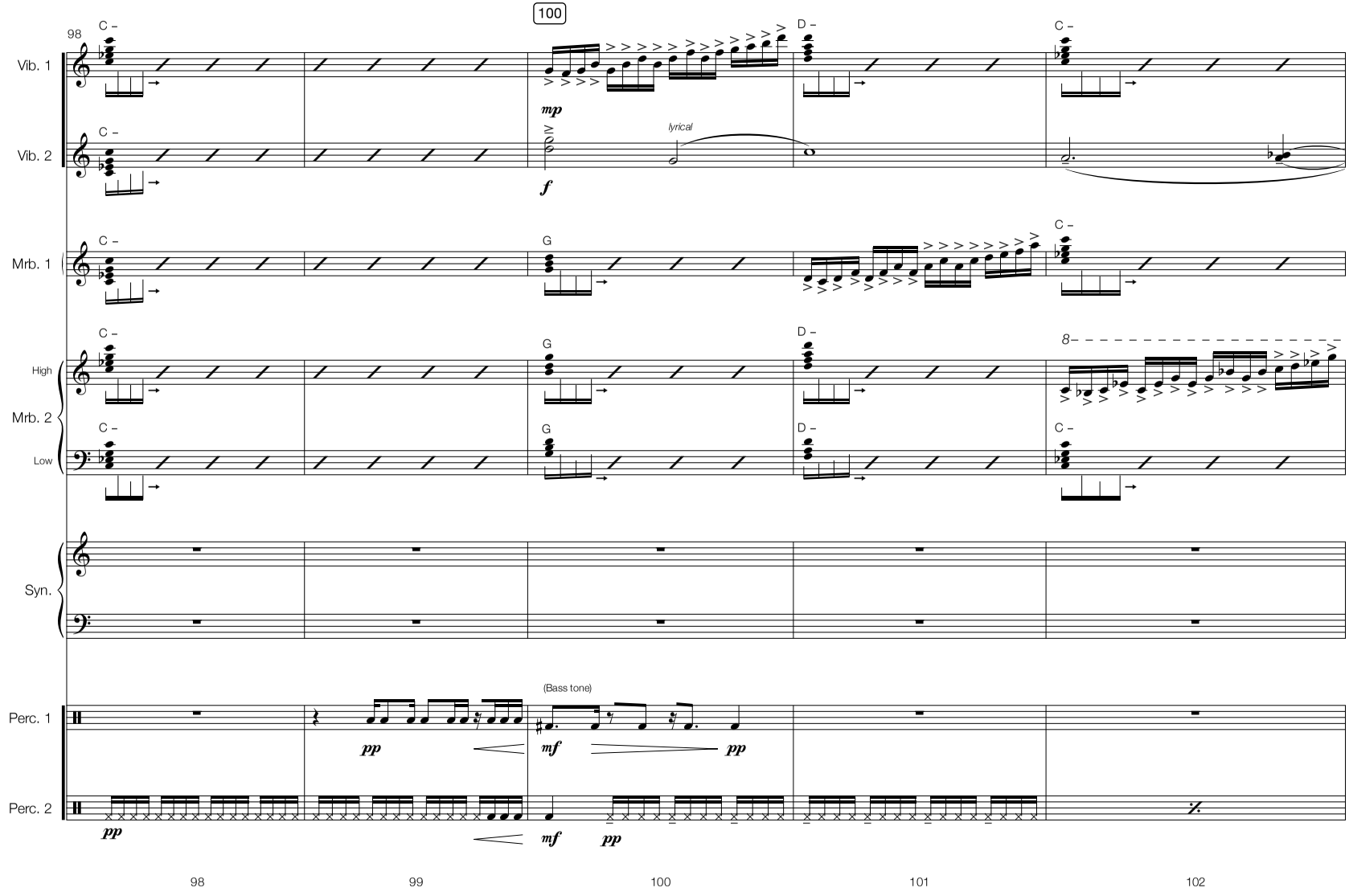

70
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Bowed
Stems up = right hand
Stems down = left hand
70
71
72
73
74
75

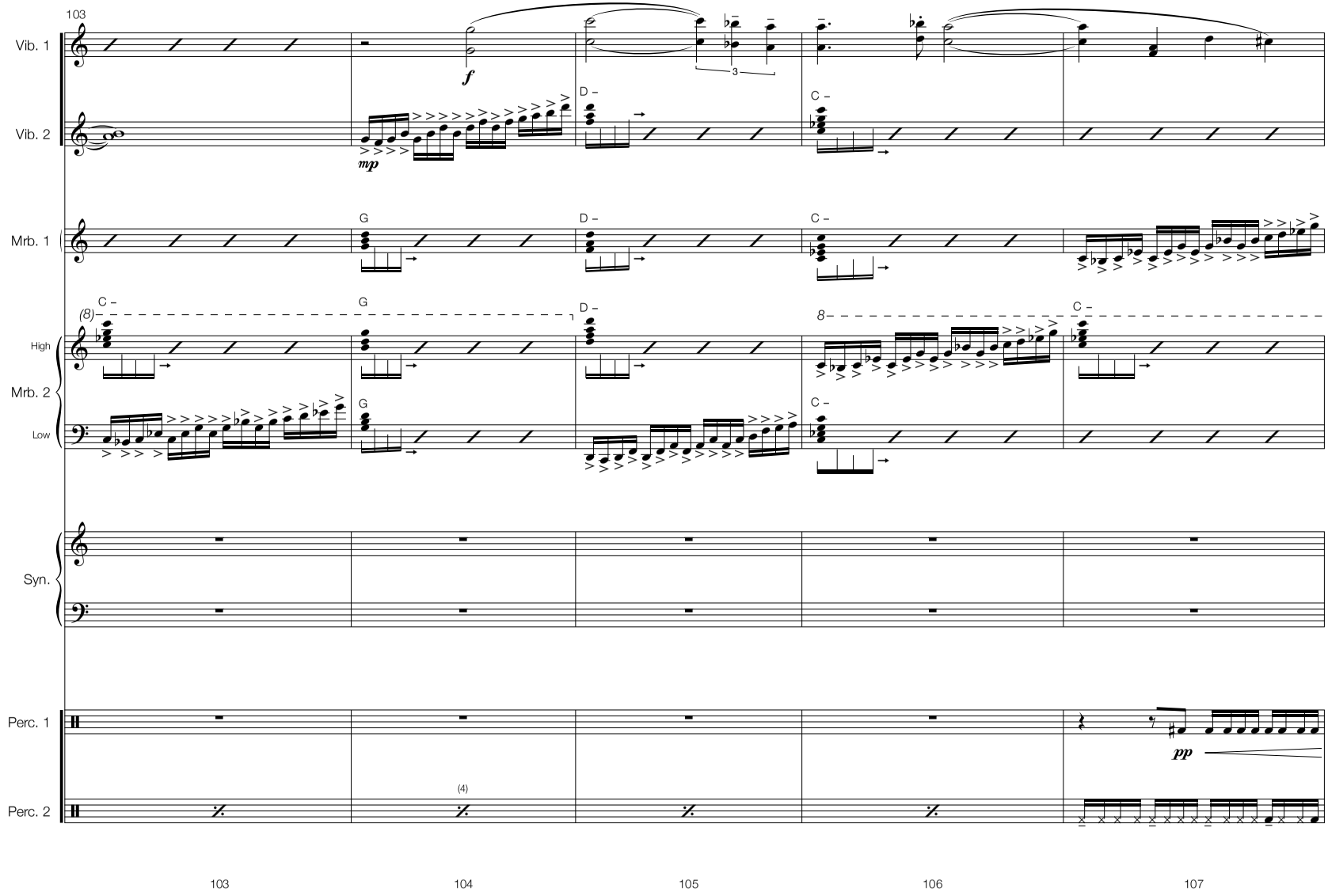

76
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Play normally
with brushes
Sus. cym.
(with soft mallets)
76
77
78
79
80
81
82

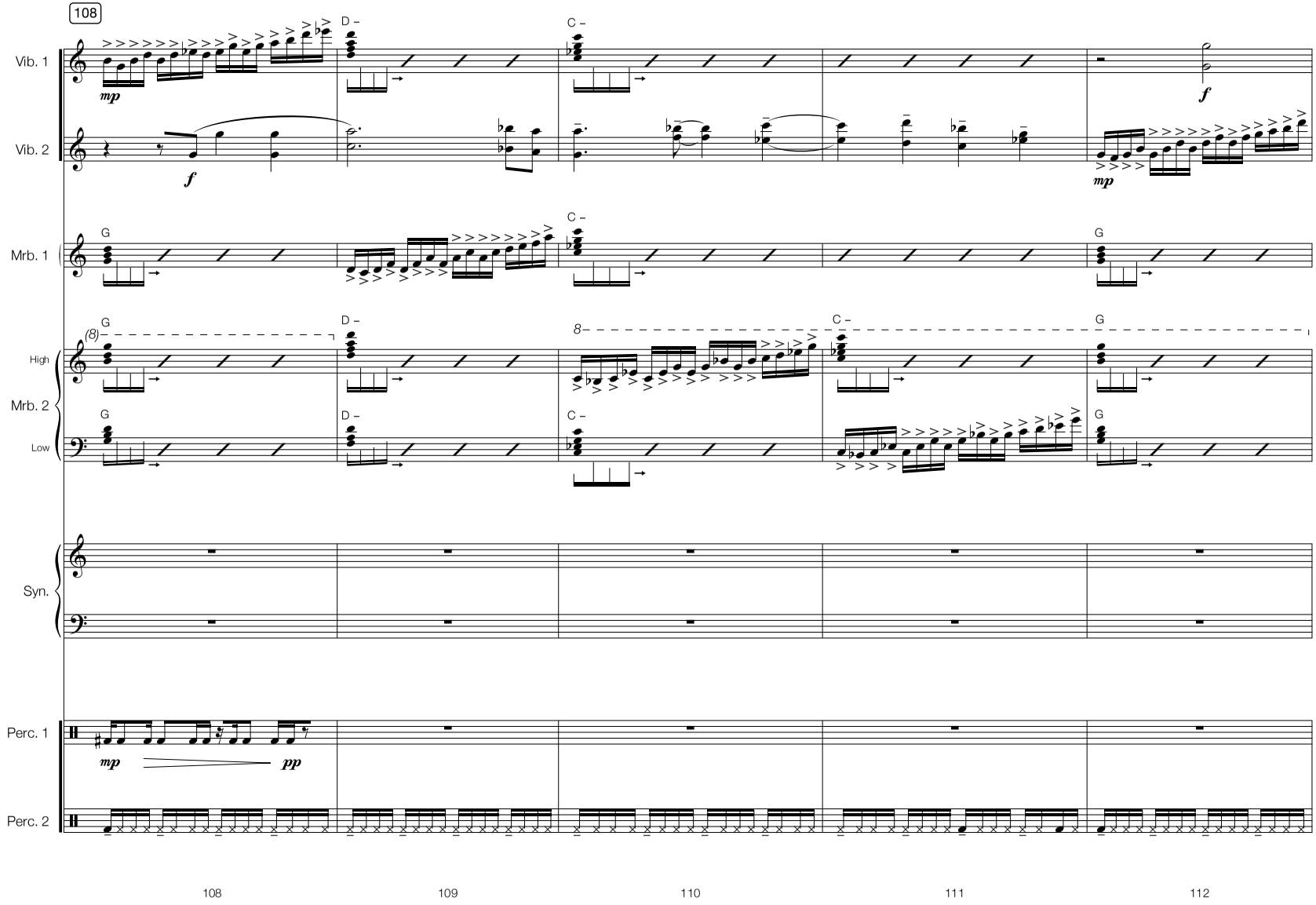

83
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mf
mf
mp
83
84
85

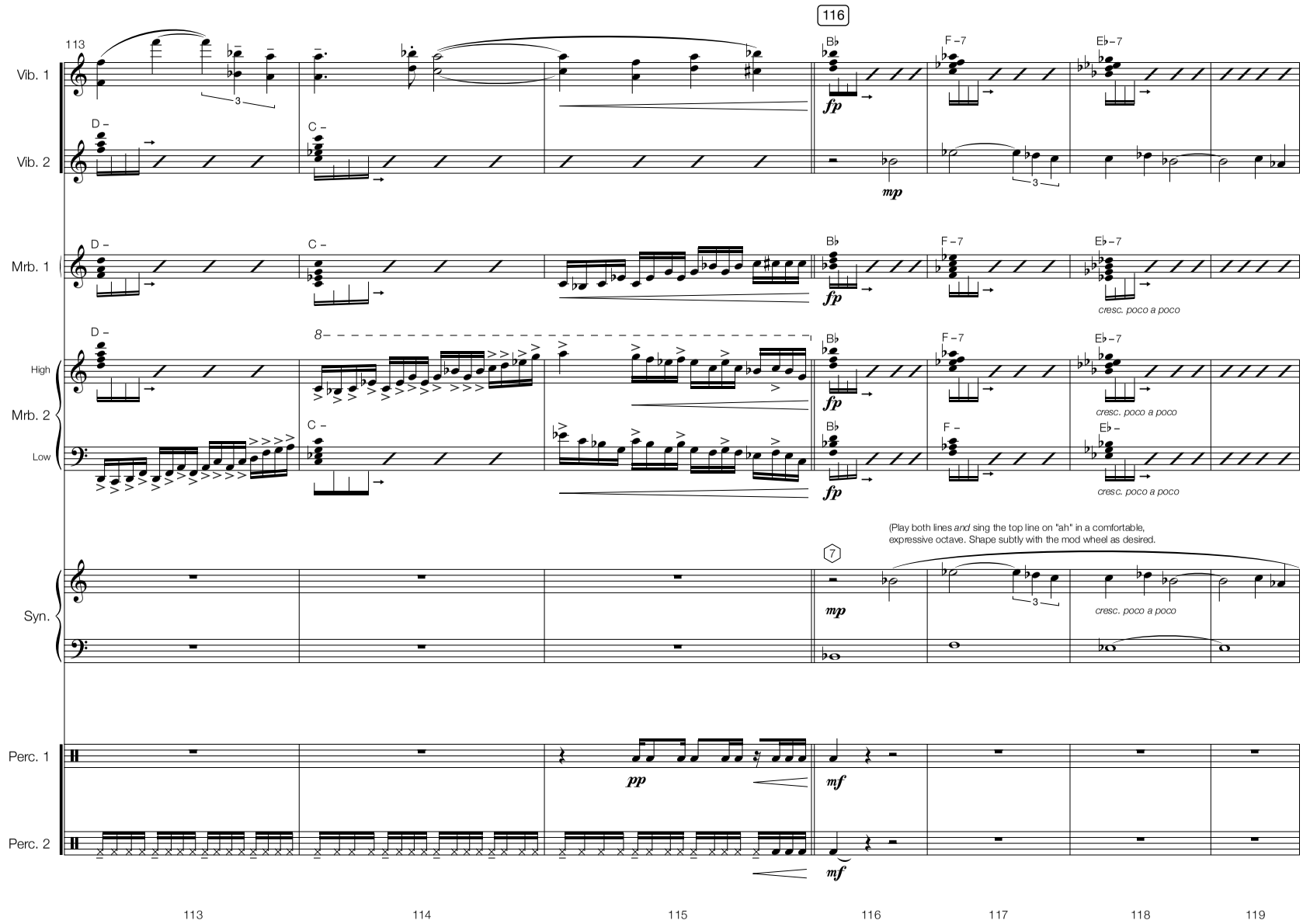

86
6
= , = 138
Vib. 1
Vib. 2
Mrb. 1
Hard mallets
High
Mrb. 2
Low
Hard mallets
Syn.
Djembe
(with hands)
(edge tone)
Perc. 1
Bass drum rim
(with bundle sticks)
On head
(with bundles)
Perc. 2
86
87
88
89
90

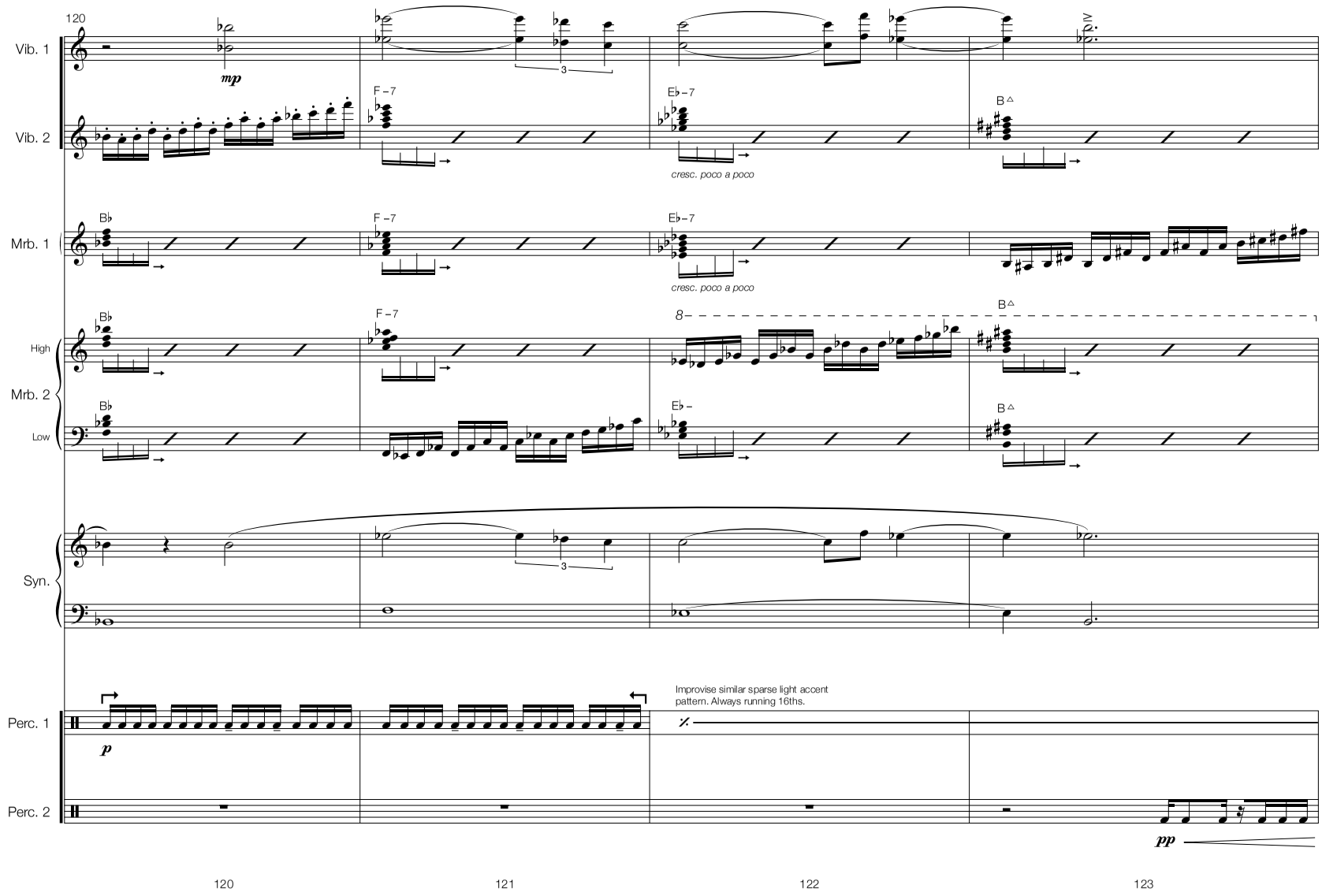

91
Improvise arpeggiation patterns ad lib. on the pitches shown. Always running 16ths.
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Medium mallets
Syn.
Perc. 1
Perc. 2
91
92
93
94
95
96
97

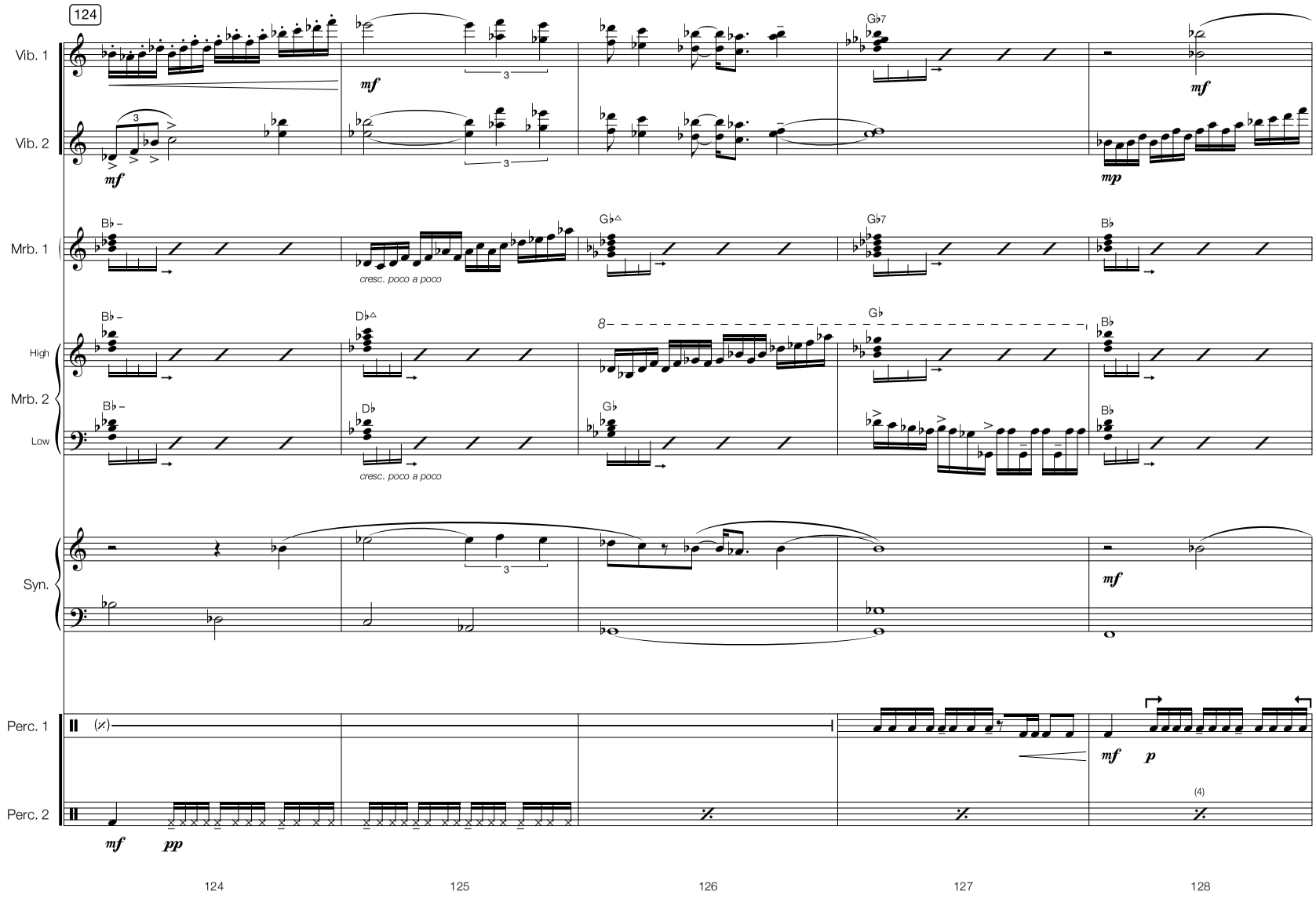

98
100
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
C –
G
D –
mp
f
lyrical
(Bass tone)
pp
mf
98
99
100
101
102

