REFLECTING POOL

for timpani and sine tones

BRENDAN GLASSON

for William Winant

2023

Performance Requirements

Timpani
   32" and 29"

Transducers
   Two audio transducers or "sound exciters" are used to drive
   sine tones into two timpani. Tones are not amplified by any
   other means; all sound is heard through the timpani.

   Place the transducers on the drum heads, using adhesive if
   necessary to prevent movement. Drive the transducers as loud as
   possible without causing distortion.

   When set up correctly, changing the pitches of the timpani with
   the pedals creates harmonic resonances in the drums.

Audio Amplifier
   A two-channel amplifier is used to drive the transducers.

Sine Tone Generator
   A Max patch is available: brendanglasson.com/reflectingpool
   Tones can be generated by other means based on the information
   below.

Performance Notes

Duration
   Each line should last 45"-2'. Marked durations may be used as
   rehearsal guides but need not be precise and are not required
   for performance.

Timpani
   Individual note durations are open, with filled notes
   representing relatively shorter durations than unfilled notes.

   Lines 1-5 use the pedals only. All sound is generated by
   transducers on the drum heads. Pitches are approximate. The
   goal is to find unique resonances at each pitch.

   Lines 6-9 use hands to draw shapes on the timpani heads,
   creating broadband noise that is filtered by pedal changes.

Sine Tones ♩
   Tones are just-tuned based on C4=261.63 Hz.

   Each frequency indicated below should include 6 sine wave
   harmonics at 2x, 3x, 4x, 5x, 6x, and 7x the fundamental to
   create a harmonic chord.

   Each harmonic should be quieter than the previous. For example,
   if the fundamental is 100% loudness, the second harmonic (2x)
   can be 90% of that amplitude, the third (3x) 80%, and so on.

Event Markers

Boxed marker numbers in the score indicate sine tone events. Events can be performed by clicking the appropriate buttons in the Max patch or another way based on the information in these notes.

Each event indicates which transducer and drum it is meant to address.

Markers 1-5 indicate the entrances of harmonic chords as described above based on the following fundamentals:

1. D2 = 73.58 Hz
2. F2 = 87.21 Hz
3. B2 = 122.64 Hz
4. D3 = 147.17 Hz
5. F3 = 174.42 Hz

All chords should be held until otherwise noted.

Marker 6 inverts the amplitude relationships of the harmonics, making the highest overtone at 80% loudness, with amplitudes decreasing as the fundamental is approached.

Marker 7 reverts the amplitudes to their original state. These changes should occur slowly (30 second change for each marker).

Markers 8-15 indicate that chords 3 and 4 should glide up or down 1 half or whole step from their previous positions. Each gliss should last ~3 seconds. All other chords should continue holding their pitches. The fundamentals of the glissandi are:

8. B2-C2 = 122.64 Hz - 130.82 Hz
9. D3-E3 = 146.83 Hz - 174.42 Hz
10. E3-D3 = 174.42 Hz - 146.83 Hz
11. C2-B2 = 130.82 Hz - 122.64 Hz
12. B2-C2 = 122.64 Hz - 130.82 Hz
13. D3-E3 = 146.83 Hz - 174.42 Hz
14. E3-D3 = 174.42 Hz - 146.83 Hz
15. C2-B2 = 130.82 Hz - 122.64 Hz

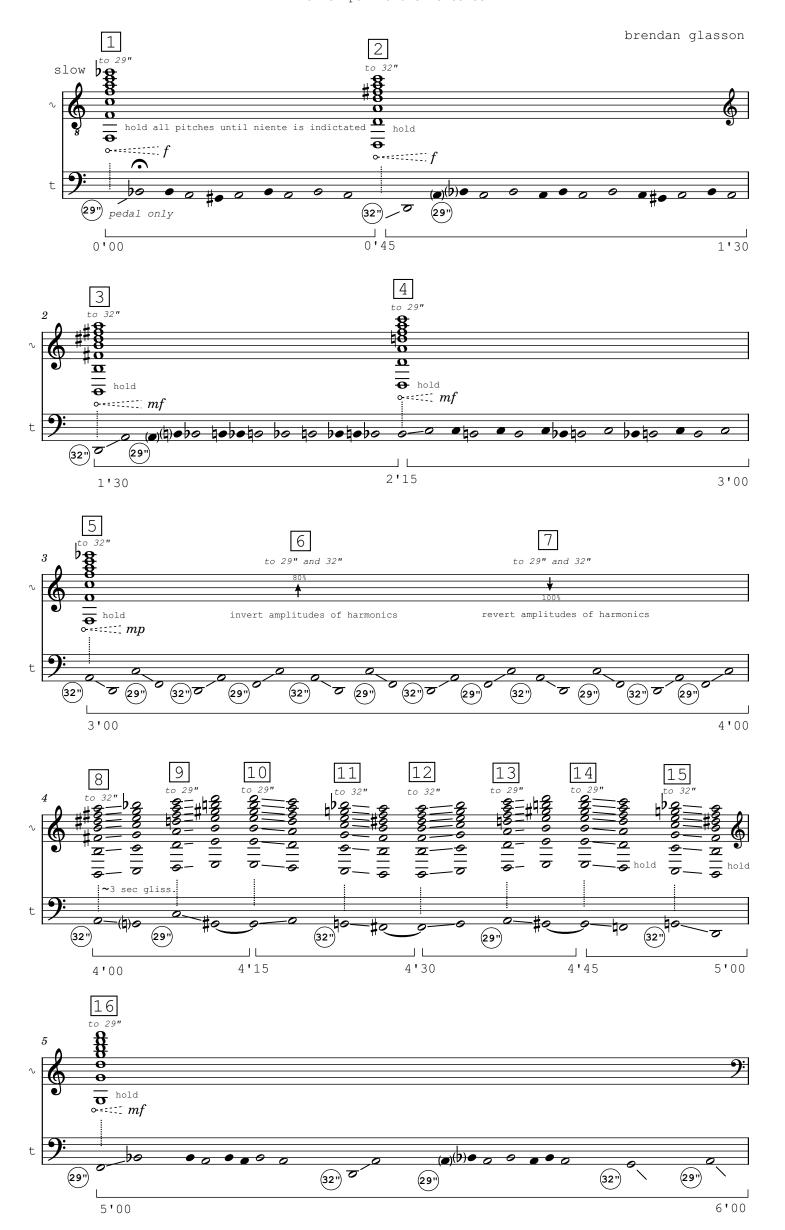**Marker 16** indicates the entrance of a chord based on the following fundamental:
16. G3 = 196.22

