David M. Gordon

Fabular Arcana

Concerto for Retuned Piano and Orchestra

Full Score

Fabular Arcana

for Paul Sánchez, Delta David Gier, and the South Dakota Symphony Orchestra
in honor of the SDSO's 100th Season, and in memory of Dr. Jan Bach

Duration: ca. 38 minutes

2 Flutes (both doubling on alto flute)
2 Oboes (both doubling on melodica)
2 B♭ Clarinets (both doubling on bass clarinet)
Bassoon
Contrabassoon

4 F Horns

4 Percussion

1: devil chaser, 2 cast iron pans, glockenspiel (shared w. 2), ribbon crasher, sleighbells, tam-tam (shared w. 2), trine, tri-tone samba whistle, xylophone
2: 10 almglocken, 2 brake drums, chimes (shared w. 3 and 4), clave, 2 cowbells, crotales (shared w. 4), glockenspiel (shared w. 1), slapstick, tam-tam (shared w. 2), wind wand
3: bass drum (shared w. 4), bell tree, chimes (shared w. 2 and 4), devil chaser, piccolo woodblock, sleighbells, ratchet, tri-tone samba whistle, wind wand (shared w. 4)
4: bass drum (shared w. 3), 10 button gongs, chimes (shared w. 2 and 3), 2 Chinese opera gongs, crotales (shared w. 2), 2 rice bowls, slapstick, starter pistol, 2 timpani, vibraphone, wind wand (shared w. 3)

Harp
Keyboards (piano/celesta)

Solo Retuned Piano

Strings

Special Instructions

General

- The following special accidentals are used in the score:

  𝄲 Quarter-tone sharp

  𝄳 Quarter-tone flat

  𝄪 Three quarter-tones sharp

  𝄫 Three quarter-tones flat

  𝄮 Sixth-tone (i.e., 33 cents) flat

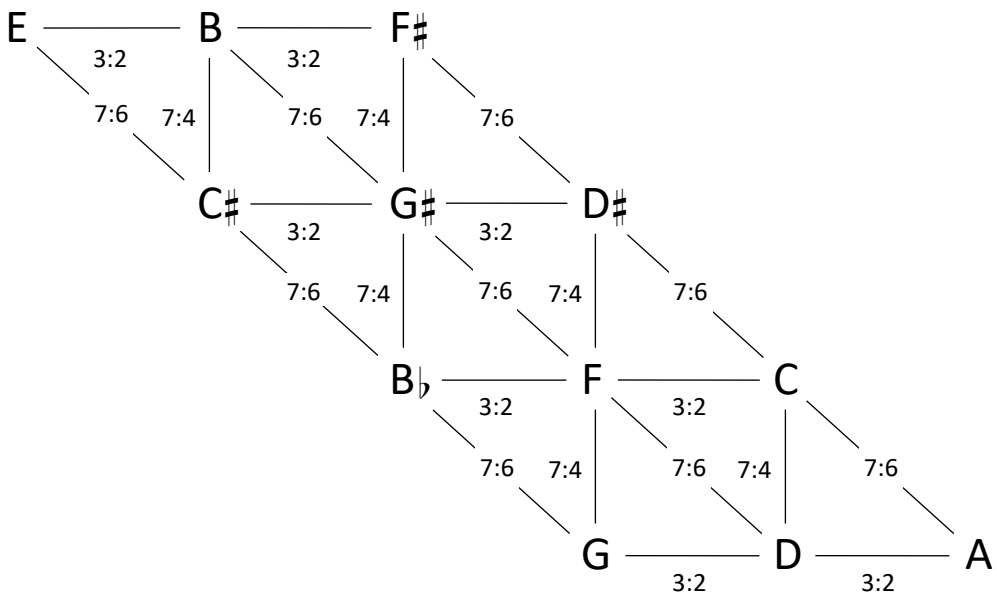
  𝄯 Sixth-tone (i.e., 33 cents) lower than a normal sharp

  𝄰 Sixth-tone (i.e., 33 cents) lower than a normal flat

- The orchestral keyboard player should be positioned as far away from the solo pianist as is practically possible.