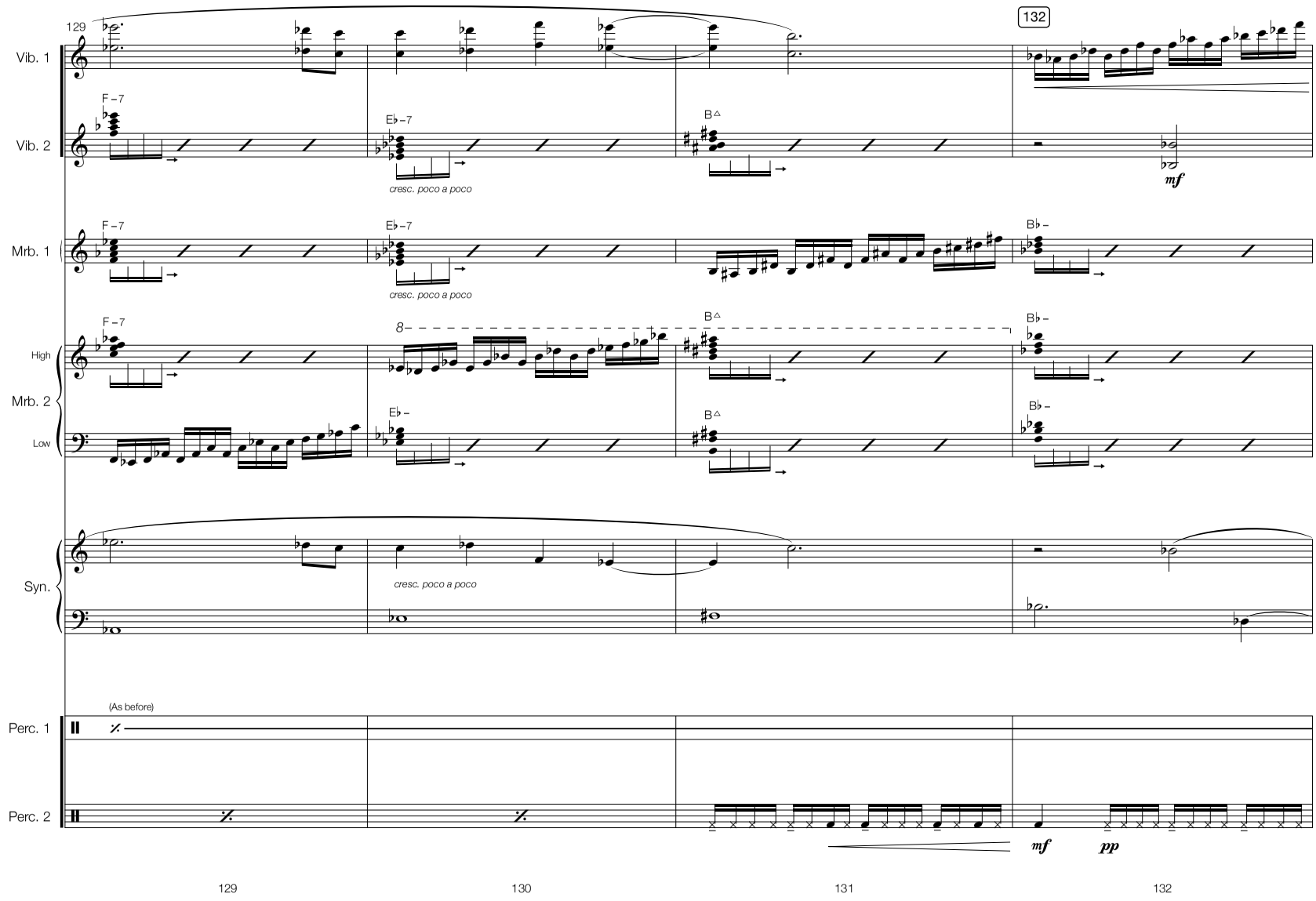

103
Vib. 1
Vib. 2
Mrb. 1
Mrb. 2
High
Low
Syn.
Perc. 1
Perc. 2
f
mp
pp
3
(4)
C –
D –
G
103
104
105
106
107

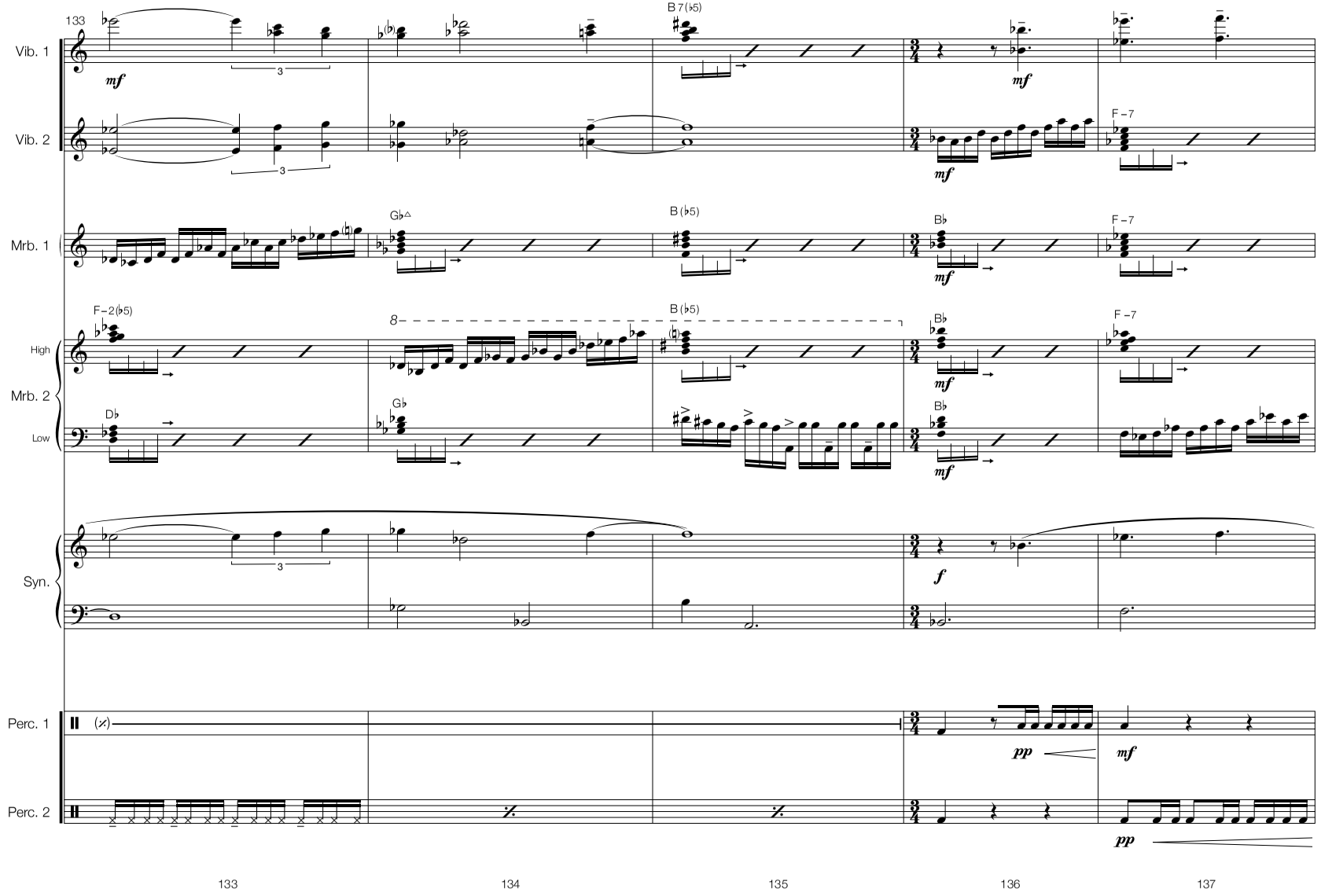

108
Vib. 1
Vib. 2
Mrb. 1
Mrb. 2
High
Low
Syn.
Perc. 1
Perc. 2
D –
C –
G
mp
f
pp
8
(8)
108
109
110
111
112

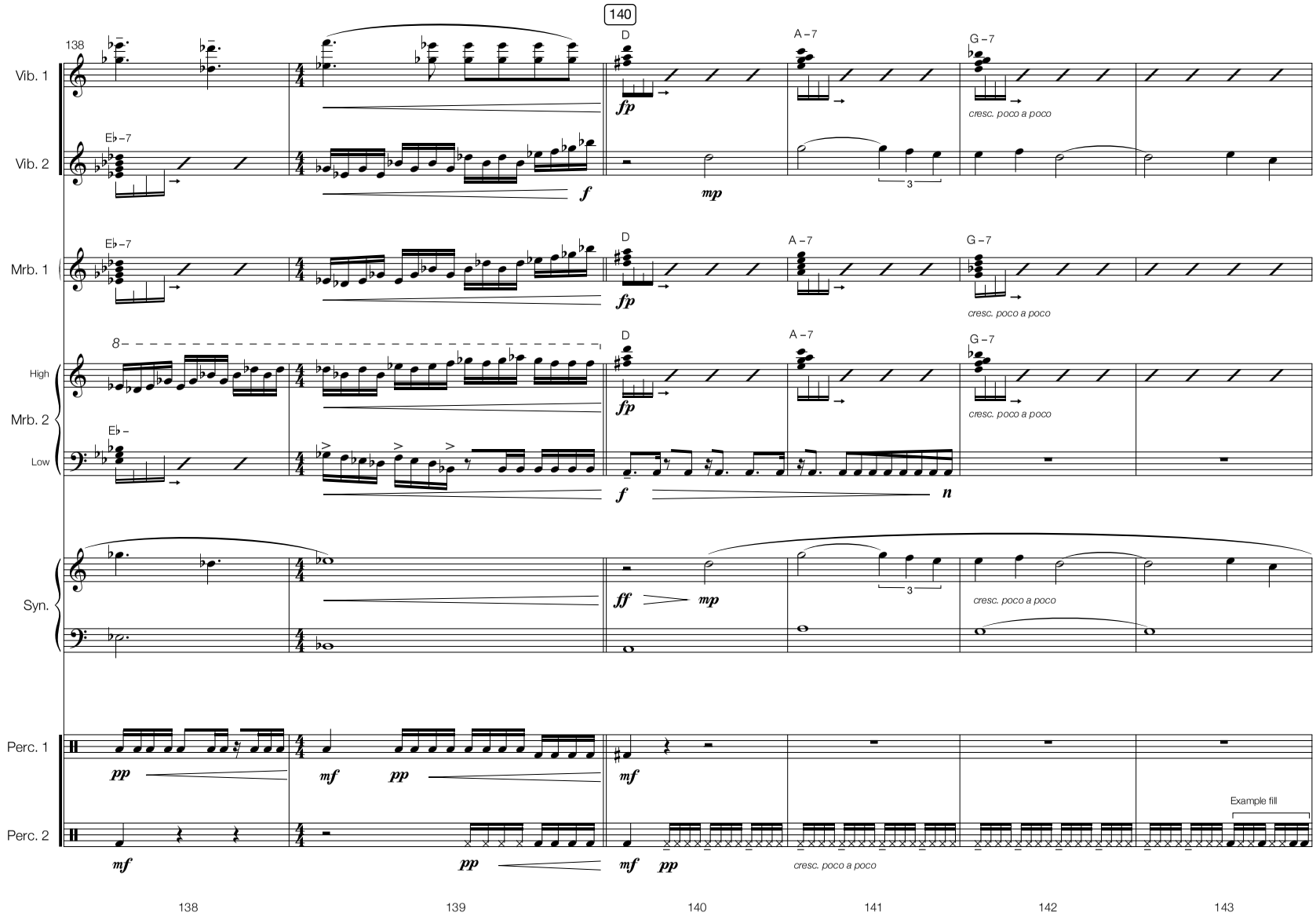

113
116
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
D –
C –
B♭
F –7
E♭–7
F –
E♭ –
fp
mp
cresc. poco a poco
8
(Play both lines and sing the top line on "ah" in a comfortable, expressive octave. Shape subtly with the mod wheel as desired.
7
pp
mf
3
113
114
115
116
117
118
119

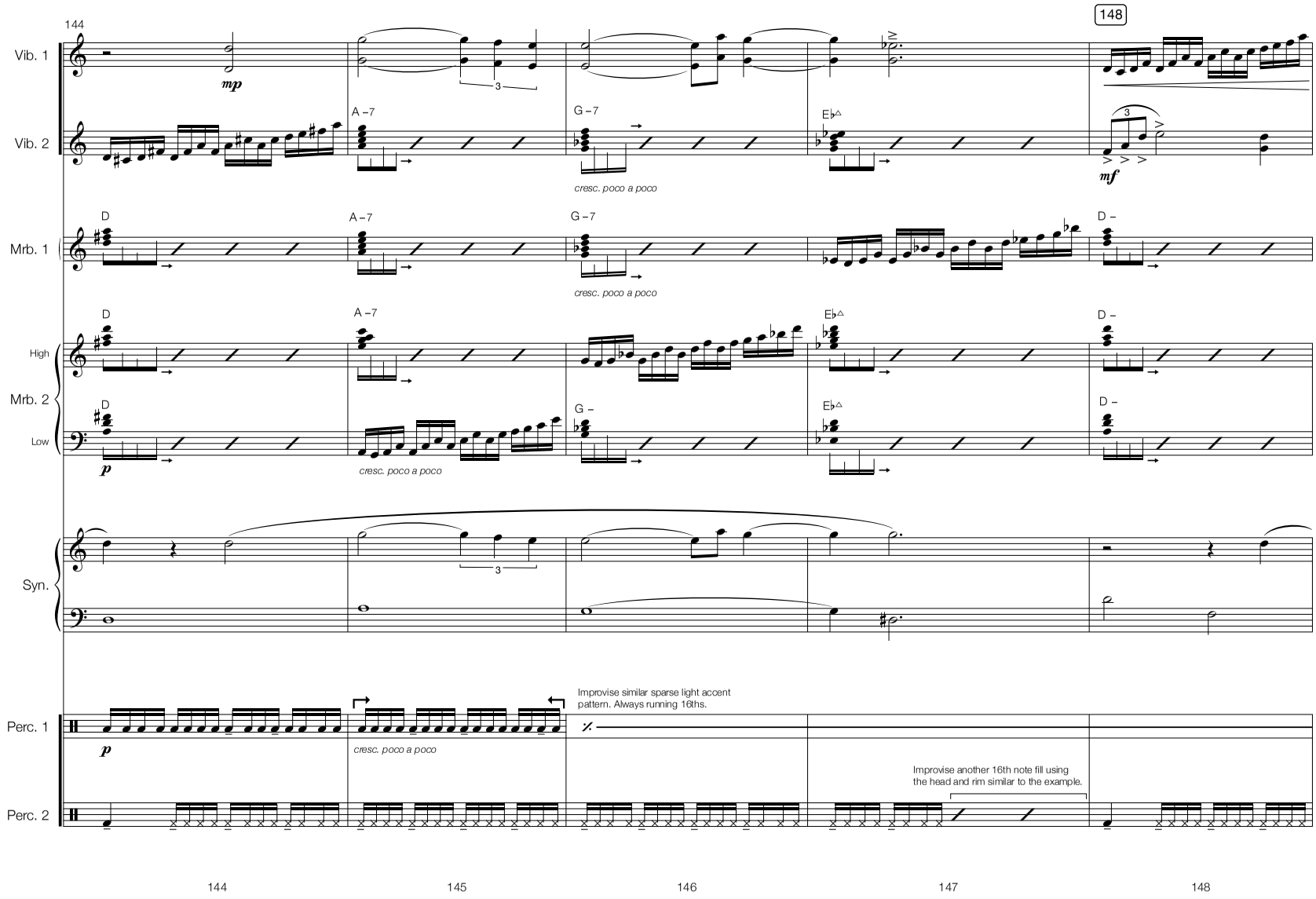

120
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mp
F –7
E♭–7
B△
cresc. poco a poco
B♭
E♭–
8–
3
Improvise similar sparse light accent pattern. Always running 16ths.
p
pp
120
121
122
123

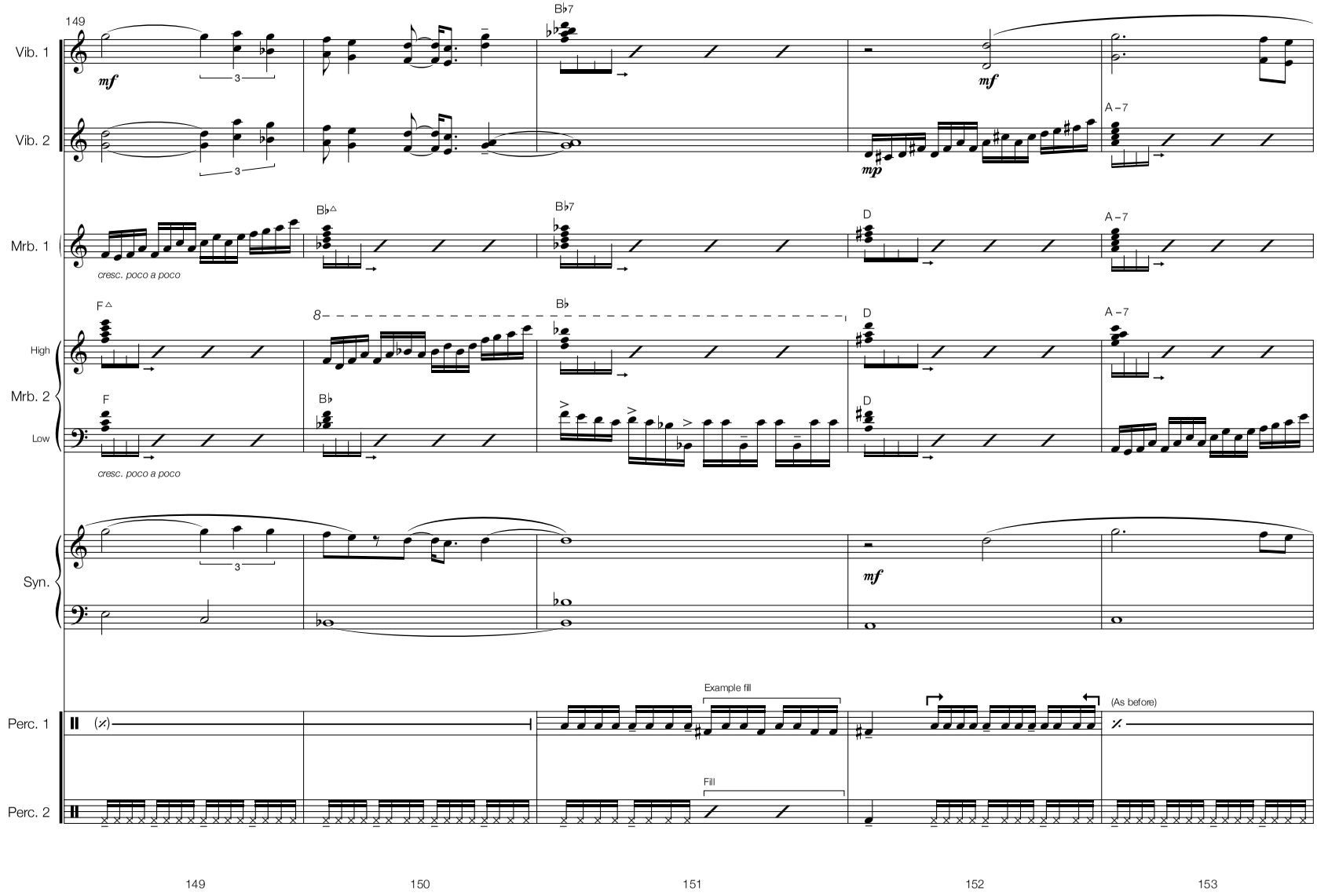

124
Vib. 1
Vib. 2
Mrb. 1
Mrb. 2
High
Low
Syn.
Perc. 1
Perc. 2
mf
mp
pp
p
cresc. poco a poco
124
125
126
127
128

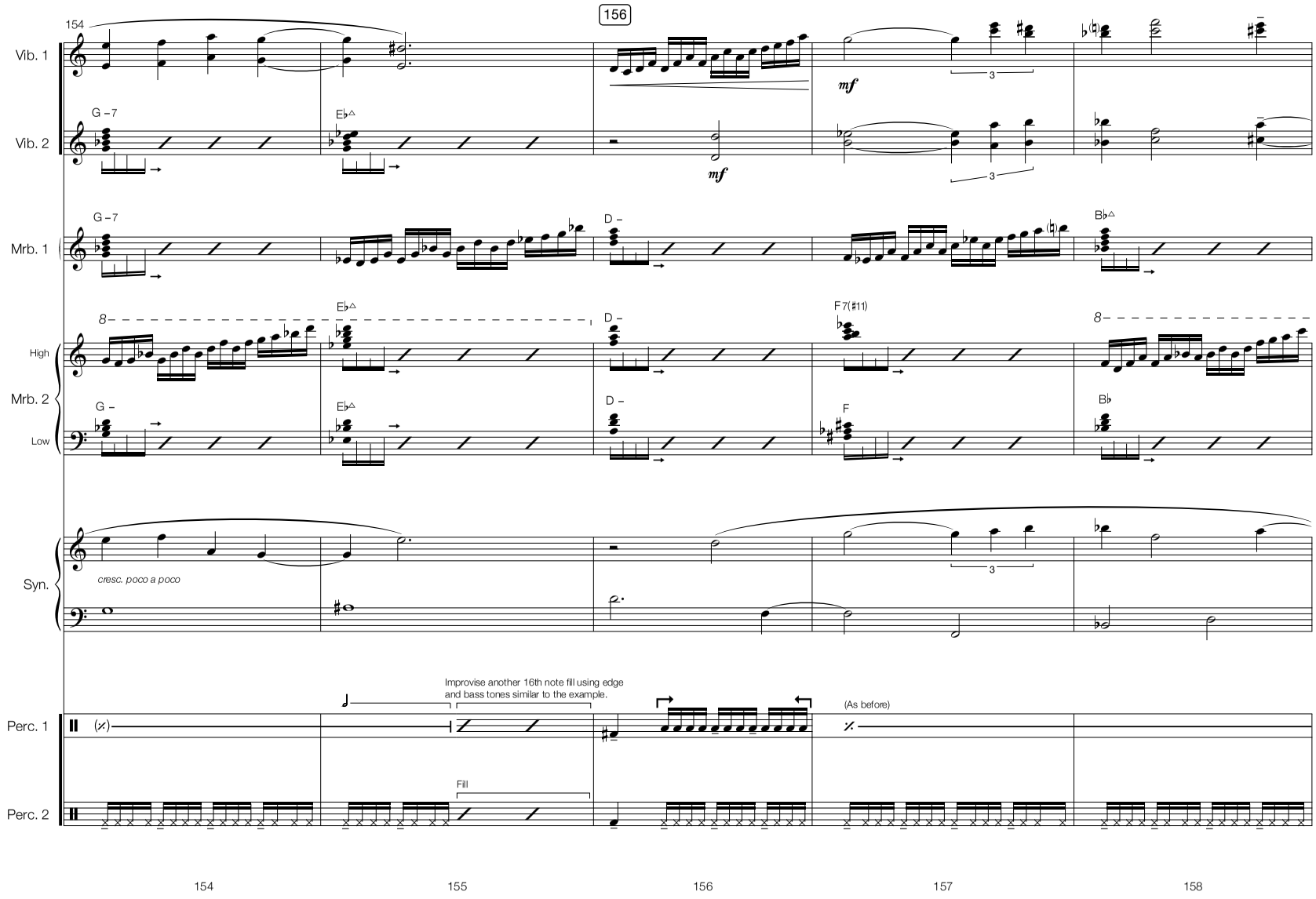

129
132
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
F –7
E♭–7
B△
B♭–
E♭–
cresc. poco a poco
8
(As before)
mf
pp
129
130
131
132