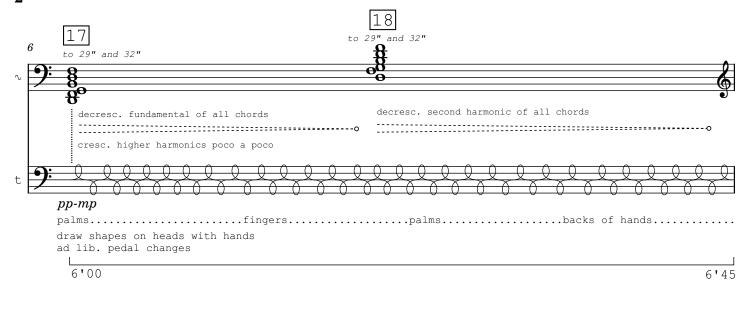**Markers 17-23** slowly remove harmonics from all sustained chords while increasing the amplitudes of remaining harmonics.
17. Remove fundamental from all chords
18. Remove second harmonic (P8) from all chords
19. Remove third harmonic (P5) from all chords
20. Remove fourth harmonic (P15) from all chords
21. Remove sixth harmonic (P5) from all chords
22. Remove seventh harmonic (m7) from all chords
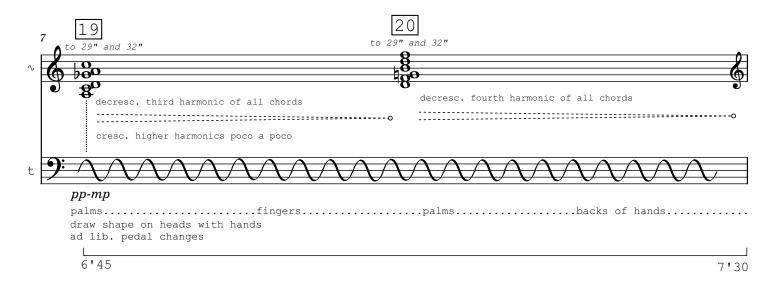23. Remove fifth harmonic (M3) from all chords

Oakland, California
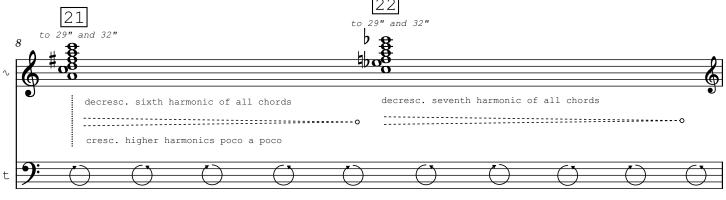2023

2

17 *to 29" and 32"*

6

decresc. fundamental of all chords

cresc. higher harmonics poco a poco

18 *to 29" and 32"*

decresc. second harmonic of all chords

pp-mp

palms......................fingers..................palms................backs of hands.............
draw shapes on heads with hands
ad lib. pedal changes

6'00

6'45

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19 *to 29" and 32"*

7

decresc. third harmonic of all chords

cresc. higher harmonics poco a poco

20 *to 29" and 32"*

decresc. fourth harmonic of all chords

pp-mp

palms......................fingers..................palms................backs of hands.............
draw shape on heads with hands
ad lib. pedal changes

6'45

7'30

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21 *to 29" and 32"*

8

decresc. sixth harmonic of all chords

cresc. higher harmonics poco a poco

22 *to 29" and 32"*

decresc. seventh harmonic of all chords

pp

trace around resonant edge of head with fingernail
alternate drums
ad lib. pedal changes

7'30

8'15

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23 *to 29" and 32"*

9

decresc. fifth harmonic of all chords

ppp

trace along non-resonant edge of head with fingernail
alternate drums
ad lib. pedal changes

8'15

9'00