Solo Retuned Piano

The piano must be tuned according to the following pattern, with A_4 tuned to 440 Hz and all octaves tuned normally. 3:2 represents a pure (i.e., just) perfect fifth of 701.96 cents, 7:4 represents a natural seventh of 968.83 cents, and 7:6 represents a septimal minor third of 266.87 cents.



The following chart provides information on the tuning's pitch frequencies in the C_4 octave, as well as the relationships between its pitches and those of standard equal temperament.

Pitch	Frequency	Deviation in cents from equal temperament
C_4	256.67 Hz	33.13 cents lower than equal-tempered C
$C♯/D♭_4$	266.17 Hz	70.17 cents lower than equal-tempered C♯/D♭
D_4	293.33 Hz	1.95 cents lower than equal-tempered D
$D♯/E♭_4$	299.44 Hz	66.26 cents lower than equal-tempered D♯/E♭
E_4	310.53 Hz	103.3 cents lower than equal-tempered E
F_4	342.22 Hz	35.08 cents lower than equal-tempered F
$F♯/G♭_4$	349.35 Hz	99.39 cents lower than equal-tempered F♯/G♭
G_4	391.11 Hz	3.91 cents lower than equal-tempered G
$G♯/A♭_4$	399.26 Hz	68.21 cents lower than equal-tempered G♯/A♭
A_4	440 Hz	0 cents higher/lower than equal-tempered A
$A♯/B♭_4$	456.3 Hz	37.04 cents lower than equal-tempered A♯/B♭
B_4	465.8 Hz	101.34 cents lower than equal-tempered B

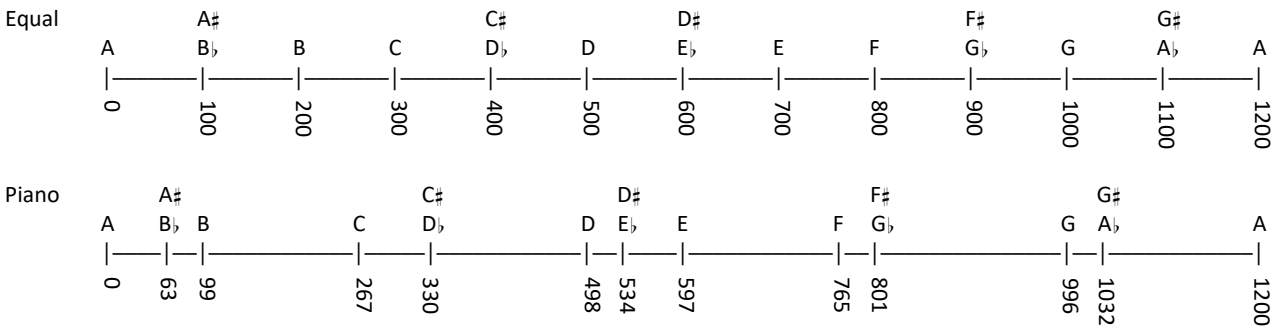
Since some of the piano's pitches need to be tuned significantly lower than usual, the piano part will often look very differently than it sounds. The score thus includes two versions of the solo piano part—a transposed one (showing what the soloist sees) and an untransposed one (showing the actual sounding pitches).

The following chart shows the relationships between the transposed and sounding pitches. An accidental with an upward-pointing arrow added to it means that the pitch is between 29 and 38 cents higher than its equal-tempered version, while an accidental with a downward-pointing arrow added to it means that the pitch is between 33 and 38 cents lower than its equal-tempered version. An accidental with an upward-pointing *double*

arrow added to it means that the pitch is between 62 and 67 cents higher than its equal-tempered version, while an accidental with a downward-pointing *double* arrow added to it means that the pitch is between 66 and 71 cents lower than its equal-tempered version.