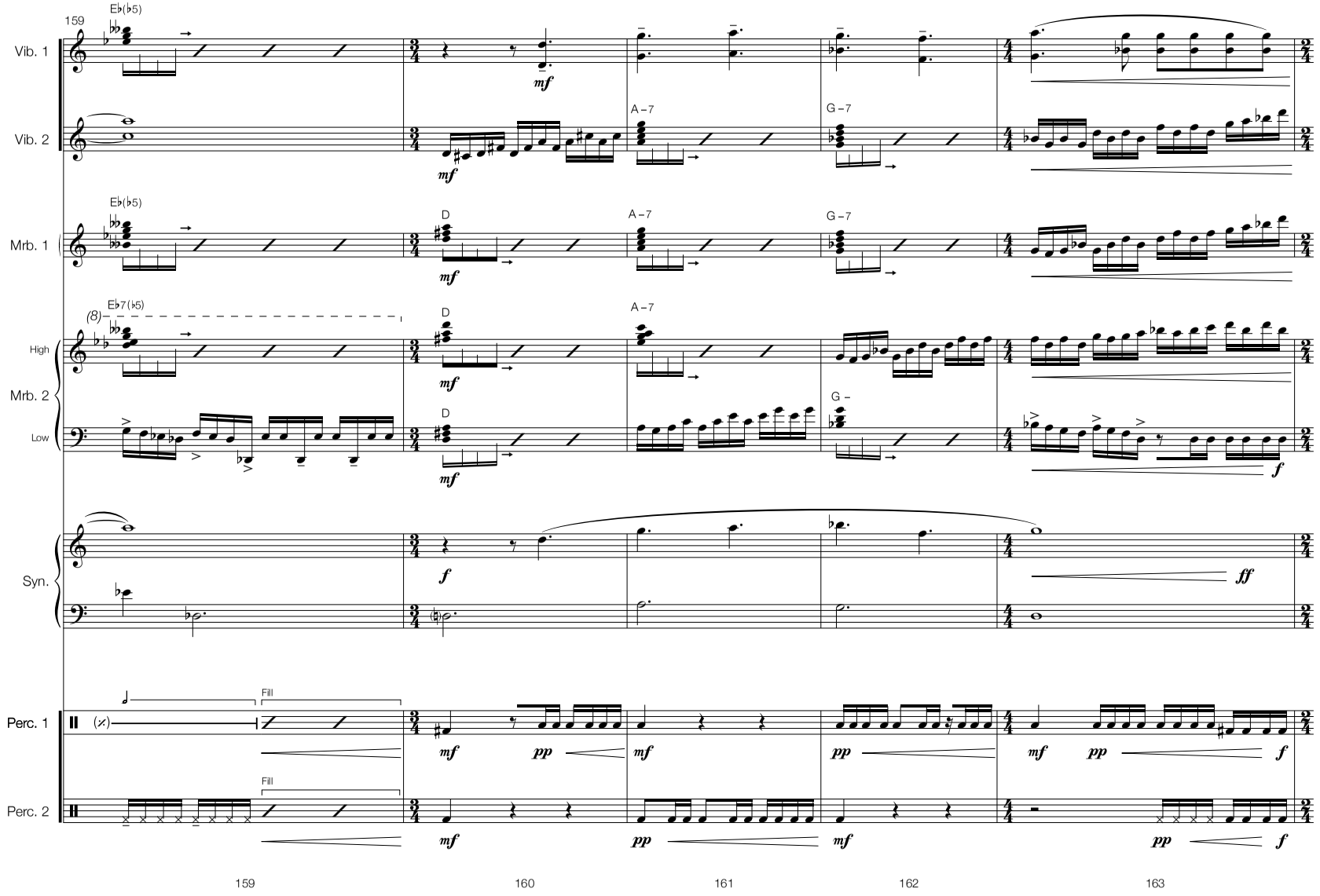

133
B 7(♭5)
Vib. 1
Vib. 2
mf
F –7
Mrb. 1
G♭△
B(♭5)
B♭
F –2(♭5)
High
Mrb. 2
Low
D♭
G♭
Syn.
f
Perc. 1
Perc. 2
pp
133
134
135
136
137

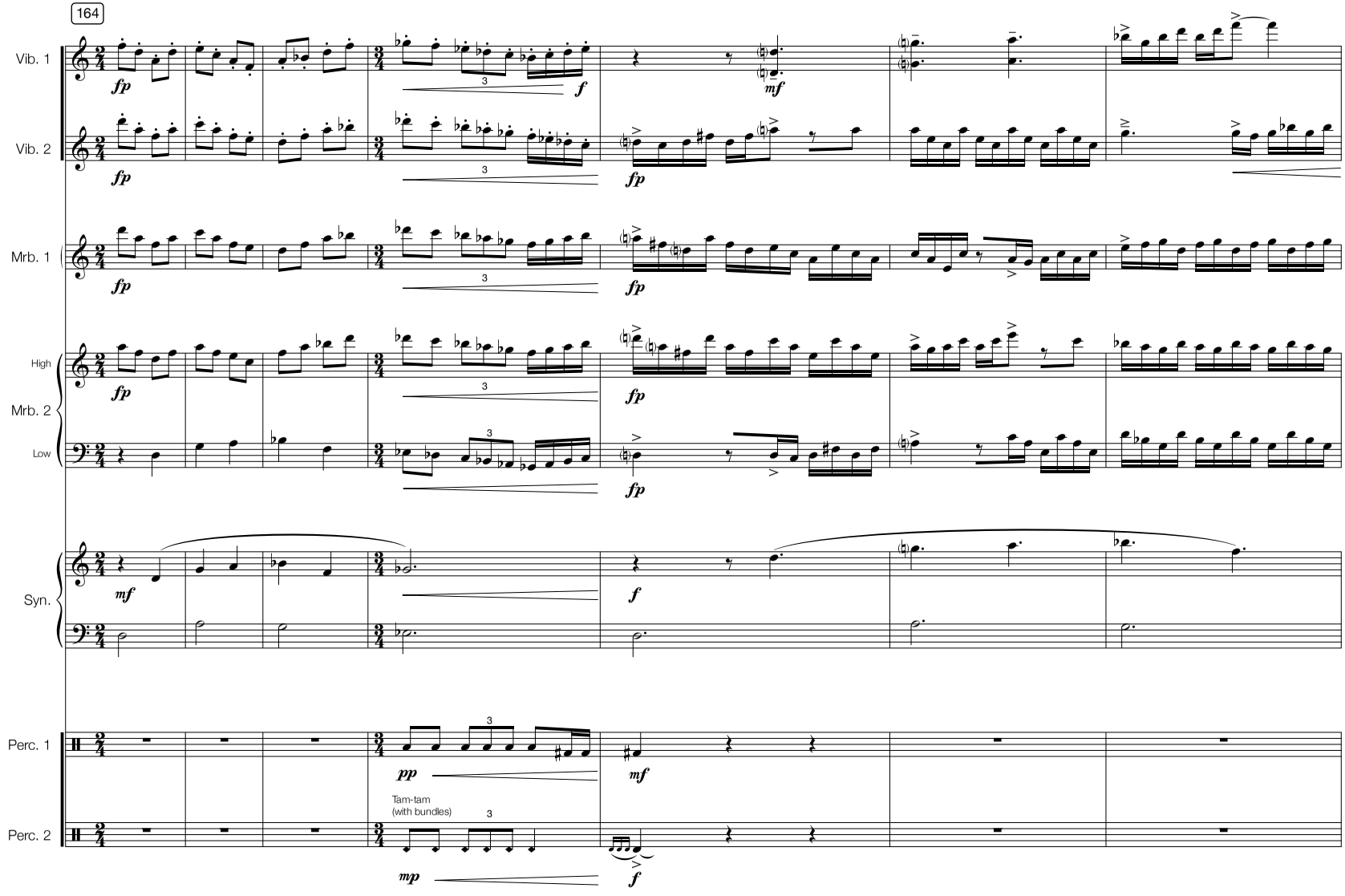

140
138
D
A –7
G –7
Vib. 1
Vib. 2
E♭ –7
fp
f
mp
cresc. poco a poco
3
Mrb. 1
High
Mrb. 2
Low
8
E♭ –
n
Syn.
ff
Perc. 1
Perc. 2
pp
mf
Example fill
138
139
140
141
142
143

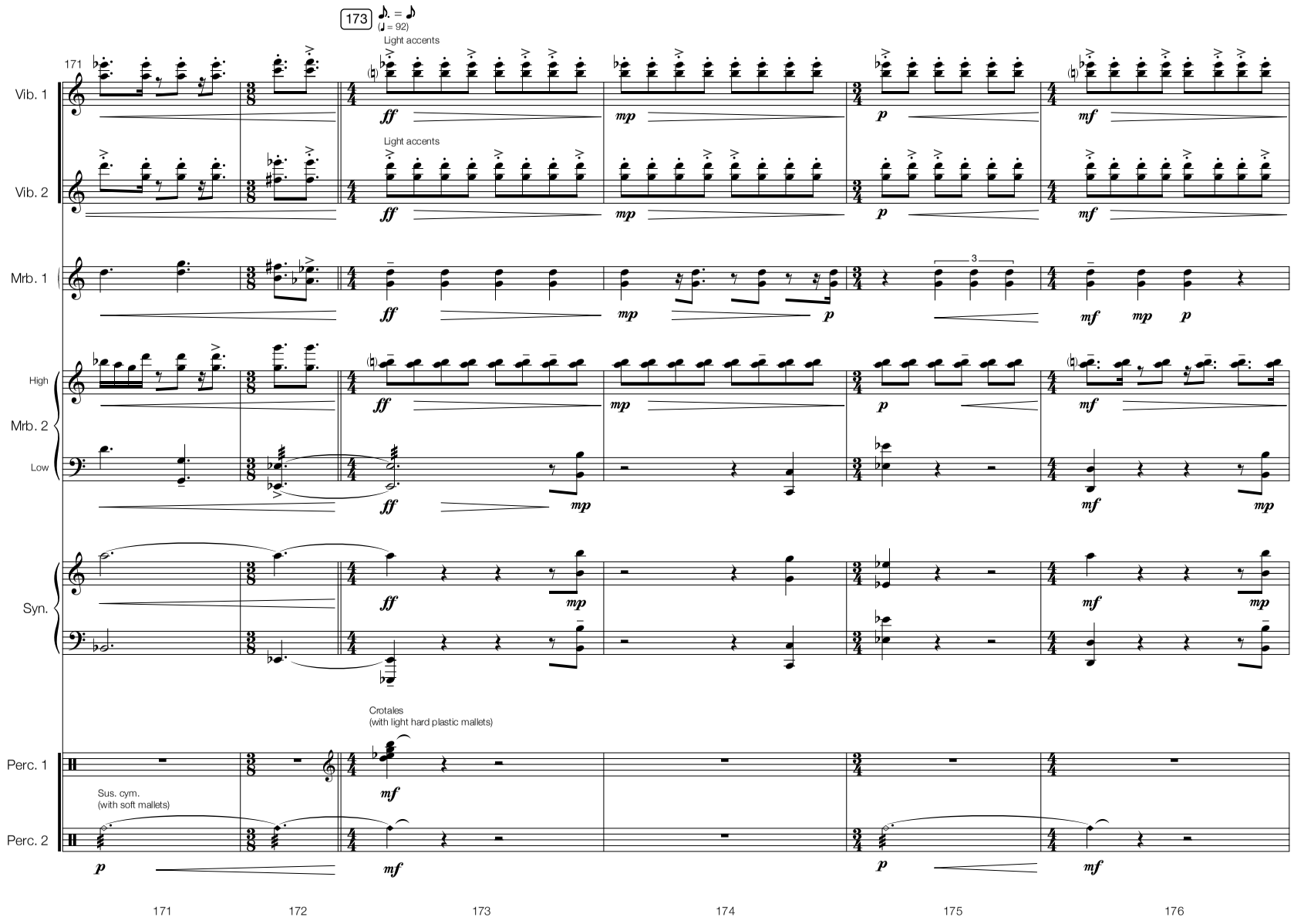

144
148
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
mp
mf
p
A –7
G –7
E♭△
D
D –
G –
cresc. poco a poco
Improvise similar sparse light accent pattern. Always running 16ths.
Improvise another 16th note fill using the head and rim similar to the example.
144
145
146
147
148

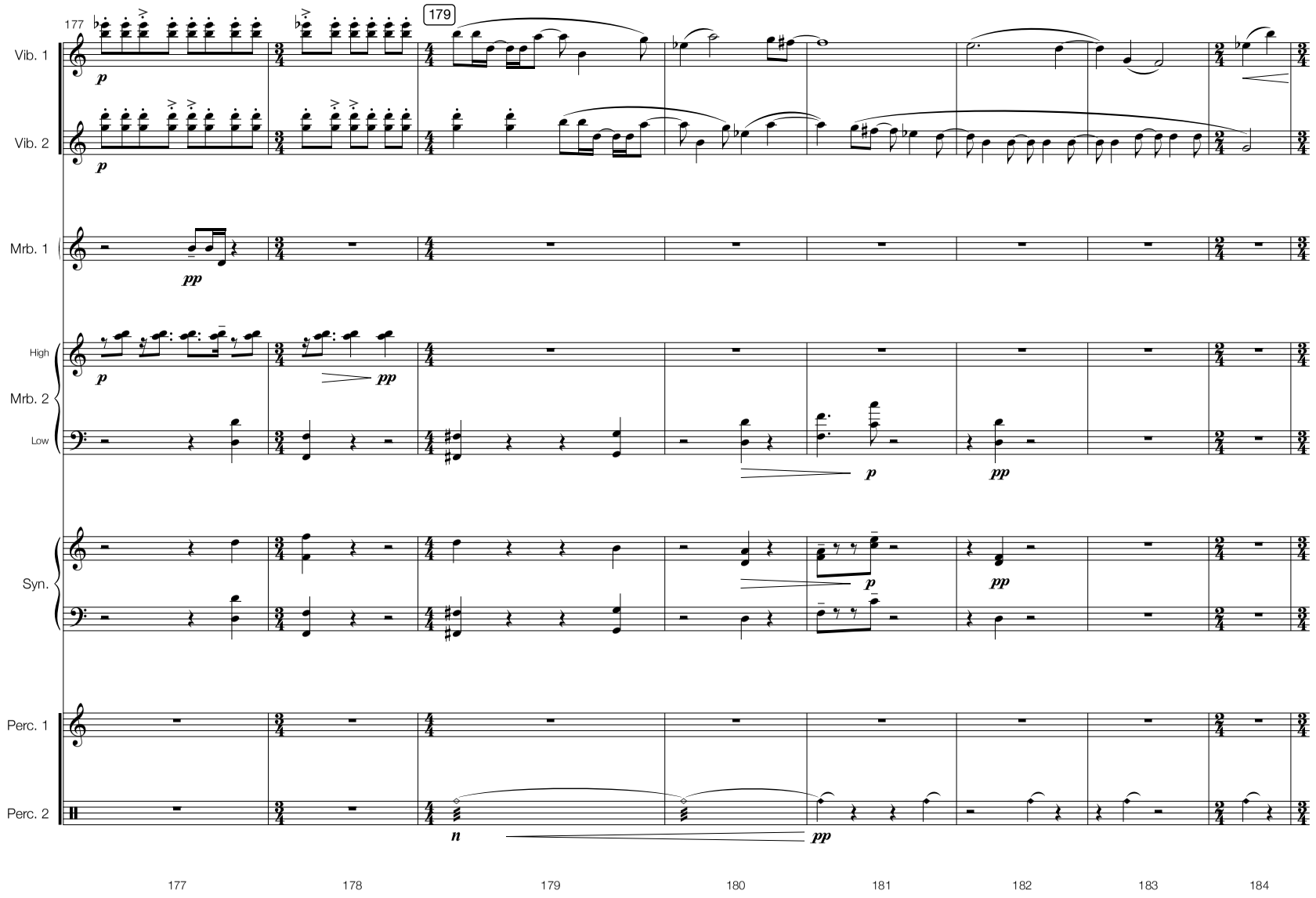

149
Vib. 1
Vib. 2
Mrb. 1
Mrb. 2
High
Low
Syn.
Perc. 1
Perc. 2
B♭7
A–7
B♭△
D
F△
B♭
F
mf
mp
cresc. poco a poco
Example fill
Fill
(As before)
149
150
151
152
153

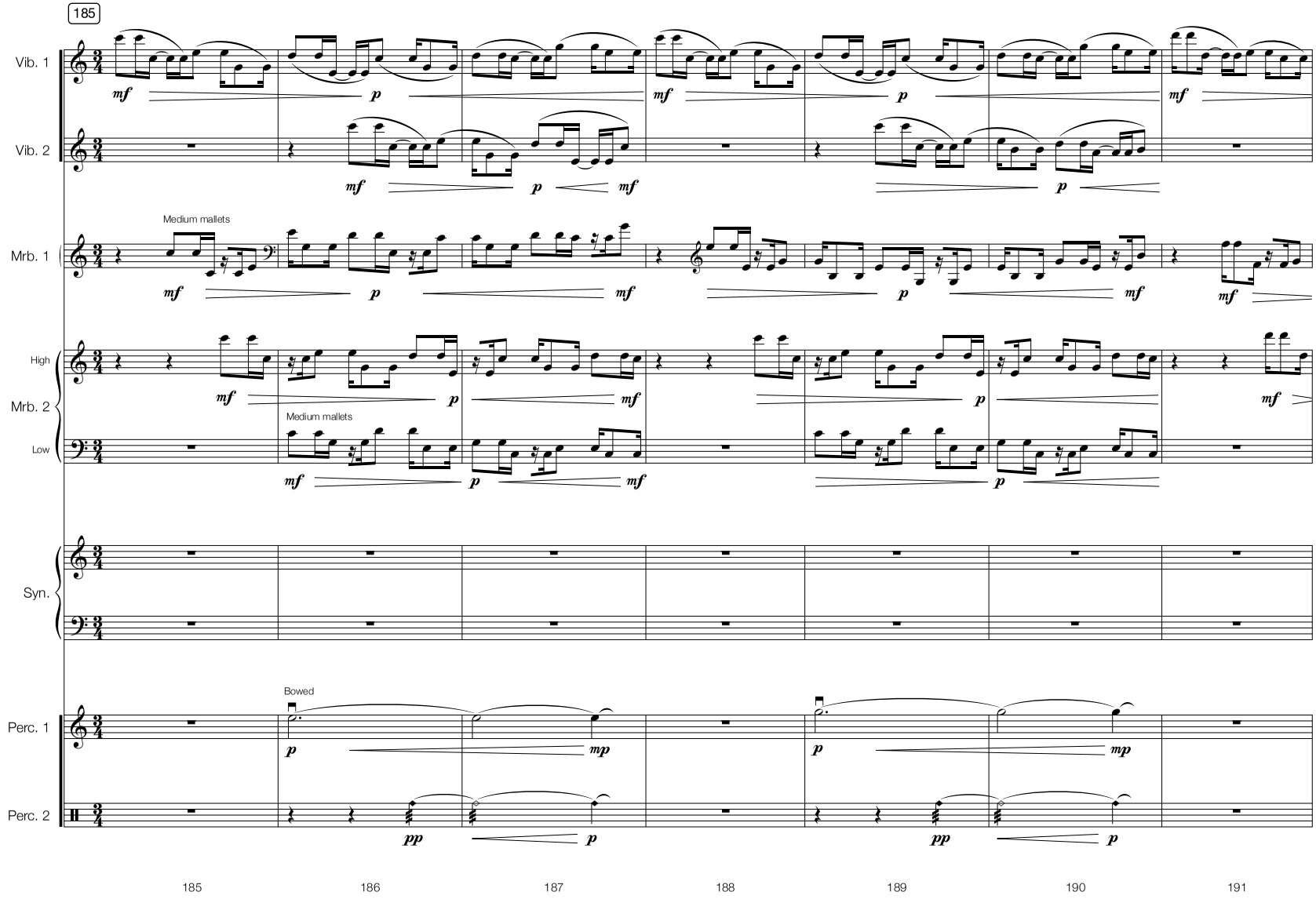

154
156
Vib. 1
Vib. 2
Mrb. 1
Mrb. 2
High
Low
Syn.
Perc. 1
Perc. 2
G –7
E♭△
D –
F 7(♯11)
B♭△
B♭
F
mf
3
8
cresc. poco a poco
Improvise another 16th note fill using edge and bass tones similar to the example.
(As before)
Fill
154
155
156
157
158

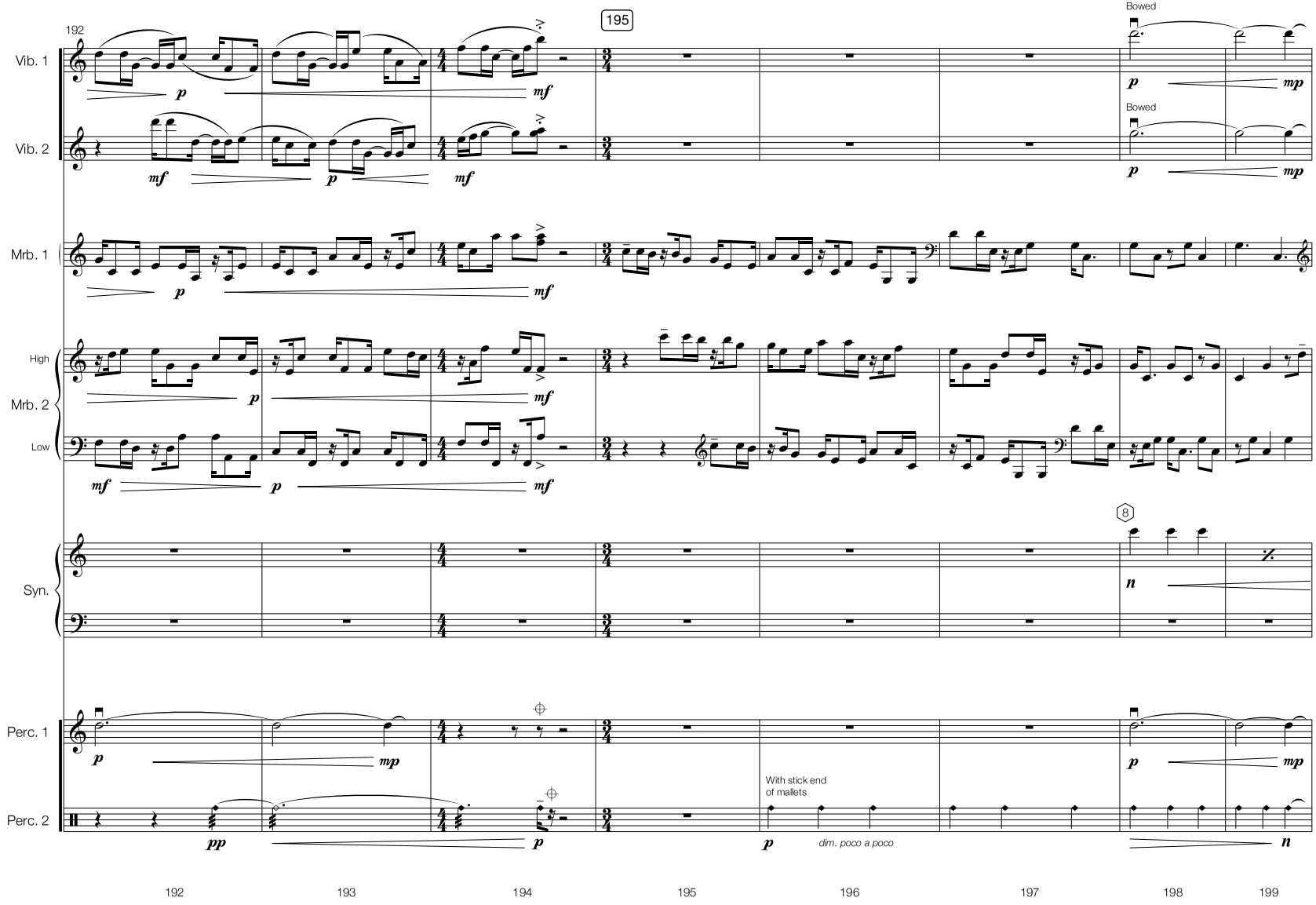

159
Vib. 1
Vib. 2
Mrb. 1
Mrb. 2
High
Low
Syn.
Perc. 1
Perc. 2
Eb(b5)
Eb7(b5)
A-7
G-7
D
G-
Fill
mf
pp
f
ff
159
160
161
162
163

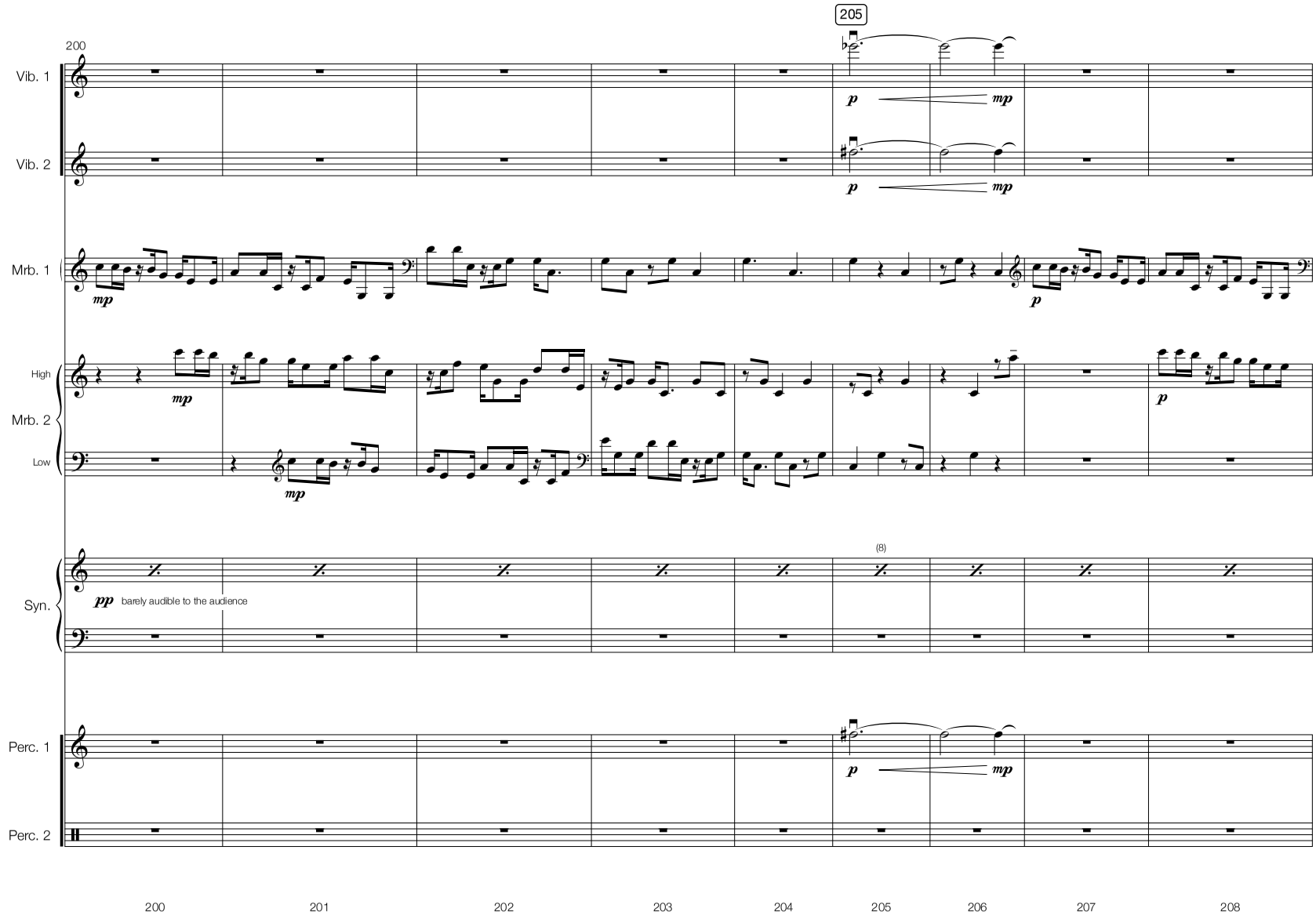

164
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Tam-tam
(with bundles)
164
165
166
167
168
169
170

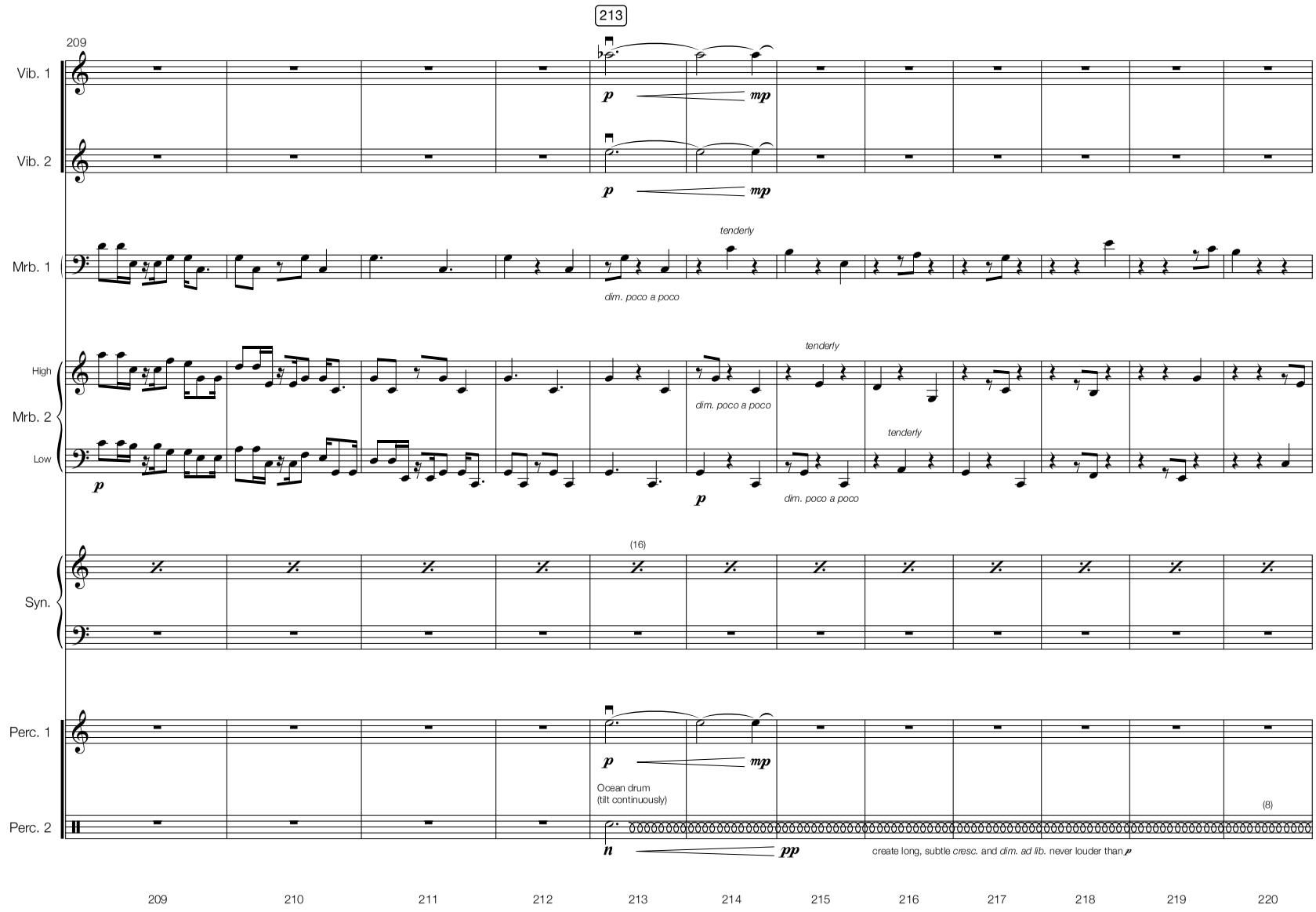

173
♪. = ♪
(♩ = 92)
171
Light accents
Vib. 1
Light accents
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Crotales
(with light hard plastic mallets)
Perc. 1
Sus. cym.
(with soft mallets)
Perc. 2
ff
mp
p
mf
171
172
173
174
175
176

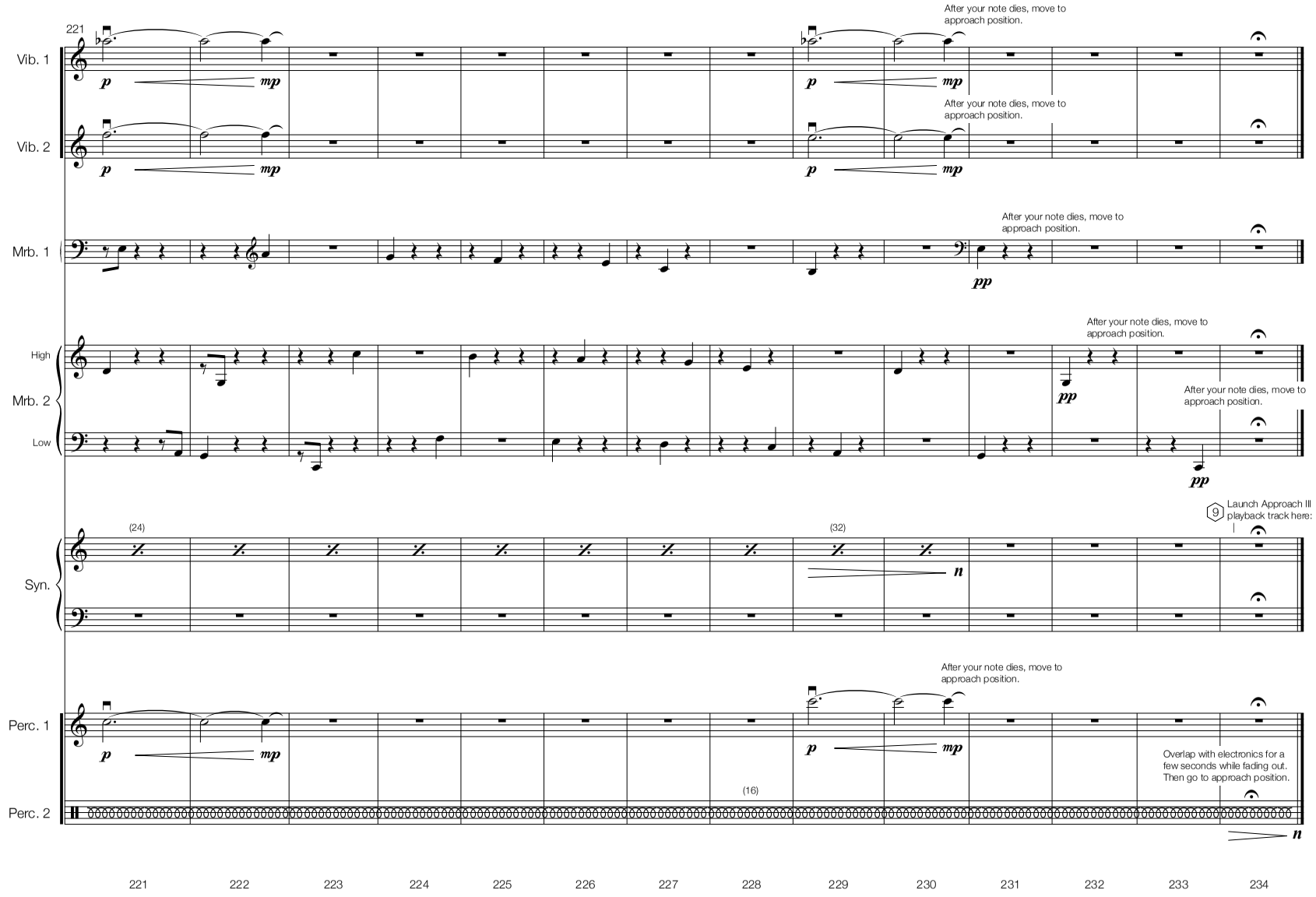

177
179
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
177
178
179
180
181
182
183
184


185
Vib. 1
Vib. 2
Medium mallets
Mrb. 1
High
Mrb. 2
Low
Medium mallets
Syn.
Bowed
Perc. 1
Perc. 2
185
186
187
188
189
190
191


192
195
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
Bowed
Bowed
With stick end
of mallets
dim. poco a poco
192
193
194
195
196
197
198
199


200
205
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
p
mp
pp barely audible to the audience
(8)
200
201
202
203
204
205
206
207
208


213
209
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
p
mp
tenderly
dim. poco a poco
(16)
Ocean drum
(tilt continuously)
(8)
pp
create long, subtle cresc. and dim. ad lib. never louder than p
209
210
211
212
213
214
215
216
217
218
219
220


221
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
After your note dies, move to approach position.
(24)
(32)
(16)
Launch Approach III playback track here:
Overlap with electronics for a few seconds while fading out. Then go to approach position.
221 222 223 224 225 226 227 228 229 230 231 232 233 234

✧ Approach III

Performance Notes

- Movement duration ≈ 10:00
- Always blend with the playback audio. Never cover it.
- During part 4, it may be beneficial to put a small spot of beeswax on the head (away from the normal playing zone) to facilitate the friction rolls. These rolls should have a warm, tonal hum.

Program Notes

Transit time to Uranus: 5 years. Distance from Saturn: 900 million miles.

Uranus' 7:20 orbital resonance with Saturn results in a compound tritone, an interval built prominently into the long melodies that intertwine with each other in this movement. Each of the drone layers (which start in unison) are gradually moved up or down by a tritone as well over the course of several minutes with faster tracks bent upward and slower ones downward. These harmonic strata undergo extreme stretching in multiples of seven (14x, 21x, etc…) to create offset temporal and frequency patterns that, if given time to play out, would take a very long time to finally align.

The percussionists are asked to listen closely to the audio and, when they hear a specific note they are "responsible" for, activate their instrument in the manner described in the score. The act of responding to certain pitches creates artificial resonance thereby causing the performance space to sound larger and more acoustically reflective than it actually is.

Score

Approach III

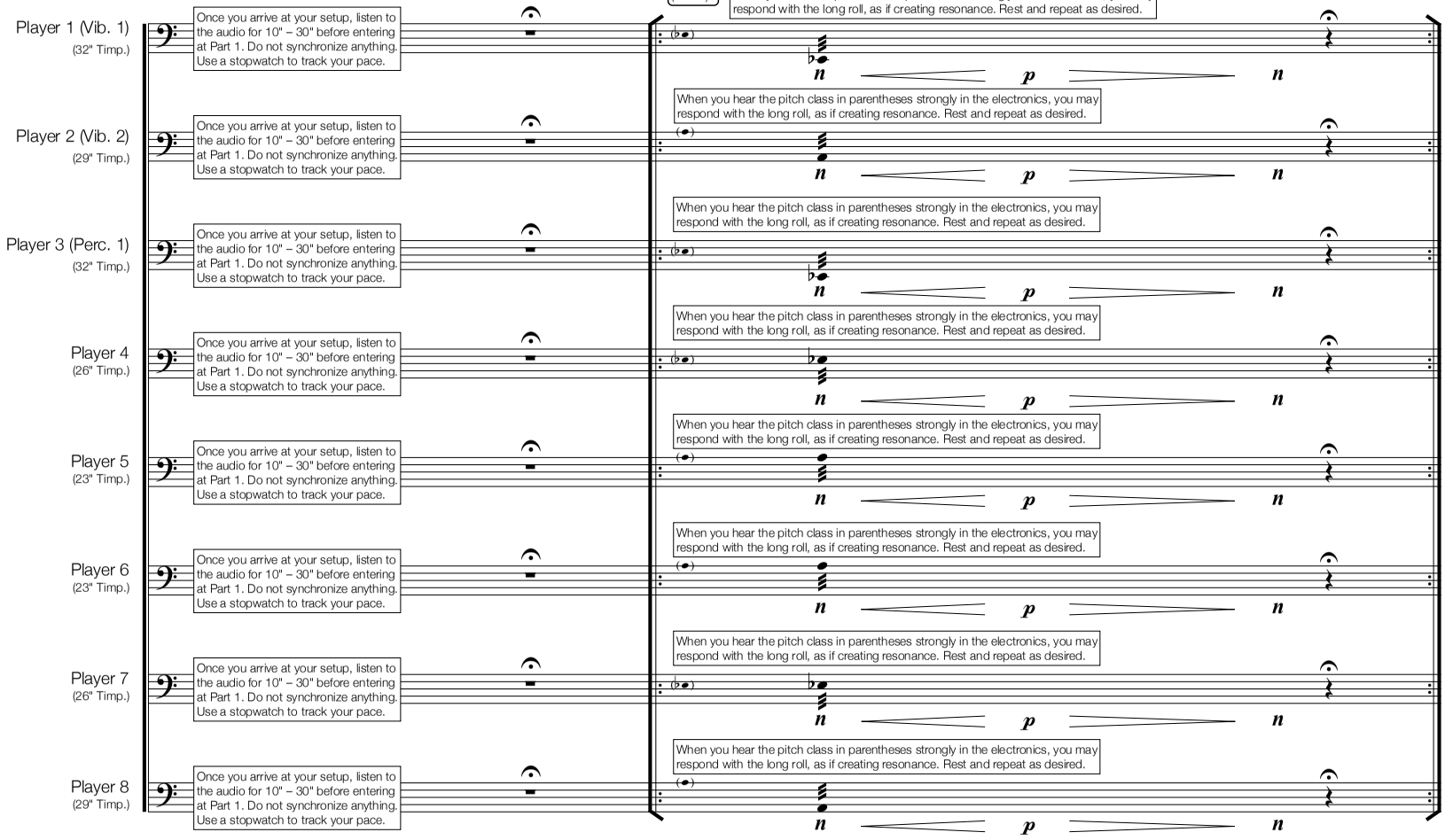
from Voyager

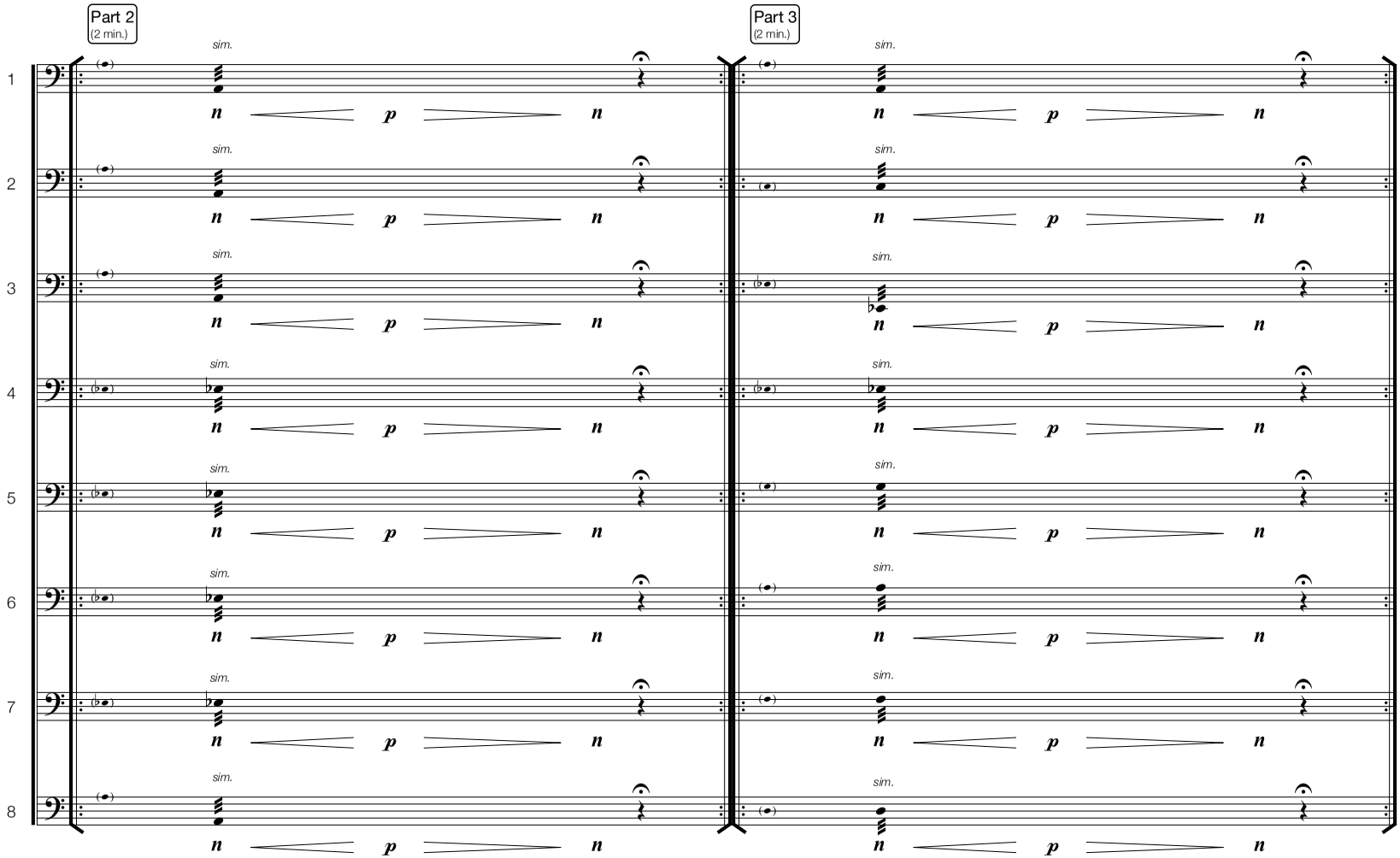
Ben Justis (2019)

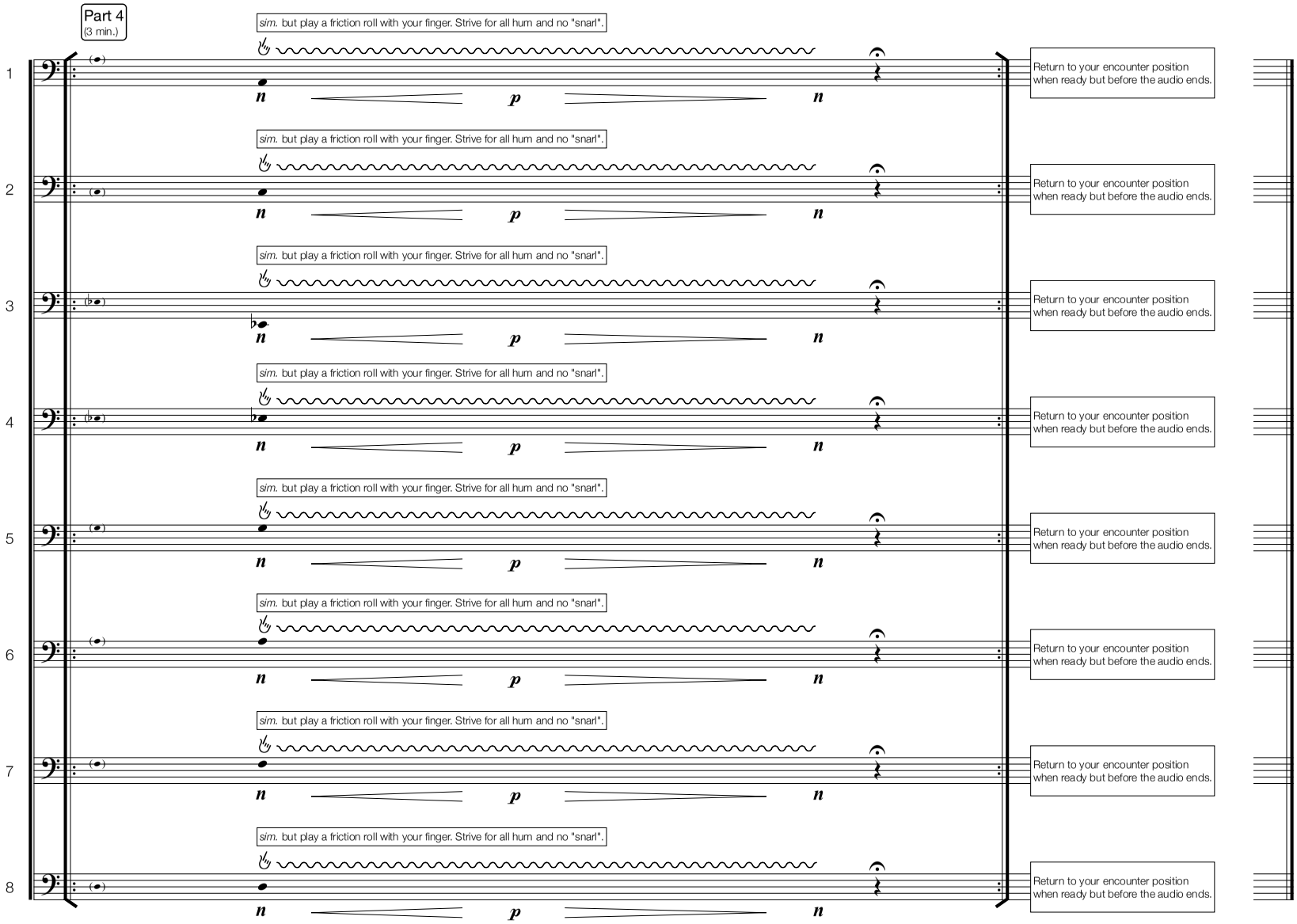
(The time in parentheses indicates the approximate duration of each part.)

Part 1 (2 min.)

When you hear the pitch class in parentheses strongly in the electronics, you may respond with the long roll, as if creating resonance. Rest and repeat as desired.




Part 2
(2 min.)
Part 3
(2 min.)
sim.
n
p
n
1
2
3
4
5
6
7
8


Part 4
(3 min.)
1
2
3
4
5
6
7
8
sim. but play a friction roll with your finger. Strive for all hum and no "snarl".
n
p
n
Return to your encounter position when ready but before the audio ends.

♅ Encounter IV: World of Ice

Performance Notes

- Movement duration ≈ 7:30
- Encounter IV is the only movement that does not overlap. The synth. player should launch the Encounter IV playback as soon as possible after the Approach III audio ends.
- Performers should choose pitches in response to the overall acoustic environment.
- Whenever chords are tied, do not choose different notes. Keep them the same.
- When the same chord is seen without a tie, you may choose new notes. Usually, these harmonies have an asterisk above them.
- Always strive to blend with the audio and adjust to its volume.
- Vibraphone 1, vibraphone 2, and percussion 1 need to take their bows with them to their Approach IV positions.

Program Notes

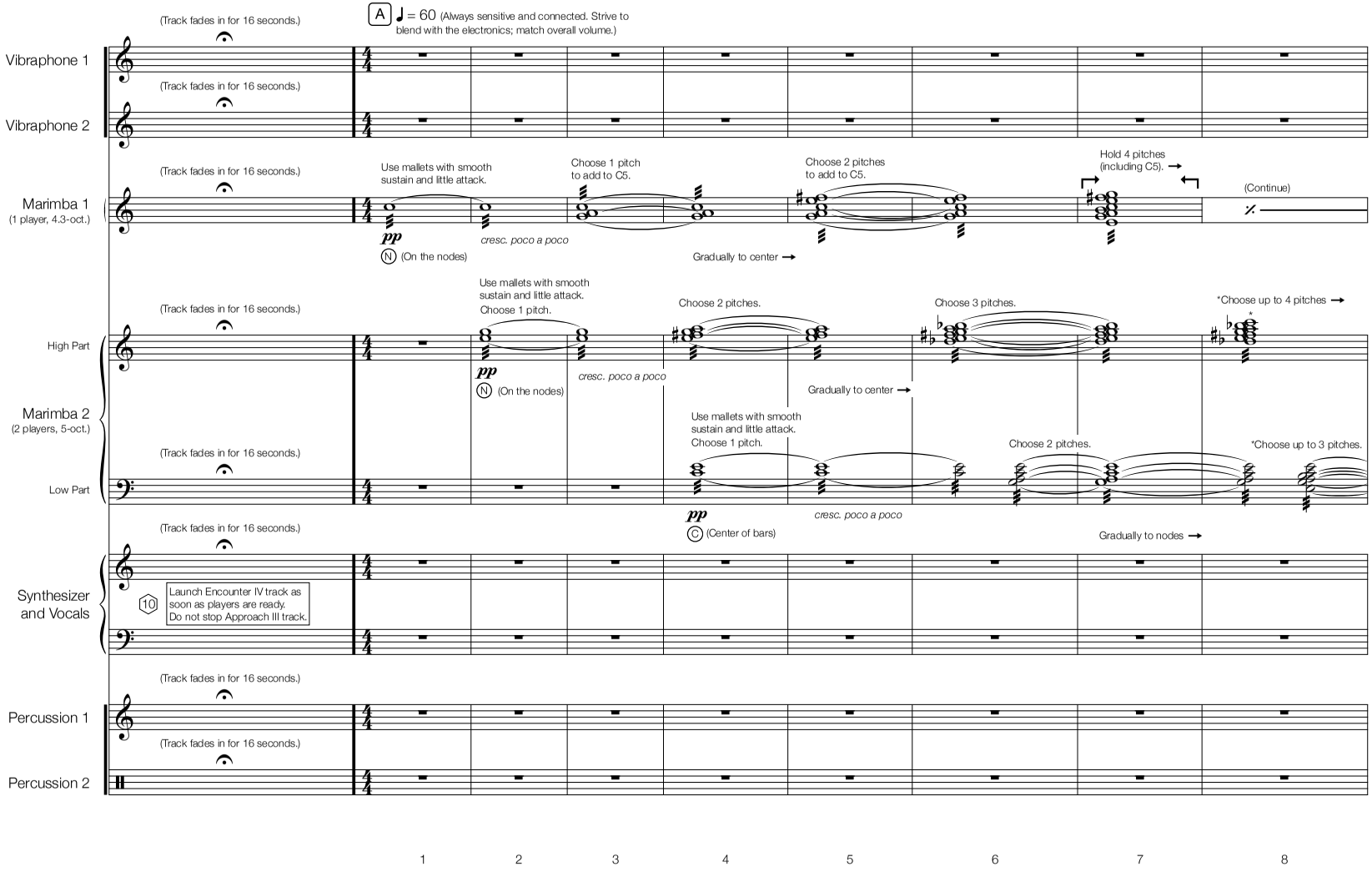
Planetary scientists hypothesize that Uranus is composed mostly of ices made of frozen water, ammonia, and methane. A mysteriously low core temperature makes it the coldest planet in our solar system and its hydrocarbon-rich atmosphere bestows it with a light green tint that is simultaneously beautiful and bland.

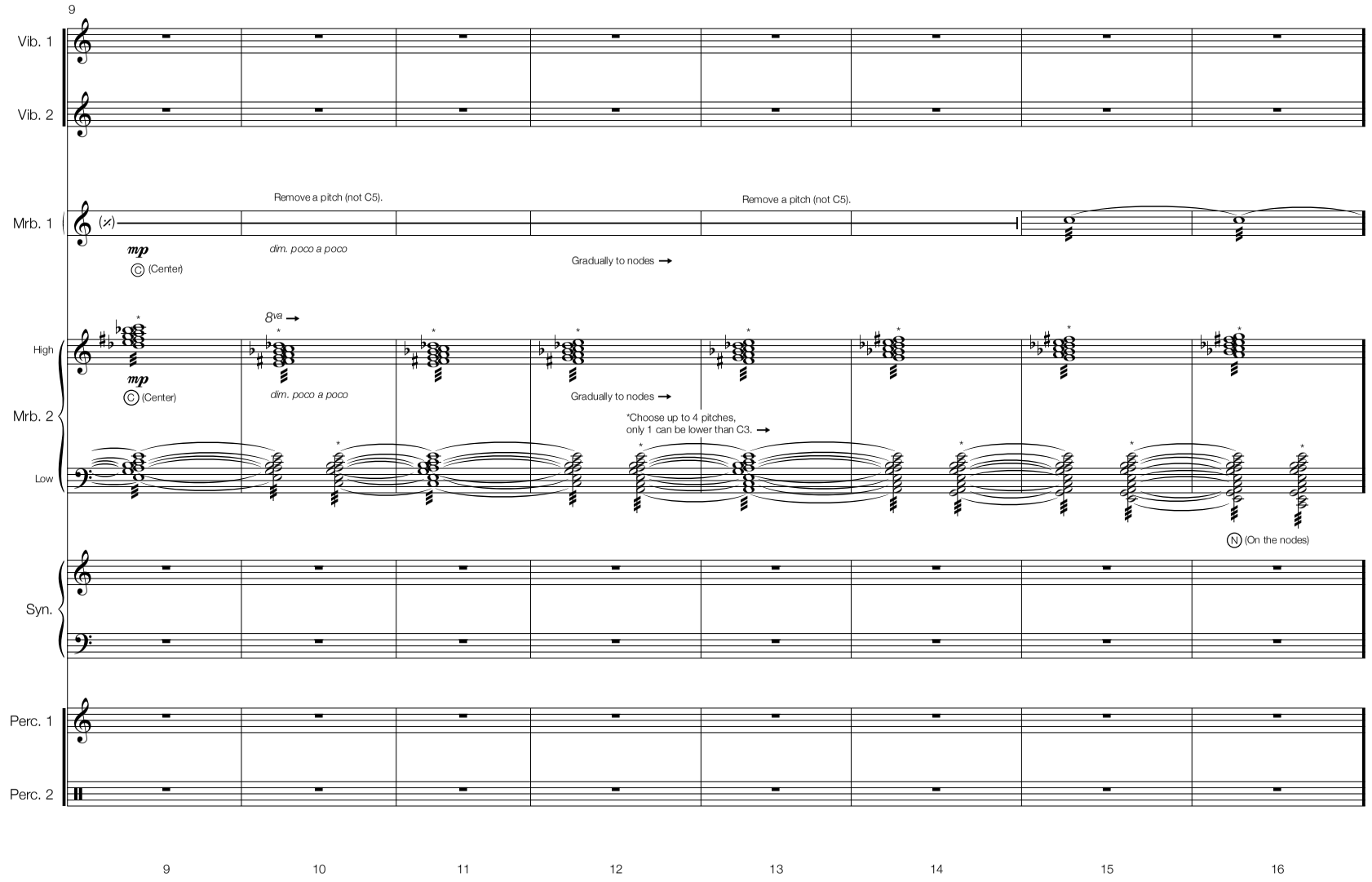
This is the only Encounter movement that uses fixed media; the crackling and buzzing sounds were created using a modeling synthesizer to simulate objects bouncing against a glass resonator. The goal was to mimic the sound of a string ensemble trapped under a thick layer of fracturing ice beneath your feet. The performers are instructed to add and subtract pitches from a large chordal stack in response to the ever-shifting acoustic environment. These sorts of in-the-moment decisions make every rendition of “World of Ice” different. The synthesizer player and vibraphonists create lean, arcing lines to form a melodic layer atop the long drones. The product is a meditative soundscape that is beautiful but bland, much like the celestial body it depicts.

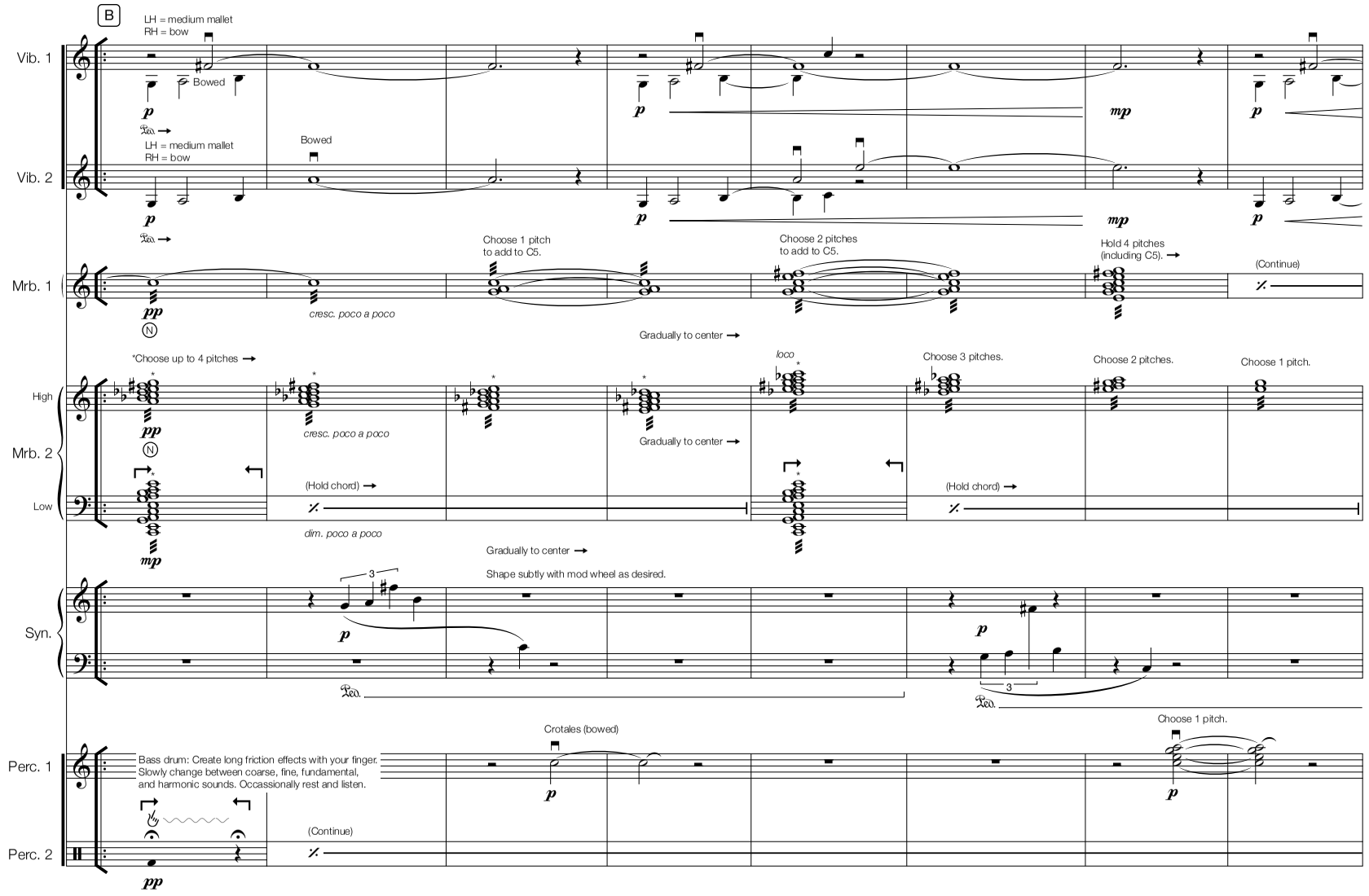
Encounter IV: World of Ice

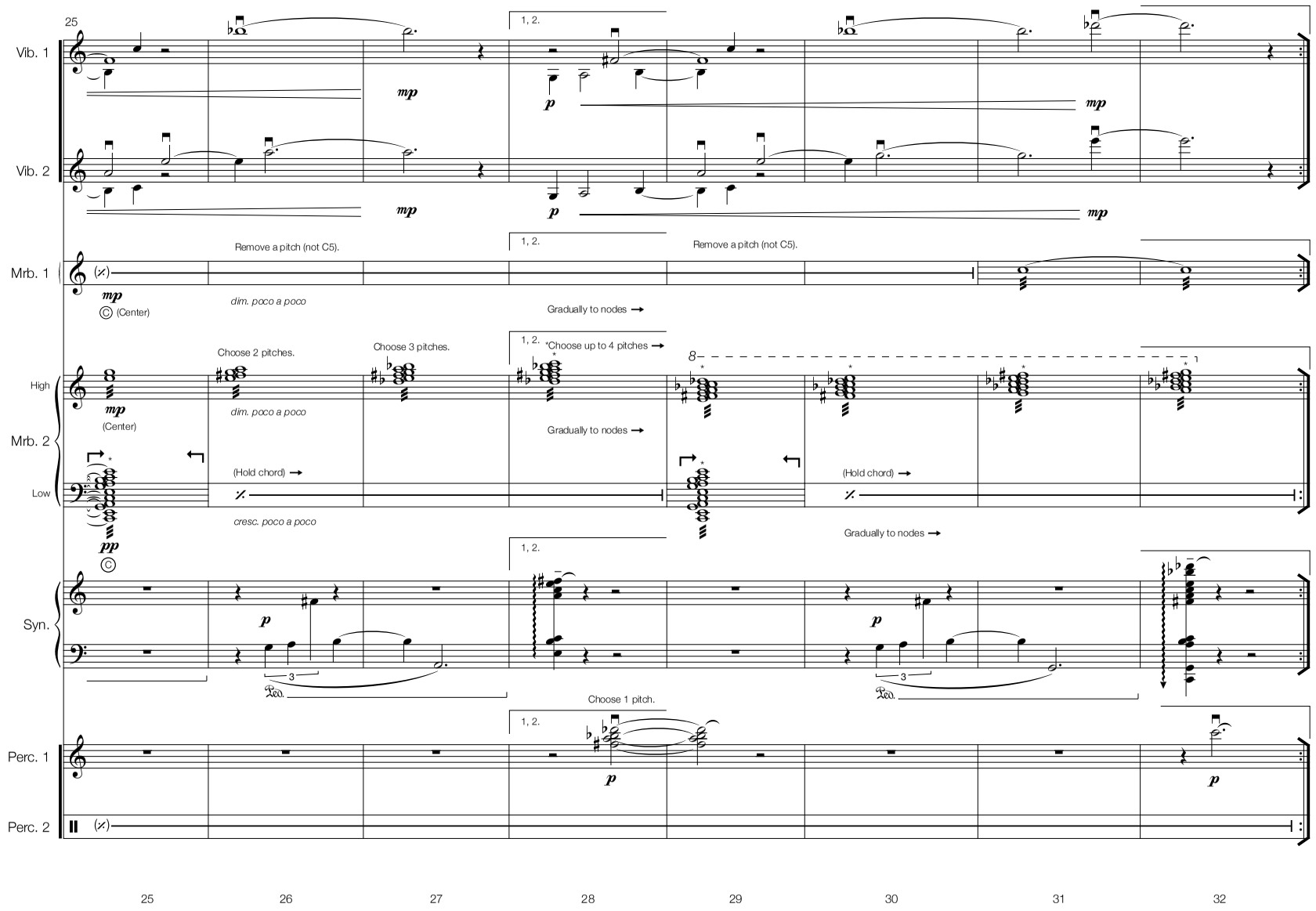
from Voyager

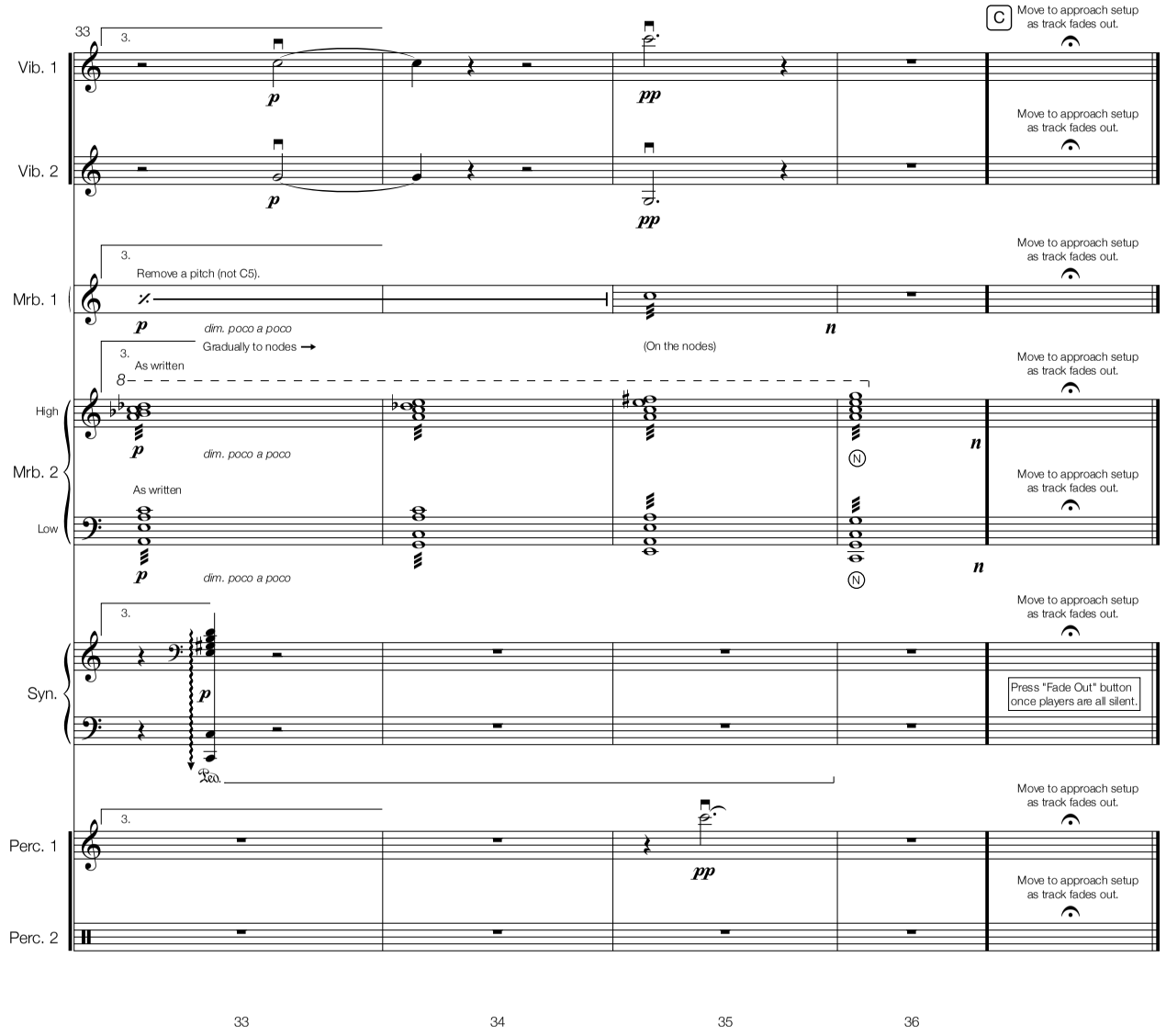
Ben Justis (2019)




9
Vib. 1
Vib. 2
Mrb. 1
Remove a pitch (not C5).
Remove a pitch (not C5).
mp
dim. poco a poco
Gradually to nodes
C (Center)
8va
High
Mrb. 2
Low
*Choose up to 4 pitches,
only 1 can be lower than C3.
N (On the nodes)
Syn.
Perc. 1
Perc. 2
9
10
11
12
13
14
15
16


B
LH = medium mallet
RH = bow
Vib. 1
Bowed
Vib. 2
Mrb. 1
Choose 1 pitch to add to C5.
Choose 2 pitches to add to C5.
Hold 4 pitches (including C5).
(Continue)
cresc. poco a poco
Gradually to center
High
Mrb. 2
Low
*Choose up to 4 pitches
loco
Choose 3 pitches.
Choose 2 pitches.
Choose 1 pitch.
(Hold chord)
dim. poco a poco
Shape subtly with mod wheel as desired.
Syn.
Crotales (bowed)
Perc. 1
Bass drum: Create long friction effects with your finger. Slowly change between coarse, fine, fundamental, and harmonic sounds. Occassionally rest and listen.
Perc. 2
17
18
19
20
21
22
23
24


25
Vib. 1
Vib. 2
Mrb. 1
Mrb. 2
High
Low
Syn.
Perc. 1
Perc. 2
1, 2.
mp
p
Remove a pitch (not C5).
dim. poco a poco
Gradually to nodes
(Center)
Choose 2 pitches.
Choose 3 pitches.
*Choose up to 4 pitches
(Hold chord)
cresc. poco a poco
pp
Choose 1 pitch.
25
26
27
28
29
30
31
32


33
3.
C
Move to approach setup as track fades out.
Vib. 1
Vib. 2
Mrb. 1
Remove a pitch (not C5).
dim. poco a poco
Gradually to nodes
(On the nodes)
As written
High
Mrb. 2
Low
Syn.
Press "Fade Out" button once players are all silent.
Perc. 1
Perc. 2
33
34
35
36

✧ Approach IV

Performance Notes

- Movement duration ≈ 8:00
- Vibraphone 1, vibraphone 2, and percussion 1 need to bring their bows to their Approach IV positions. They should remove their lowest crotale from the nearby Approach II rack (see the layout in the Production Guide) to use on the timpani.
- A glass mallet is a small, light, medium-hard plastic glockenspiel mallet wrapped in a thin layer of moleskin. It is designed to used on the glasses to achieve a delicate, resonant, full sound with little attack. See the Production Guide for more information about the glass mallet.
- The two glasses used by player 8 should be small single Old Fashioned glasses with moderately thick sides. They are around three inches in diameter, three-and-a-half inches tall, with quarter-inch thick walls. The pitch should be as close as possible to E5 or E6 (660 hz or 1320 hz). Do not fill the glasses with anything.

- Snares should only be on when playing the snare drum. Disengage when not in use to avoid sympathetic buzzing.
- There is a notable swell in the audio around seven minutes when all of the whales sing together. The performers should also swell similarly at this point as indicated in their part.
- Vibraphone 1, vibraphone 2, and percussion 1 need to take their bows with them when they return to the Encounter setup.

Program Notes

Time to Neptune: 3 years. Distance from Uranus: 1 billion miles

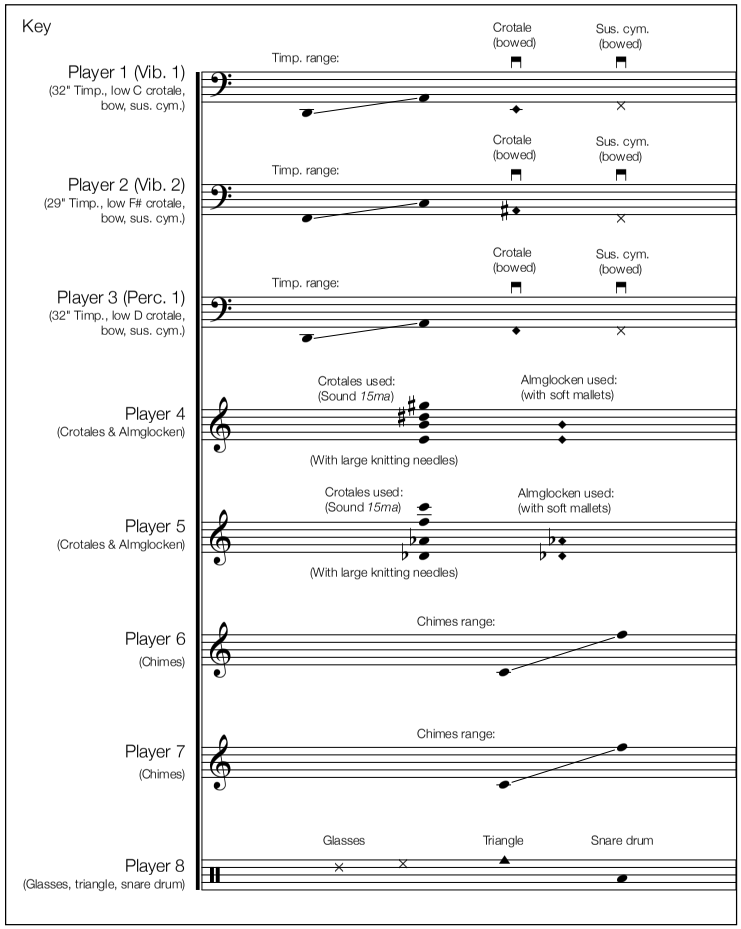
This is the only movement wherein the performers play all of the instruments featured in the other Approaches to create rich palette of colors. However, the 1:2 orbital resonance of Uranus to Neptune results in the interval of an octave; not exactly a stimulating musical distance or rhythmic relationship. So, *naturally*, lots and lots of whale sounds was the solution. The songs of humpbacks were featured on the Golden Record underneath greetings from members of the United Nations. Given that Neptune has strong associations with the ocean (as the Roman god of the sea) a more aquatic sound environment seemed appropriate. Applying extreme stretching to the whale song resulted in the rather pleasing discovery of a beautiful array of lush timbres. By shifting the audio tracks by a particular amount, the whales sing as a choir as their squeals and grunts interlock and diverge, seemingly at random. Finally, on a big crescendo, the songs align to create a haunting sonority which is mirrored by the performers.

Score

Approach IV

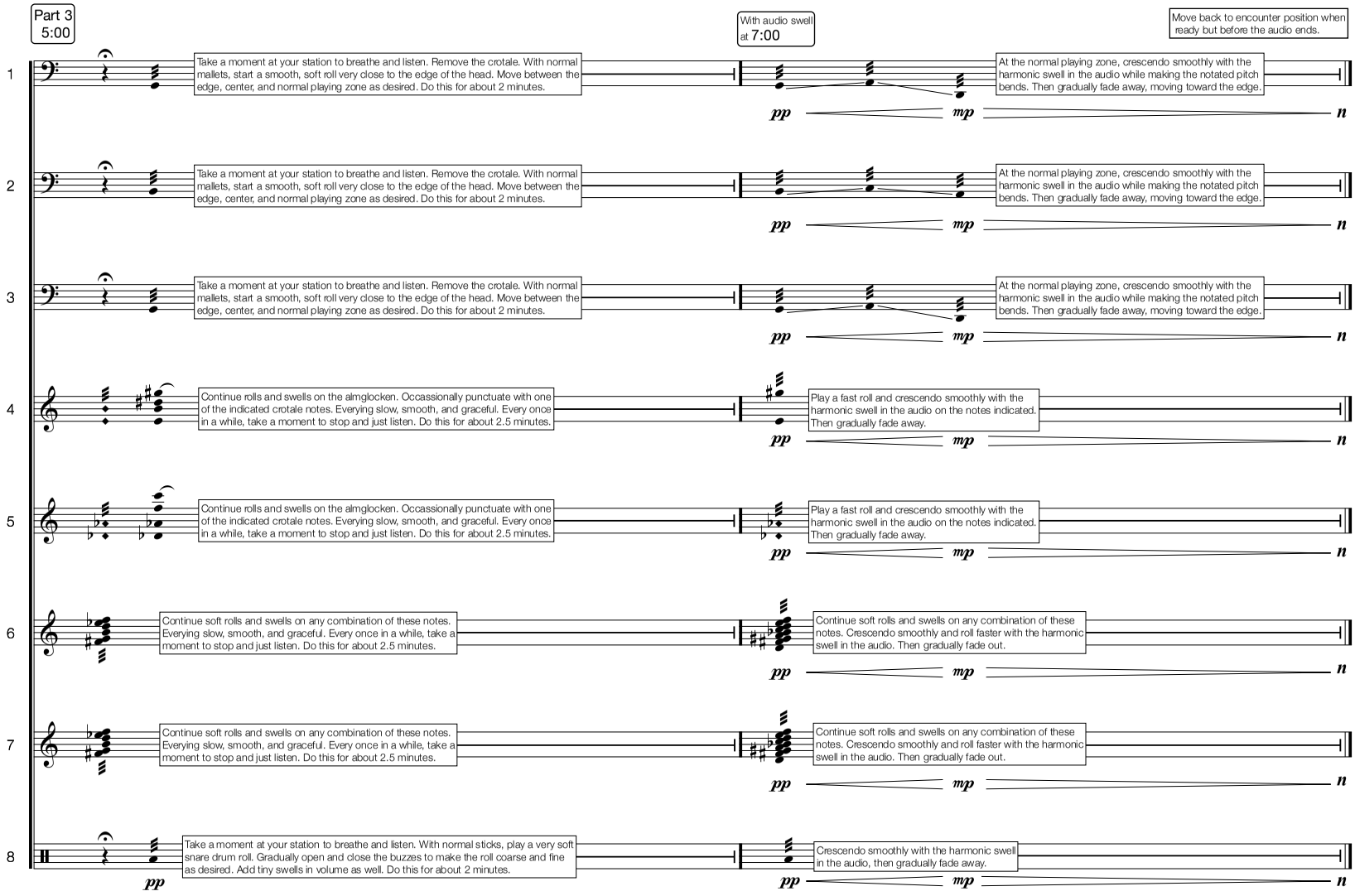
from Voyager

Ben Justis (2019)




Part 1
(Always blend with audio)
1:00
(Playback audio time elapsed)
1
2
3
4
5
6
7
8
Take a moment at your station to breathe and listen. Set your cymbal upside-down on the head. Slowly bow it and pitch bend with the pedal very gradually. Everying long, slow, connected, and graceful. Every few bows, take a moment to stop and listen. Do this for about 2.5 minutes.
(Fade out when going into next part)
pp
sempre l.v.
n
Take a moment seated at your station to breathe and listen. Begin a soft roll on the lower almglocken, then roll on both, or just the higher one, as you wish. Create slow, soft swells that rise and fall with the audio. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.
Take a moment at your station to breathe and listen. Using soft, heavy unwrapped rubber mallets, begin a soft roll on the lower note, then roll on both, or just the higher one, as you wish. Create gradual swells that rise and fall with the audio. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.
Take a moment at your station to breathe and listen. Using glass mallets (see program notes), begin a soft roll between both glasses. Then roll on just one or both as desired. Create slow, soft swells that rise and fall with the audio. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.


Part 2
3:00
1
2
3
4
5
6
7
8
Set your crotale on the head near the edge. Slowly bow it and pitch bend with the pedal very gradually. Everying long, slow, connected, and graceful. Every few bows, take a moment to stop and listen. Do this for about 2.5 minutes.
(Fade out when going into next part)
pp
n
Continue rolls and swells on the almglocken. Occassionally punctuate with one of the indicated crotale notes. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.
Continue soft rolls and swells on any combination of these notes. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.
Continue rolls and soft swells on triangle (with normal beater), one glass, both glasses, or any combination. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.


Part 3
5:00
With audio swell
at 7:00
Move back to encounter position when ready but before the audio ends.
1
Take a moment at your station to breathe and listen. Remove the crotale. With normal mallets, start a smooth, soft roll very close to the edge of the head. Move between the edge, center, and normal playing zone as desired. Do this for about 2 minutes.
At the normal playing zone, crescendo smoothly with the harmonic swell in the audio while making the notated pitch bends. Then gradually fade away, moving toward the edge.
pp
mp
n
2
Take a moment at your station to breathe and listen. Remove the crotale. With normal mallets, start a smooth, soft roll very close to the edge of the head. Move between the edge, center, and normal playing zone as desired. Do this for about 2 minutes.
At the normal playing zone, crescendo smoothly with the harmonic swell in the audio while making the notated pitch bends. Then gradually fade away, moving toward the edge.
pp
mp
n
3
Take a moment at your station to breathe and listen. Remove the crotale. With normal mallets, start a smooth, soft roll very close to the edge of the head. Move between the edge, center, and normal playing zone as desired. Do this for about 2 minutes.
At the normal playing zone, crescendo smoothly with the harmonic swell in the audio while making the notated pitch bends. Then gradually fade away, moving toward the edge.
pp
mp
n
4
Continue rolls and swells on the almglocken. Occassionally punctuate with one of the indicated crotale notes. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.
Play a fast roll and crescendo smoothly with the harmonic swell in the audio on the notes indicated. Then gradually fade away.
pp
mp
n
5
Continue rolls and swells on the almglocken. Occassionally punctuate with one of the indicated crotale notes. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.
Play a fast roll and crescendo smoothly with the harmonic swell in the audio on the notes indicated. Then gradually fade away.
pp
mp
n
6
Continue soft rolls and swells on any combination of these notes. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.
Continue soft rolls and swells on any combination of these notes. Crescendo smoothly and roll faster with the harmonic swell in the audio. Then gradually fade out.
pp
mp
n
7
Continue soft rolls and swells on any combination of these notes. Everying slow, smooth, and graceful. Every once in a while, take a moment to stop and just listen. Do this for about 2.5 minutes.
Continue soft rolls and swells on any combination of these notes. Crescendo smoothly and roll faster with the harmonic swell in the audio. Then gradually fade out.
pp
mp
n
8
Take a moment at your station to breathe and listen. With normal sticks, play a very soft snare drum roll. Gradually open and close the buzzes to make the roll coarse and fine as desired. Add tiny swells in volume as well. Do this for about 2 minutes.
Crescendo smoothly with the harmonic swell in the audio, then gradually fade away.
pp
pp
mp
n

♆ Encounter V: World of Darkness

Performance Notes

- Movement duration ≈ 6:30
- The second time at measure 15, the tempo should very gradually increase to 68 BPM by measure 40.
- There is a slight but noticeable tempo jump at measure 42 from 68 BPM to 72 BPM.
- From measure 42 to 53, the tempo should steadily increase from 72 BPM to 84 BPM. Small metronome markings are included as a guide along the way.
- Individual performers should leave for their final Approach positions when indicated in their part.

Program Notes

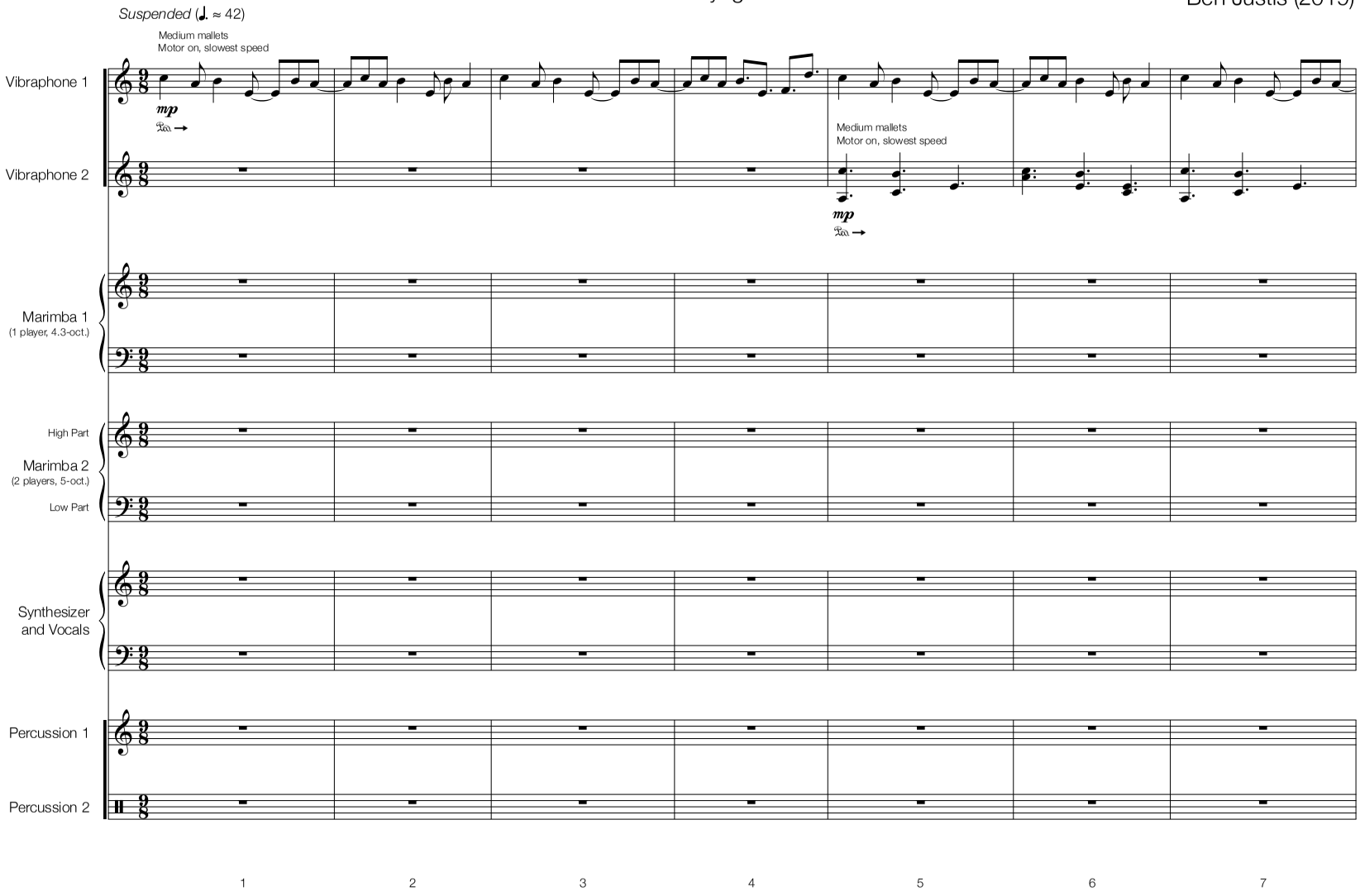
At more than 2.7 billion miles from its origin point, Voyager was a long, long way from home when it visited Neptune. At that distance, it took over four hours for signals (traveling at light speed) to reach ground stations on Earth. The navigational accuracy across such a vast distance is like sinking a golf putt from 2,260 miles away; the distance from London to Cairo. Taking imagery of the planet proved especially difficult, as its deep blue surface as distance from the sun makes it 900 times dimmer there than on Earth. Like Jupiter, it has visible weather patterns including a massive patch in the atmosphere called “The Great Dark Spot”.

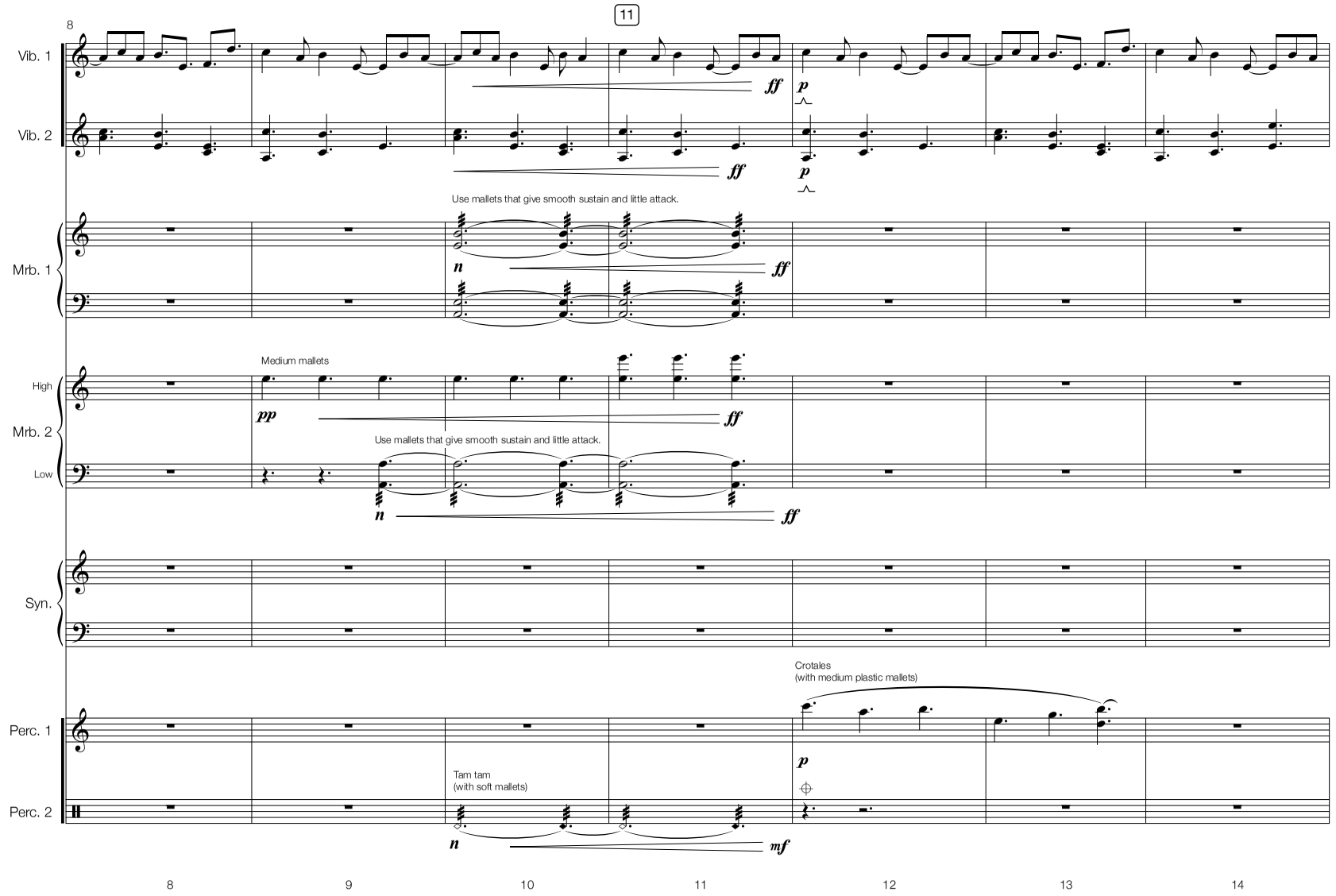
The mood of this movement is one that is dark but not bitter. Darkness, after all, is a beautiful thing. A deep-black night allows us view the splendor of the night sky. Had Earth been tidally locked in a state of perpetual daylight, astronomy as a field may never have formed and we would know nothing of the other planets, stars, solar systems, and galaxies out in the cosmos. A slow vibraphone ostinato is gradually joined by other voices to create a ponderous harmonic texture. The chords drift around, sometimes less predictably, while lingering dissonances gradually resolve to sweeter sonorities. After a repeat of this section with unpitched material added, the layers suddenly fall away and the vibraphonists shift us into a much more energetic section. We realize that, though Voyager’s appeared to meander lazily past the planets when it took observations, at 11 miles per second (that’s over *Mach-50*, by the way), it was actually going very, very fast. The low marimba roars in with the Jupiter progression as the high part adds a severe, blues-infused filigree; a nod to Neptune’s azure hue. The other instruments pile on as the tempo increases and a brief drop in energy re-introduces the *O Magnum Mysterium* tune for just a few bars. The speed picks up more and the texture explodes in a series of loud 16th-notes. We’re left with a wandering, lonely pattern like the beginning now punctuated with soft, sustained chords and gentle counterpoint. The instruments fall away gradually as the performers depart for the final Approach.

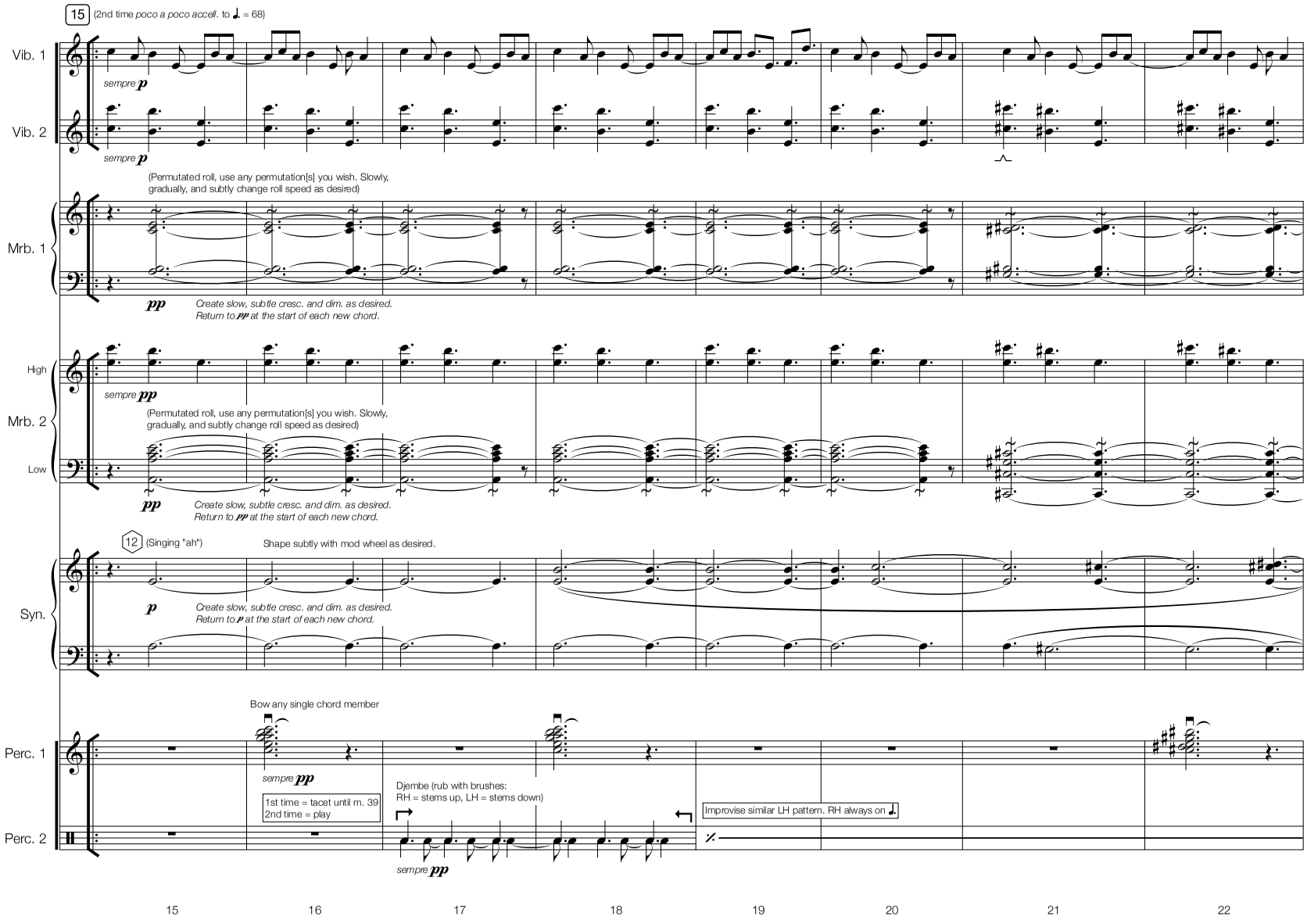
Encounter V: World of Darkness

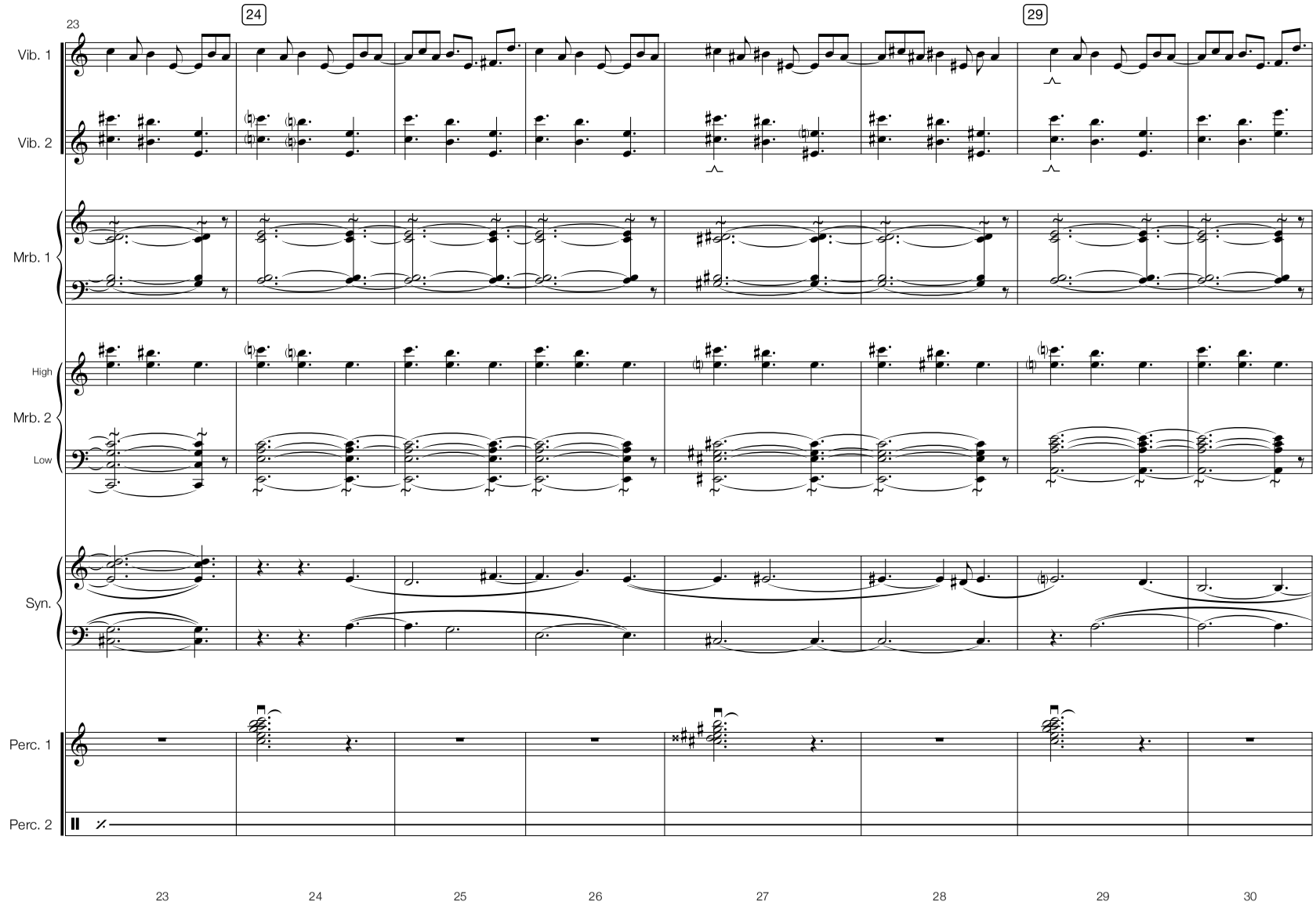
from Voyager

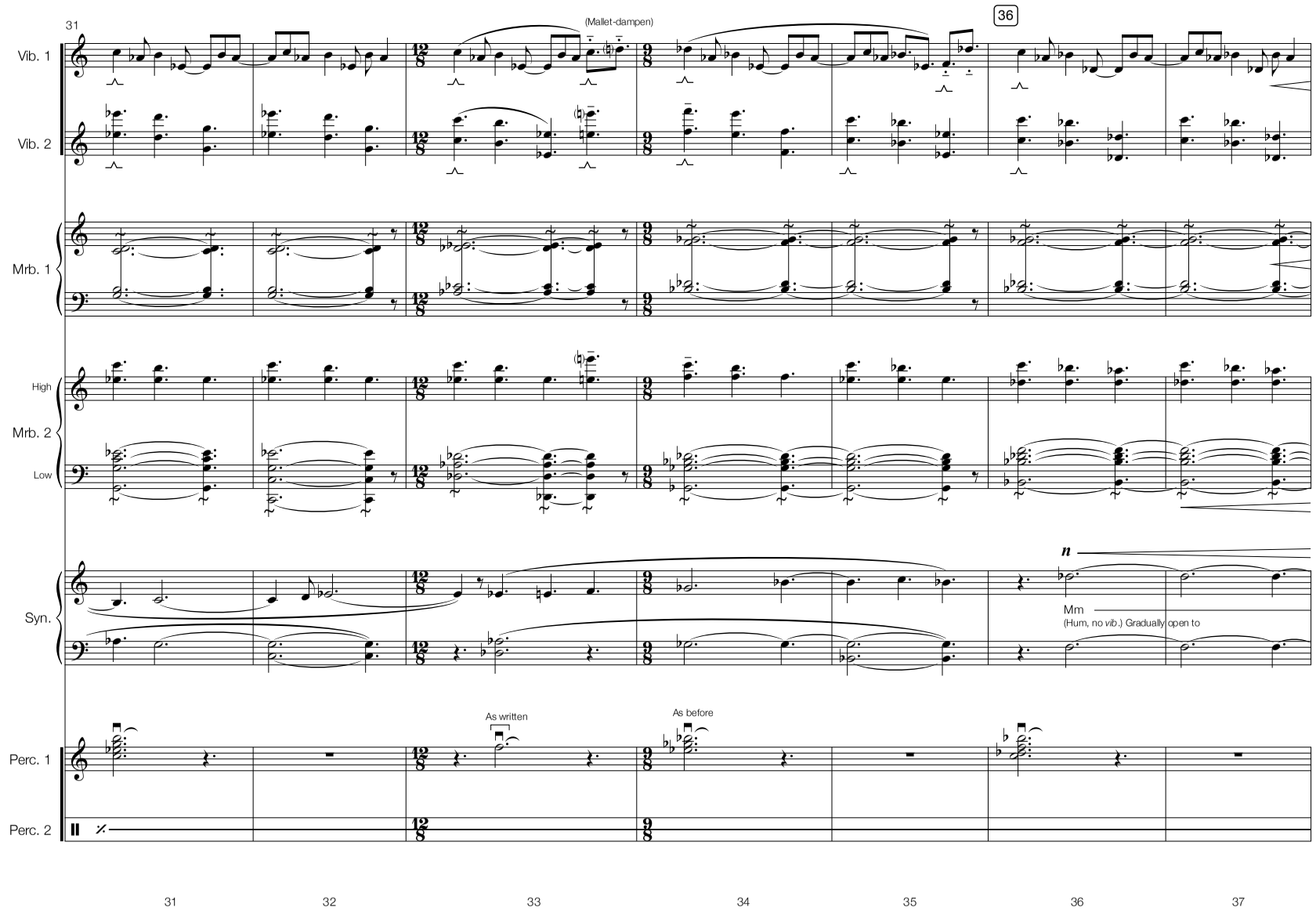
Ben Justis (2019)

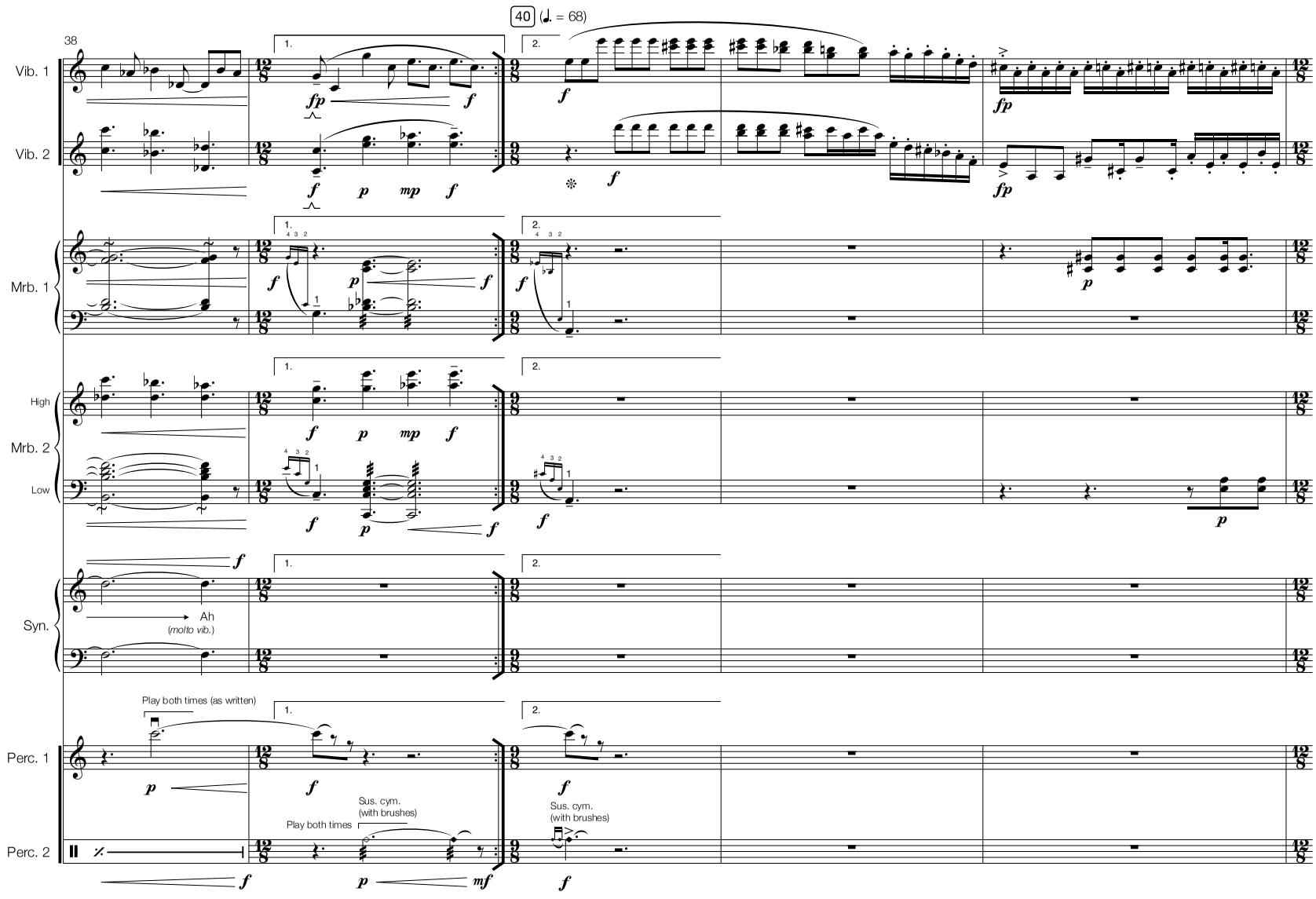


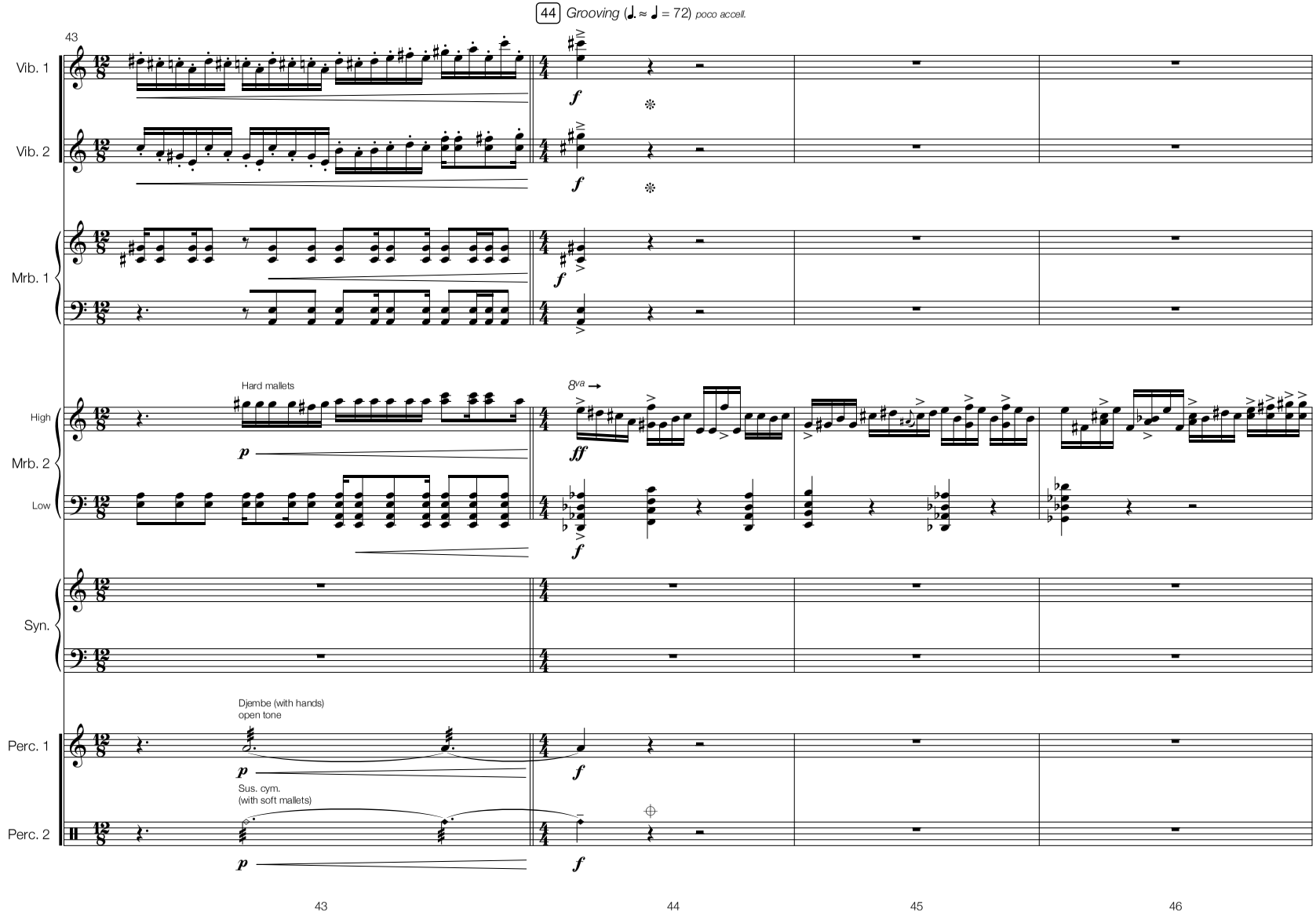

8
11
Vib. 1
Vib. 2
ff
p
Use mallets that give smooth sustain and little attack.
Mrb. 1
Medium mallets
High
Mrb. 2
Low
pp
Syn.
Crotales
(with medium plastic mallets)
Perc. 1
Tam tam
(with soft mallets)
Perc. 2
mf
8
9
10
11
12
13
14

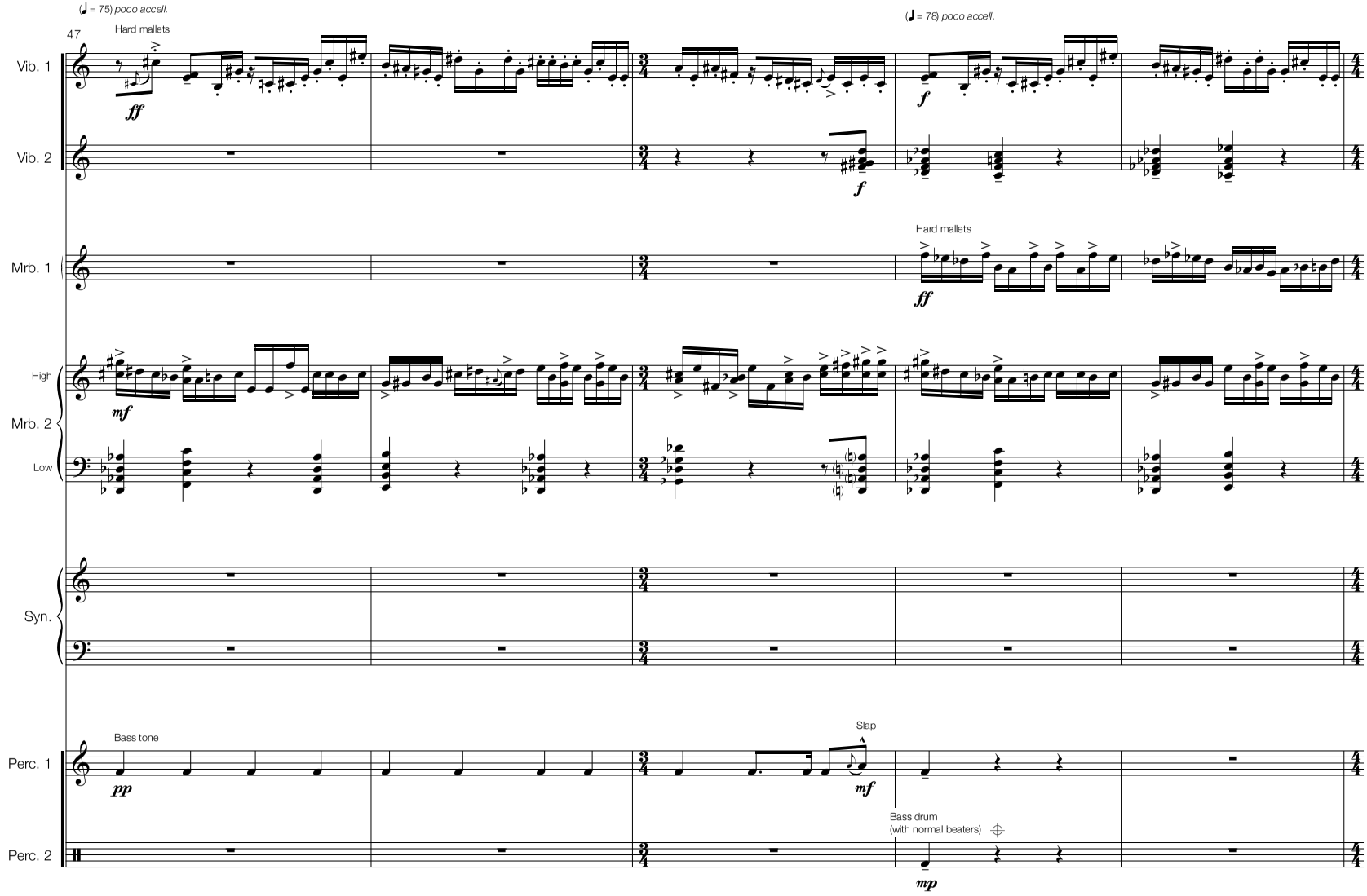

15
(2nd time poco a poco accell. to ♩. = 68)
Vib. 1
sempre p
Vib. 2
sempre p
(Permutated roll, use any permutation[s] you wish. Slowly, gradually, and subtly change roll speed as desired)
Mrb. 1
pp
Create slow, subtle cresc. and dim. as desired.
Return to pp at the start of each new chord.
High
Mrb. 2
Low
sempre pp
(Permutated roll, use any permutation[s] you wish. Slowly, gradually, and subtly change roll speed as desired)
pp
Create slow, subtle cresc. and dim. as desired.
Return to pp at the start of each new chord.
12
(Singing "ah")
Shape subtly with mod wheel as desired.
Syn.
p
Create slow, subtle cresc. and dim. as desired.
Return to p at the start of each new chord.
Bow any single chord member
Perc. 1
sempre pp
1st time = tacet until m. 39
2nd time = play
Djembe (rub with brushes:
RH = stems up, LH = stems down)
Improvise similar LH pattern. RH always on ♩.
Perc. 2
sempre pp
15
16
17
18
19
20
21
22

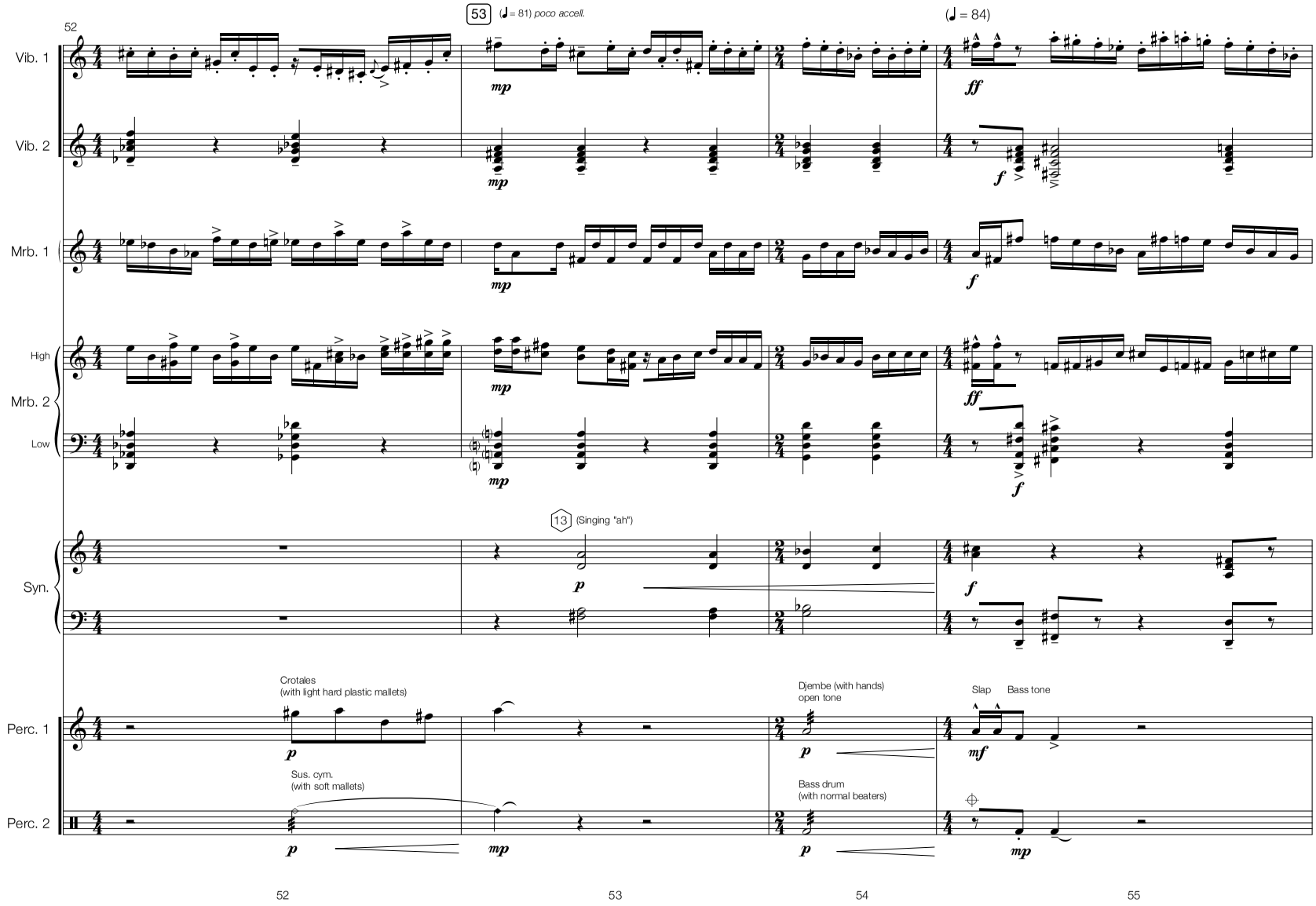

23
24
29
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
23
24
25
26
27
28
29
30

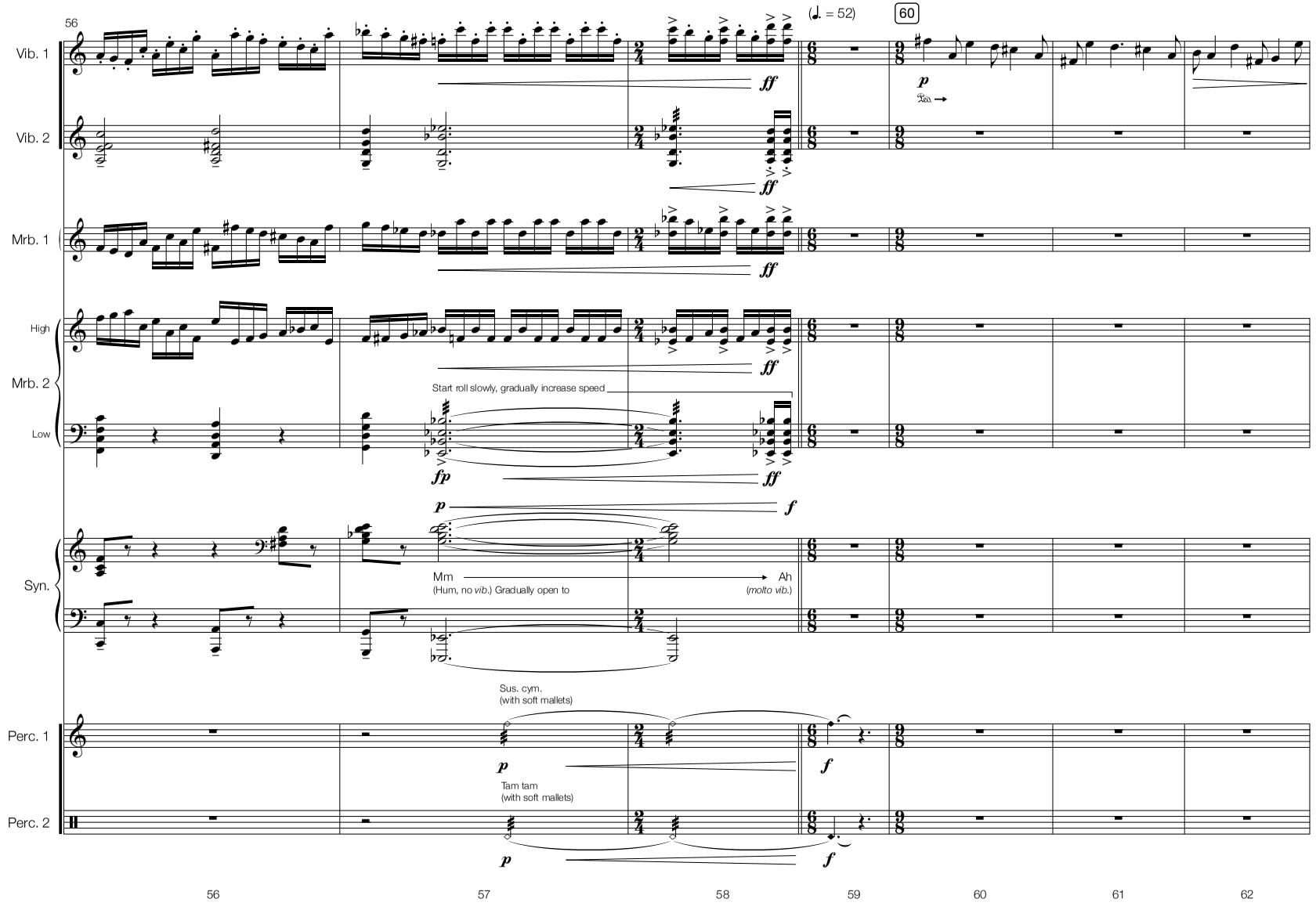

31
36
(Mallet-dampen)
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
n
Mm
(Hum, no vib.) Gradually open to
As written
As before
Perc. 1
Perc. 2
31
32
33
34
35
36
37

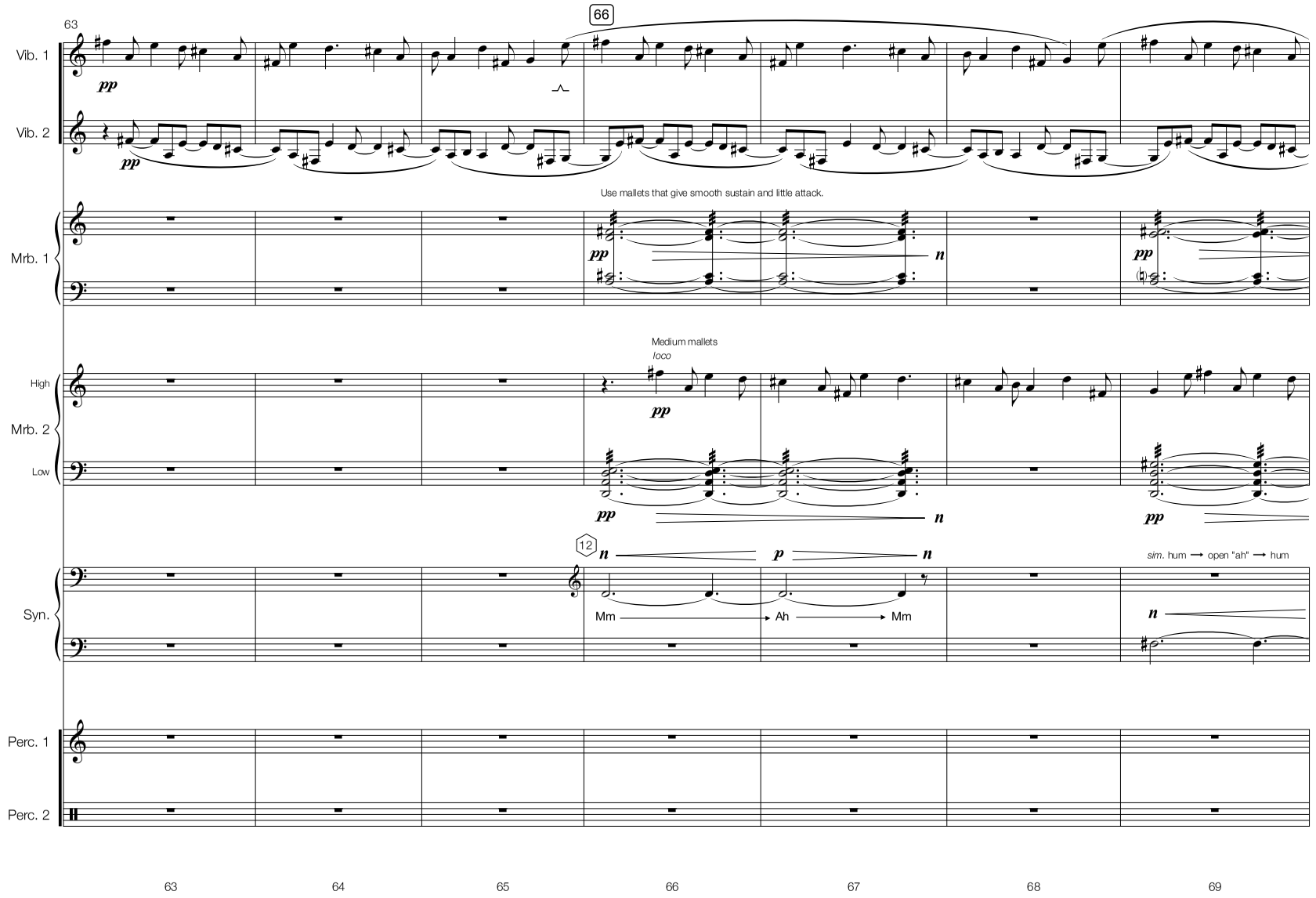

40 (♩. = 68)
38
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Ah
(molto vib.)
Play both times (as written)
Perc. 1
Sus. cym.
(with brushes)
Play both times
Perc. 2
Sus. cym.
(with brushes)
38
39
40
41
42

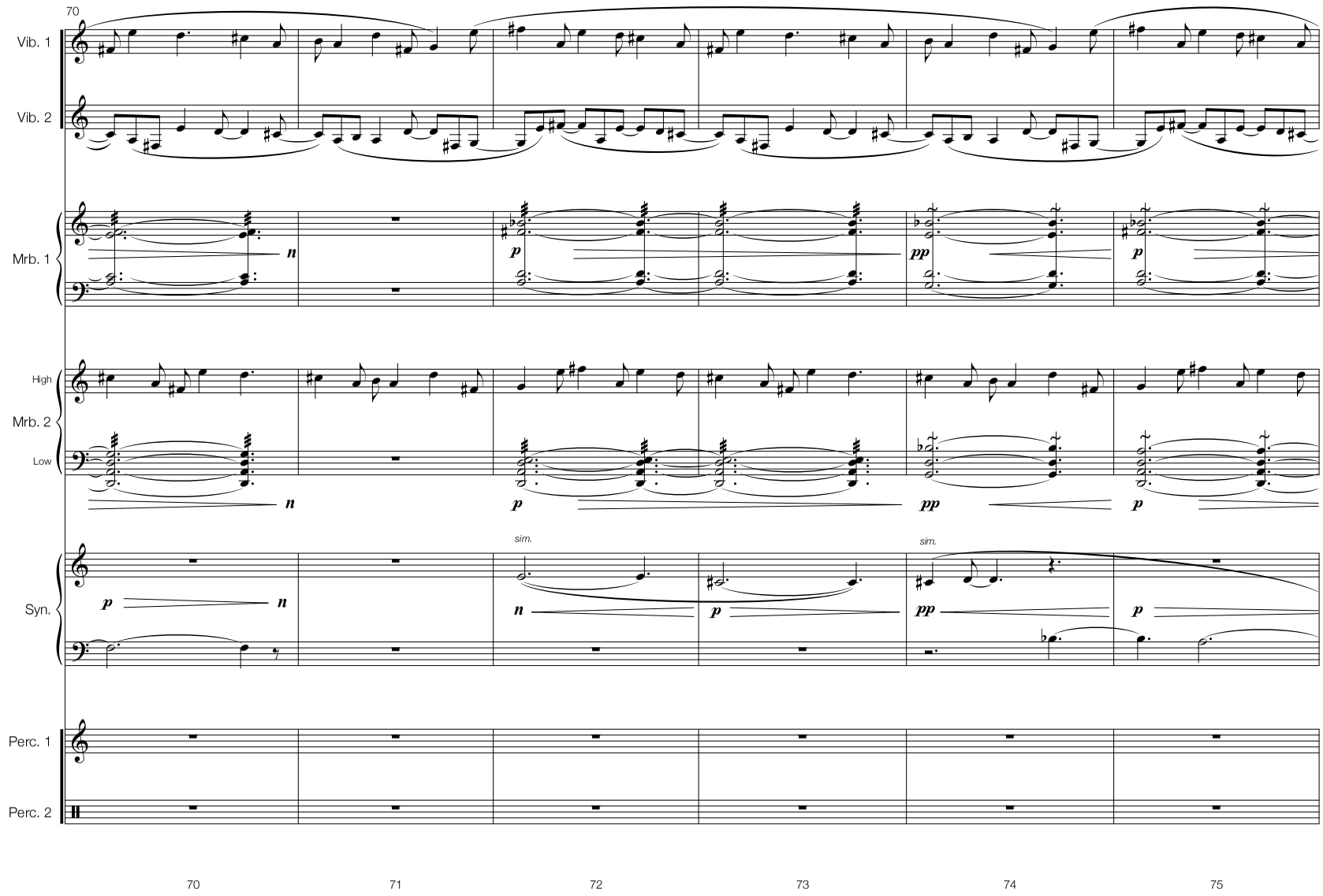

44 Grooving (♩. ≈ ♩ = 72) poco accell.
43
Vib. 1
Vib. 2
Mrb. 1
Hard mallets
8va
High
Mrb. 2
Low
Syn.
Djembe (with hands)
open tone
Perc. 1
Sus. cym.
(with soft mallets)
Perc. 2
43
44
45
46

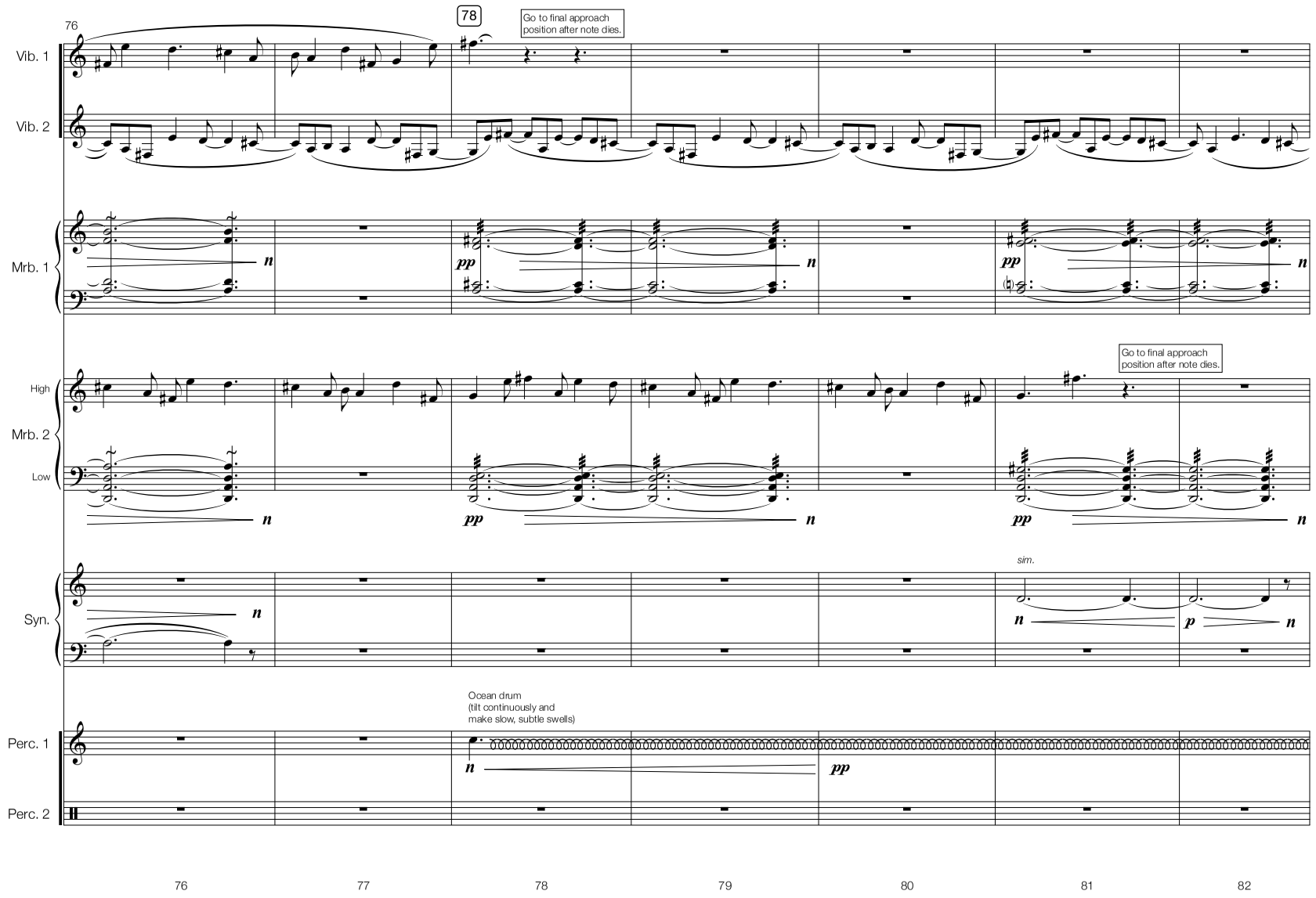

♩ = 75) poco accell.
47
Hard mallets
Vib. 1
Vib. 2
♩ = 78) poco accell.
Mrb. 1
Hard mallets
High
Mrb. 2
Low
Syn.
Bass tone
Slap
Perc. 1
Bass drum
(with normal beaters)
Perc. 2
47
48
49
50
51

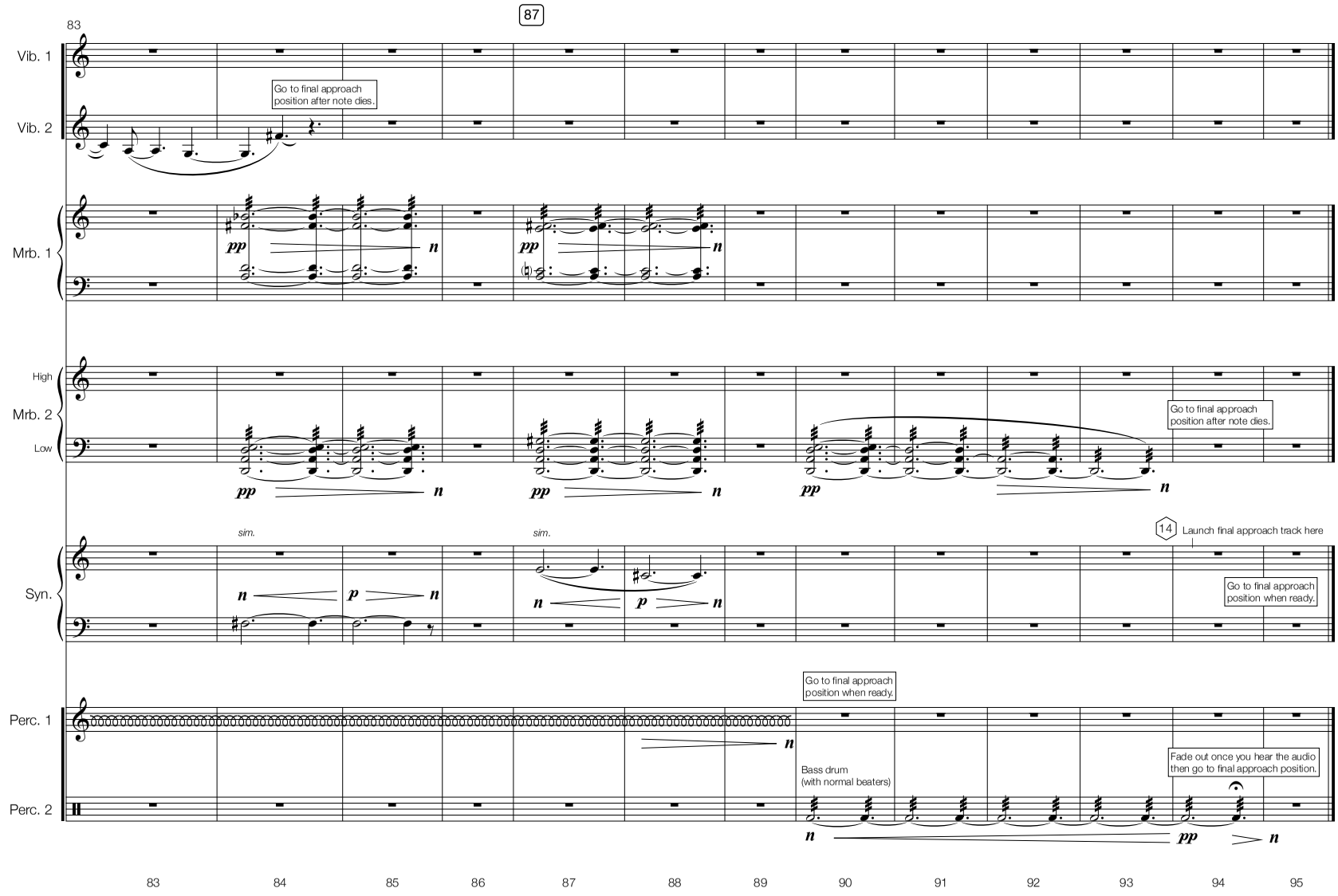

52
53
(♩ = 81) poco accell.
(♩ = 84)
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
13
(Singing "ah")
Syn.
Crotales
(with light hard plastic mallets)
Djembe (with hands)
open tone
Slap
Bass tone
Perc. 1
Sus. cym.
(with soft mallets)
Bass drum
(with normal beaters)
Perc. 2
52
53
54
55


56
(♩. = 52)
60
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Start roll slowly, gradually increase speed
Syn.
Mm
(Hum, no vib.) Gradually open to
Ah
(molto vib.)
Sus. cym.
(with soft mallets)
Perc. 1
Tam tam
(with soft mallets)
Perc. 2
56
57
58
59
60
61
62


63
66
Vib. 1
Vib. 2
pp
Use mallets that give smooth sustain and little attack.
Mrb. 1
Medium mallets
loco
High
Mrb. 2
Low
12
p
Syn.
Mm
Ah
Mm
sim. hum → open "ah" → hum
Perc. 1
Perc. 2
63
64
65
66
67
68
69


70
Vib. 1
Vib. 2
Mrb. 1
High
Mrb. 2
Low
Syn.
Perc. 1
Perc. 2
n
p
pp
sim.
70
71
72
73
74
75


76
78
Go to final approach position after note dies.
Vib. 1
Vib. 2
Mrb. 1
pp
n
High
Mrb. 2
Low
Go to final approach position after note dies.
sim.
Syn.
p
Ocean drum
(tilt continuously and make slow, subtle swells)
Perc. 1
Perc. 2
76
77
78
79
80
81
82


83
87
Vib. 1
Vib. 2
Go to final approach position after note dies.
Mrb. 1
High
Mrb. 2
Low
Go to final approach position after note dies.
Syn.
sim.
sim.
14
Launch final approach track here
Go to final approach position when ready.
Perc. 1
Go to final approach position when ready.
Bass drum (with normal beaters)
Fade out once you hear the audio then go to final approach position.
Perc. 2
83
84
85
86
87
88
89
90
91
92
93
94
95

Performance Notes

- Movement duration ≈ 40,000 years
- Music duration ≈ 8:00
- Players should be spaced as far apart as possible for this movement.
- Snares should only be on when playing the snare drum. Disengage when not in use to avoid sympathetic buzzing.
- A glass mallet is a small, light, medium-hard plastic glockenspiel mallet wrapped in a thin layer of moleskin. It is designed to used on the glasses to achieve a delicate, resonant, full sound with little attack. See the Production Guide for more information about the glass mallet.
- To roll on two glasses, turn your hand sideways and play quickly between them, like a triangle roll. Space the glasses only about two inches apart to make the roll soft.
- To roll on a single glass, grip the mallet in the normal place on the stick but hold it upside down. Lower the mallet head into the glass and play on the inside near the top.
- The two glasses used by each player should be small single Old Fashioned glasses with moderately thick sides. They are around three inches in diameter, three-and-a-half inches tall, with quarter-inch thick walls. Strive to use the same model of glass, if possible. The pitch should be as close as possible to E5 or E6 (660 hz or 1320 hz). Do not fill the glasses with anything.

Program Notes

Time to the Gliese star system: 40,000 years

Distance from Neptune: 17.6 light years (or 1.03 quintillion miles)

In 2012, Voyager 1 crossed the heliopause, or sphere of the sun’s influence, making it the first vessel to exit the solar system into interstellar space. Unless acted on by some unknown force, it will never return to our cosmic neighborhood. Voyager carries the Golden Record, an emblem of humanity, a time capsule of who we are and what we accomplished for far longer than any of us could ever hope to live. Perhaps, when it reaches its next destination, it will be the last remaining evidence that we ever existed.

As the signal strength dwindled and the reception time grew longer, Voyager still continued to transmit data about this new cosmic frontier. In particular, the plasma wave detection instruments on board measured solar phenomena inside and outside the heliopause. Using this data, scientists at the University of Iowa Plasma and Radio Wave Group have translated the information and compressed it into an audio format. Thus, we can “hear” what Voyager’s instruments were picking up during this critical mission juncture. In this Approach, the delightfully weird array of squeaks, squawks, thuds, and whistles form an audio collage which is filtered, imaged, and balanced to shift the focus of the cacophony. Surprisingly, plasma output from the sun was rendered into a magical bell-like timbre close to the pitch E5. The percussionists complement this by playing a long snare drum roll (representing static and signal degradation) followed by rolls on small glasses. To push the idea of an über-diminuendo further, the musical instructions themselves are very unspecific. The performers are told only to create a very long fade-out, in their own time, as Voyager and our token of humanity travels farther, and farther, and farther, and farther, and farther, and farther, and farther, and farther, and farther, ...

Score

Approach V: In the Realm of Stars and Static

from Voyager

Ben Justis (2019)

All players go to your snare drum. Take a moment and listen to the environment. Breathe deeply.

Play a very long buzz roll, starting at ***n***, growing to ***p***, back down to ***n***, then stop. Take about four minutes for this swell.

Put down your sticks.

In one hand, use your glass mallet* to roll as softly and delicately as possible between two small glasses*. After about a minute, take a beater in your other hand and start a triangle roll as softly as possible, in the corner of the instrument.

For at least three minutes, switch very gradually between triangle rolls, double glass rolls*, single glass rolls* (with the mallet held upside down), or any combination thereof. Always overlap with a triangle roll when switching from double to single glass rolls. There should not be any breaks in the sound until you are completely finished. Always very soft and delicate.

Strive to blend with the electronics, as if your sound is resonance from very, very far away.

When you are finished, set your implements down gently and join the audience.

*Consult the performance notes.

Bibliography and Audio Sources

Porco, Carolyn. "Science Friday: The Spaceships at the End of the Solar System Turn 40." Transcript.

The sounds from the Golden Record (human voices and whale song) were downloaded from NASA's Jet Propulsion Laboratory website (https://www.jpl.nasa.gov). According to their image and multimedia use policy, content on the JPL site may be used for any purpose without prior permission. You can find their policy online here: https://www.jpl.nasa.gov/imagepolicy.

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