Transposed pitch	**Relationship to closest concert pitch(es)**	**Notation of sounding pitch**
A	Identical to concert A	A
A♯/B♭	62.96 cents higher than concert A 37.04 cents lower than concert A♯/B♭	A𝄲/B𝄳
B	Only 1.34 cents lower than concert A♯/B♭	A♯/B♭
C	66.87 cents higher than concert B 33.13 cents lower than concert C	B𝄲/C𝄳
C♯/D♭	29.83 cents higher than concert C 70.17 cents lower than concert C♯/D♭	C𝄲/D𝄳
D	Only 1.34 cents lower than concert D	D
D♯/E♭	33.74 cents higher than concert D 66.26 cents lower than concert D♯/E♭	D𝄲/E𝄳
E	Only 3.3 cents lower than concert D♯/E♭	D♯/E♭
F	64.92 cents higher than concert E 35.08 cents lower than concert F	E𝄲/F𝄳
F♯/G♭	Only .61 cents higher than concert F	F
G	Only 3.91 cents lower than concert G	G
G♯/A♭	31.79 cents higher than concert G 68.21 cents lower than concert G♯/A♭	G𝄲/A𝄳

The two pitch lines below give a rough visual representation of the relationship between equal temperament and the piano's tuning. The numbers below the lines indicate the distances, in cents, between the various pitches and the bottom A.



The following matrix shows the many different intervals found within the piano's tuning, along with their respective locations. Rightward horizontal movement represents increasing upward interval size—in "half-step" increments—above the pitches indicated on the left. Thus, for example, the box that is directly to the right of G shows that the interval between G and the G♯/A♭ above it is 49:48, which is only 35.70 cents wide (an extremely small "half-step"), while the box that is five to the right of G shows that the interval between G and the C above it is 21:16, which is 470.78 cents (a conspicuously flat "perfect" fourth).

	↑ 1	**↑ 2**	**↑ 3**	**↑ 4**	**↑ 5**	**↑ 6**	**↑ 7**	**↑ 8**	**↑ 9**	**↑ 10**	**↑ 11**
G♯ A♭	↑ A 54:49 168.21	↑ A♯/B♭ 8:7 231.17	↑ B 7:6 266.87	↑ C 9:7 435.08	↑ C♯/D♭ 4:3 498.05	↑ D 72:49 666.26	↑ D♯/E♭ 3:2 701.96	↑ E 14:9 764.92	↑ F 12:7 933.13	↑ F♯/G♭ 7:4 968.83	↑ G 96:49 1164.30
G	↑ G♯/A♭ 49:48 35.70	↑ A 9:8 203.91	↑ A♯/B♭ 7:6 266.87	↑ B 343:288 302.57	↑ C 21:16 470.78	↑ C♯/D♭ 49:36 533.74	↑ D 3:2 701.96	↑ D♯/E♭ 49:32 737.65	↑ E 343:216 800.61	↑ F 7:4 968.83	↑ F♯/G♭ 343:192 1004.52
F♯ G♭	↑ G 384:343 195.48	↑ G♯/A♭ 8:7 231.17	↑ A 432:343 399.39	↑ A♯/B♭ 64:49 462.35	↑ B 4:3 498.05	↑ C 72:49 666.26	↑ C♯/D♭ 32:21 729.22	↑ D 576:343 897.43	↑ D♯/E♭ 12:7 933.13	↑ E 16:9 996.09	↑ F 96:49 1164.30
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E	↑ F 54:49 168.21	↑ F♯/G♭ 9:8 203.91	↑ G 432:343 399.39	↑ G♯/A♭ 9:7 435.08	↑ A 486:343 603.30	↑ A♯/B♭ 72:49 666.26	↑ B 3:2 701.96	↑ C 81:49 870.17	↑ C♯/D♭ 12:7 933.13	↑ D 648:343 1101.34	↑ D♯/E♭ 27:14 1137.04
D♯ E♭	↑ E 28:27 62.96	↑ F 8:7 231.17	↑ F♯/G♭ 7:6 266.87	↑ G 64:49 462.35	↑ G♯/A♭ 4:3 498.05	↑ A 72:49 666.26	↑ A♯/B♭ 32:21 729.22	↑ B 14:9 764.92	↑ C 12:7 933.13	↑ C♯/D♭ 16:9 996.09	↑ D 96:49 1164.30
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C	↑ C♯/D♭ 28:27 62.96	↑ D 8:7 231.17	↑ D♯/E♭ 7:6 266.87	↑ E 98:81 329.83	↑ F 4:3 498.05	↑ F♯/G♭ 49:36 533.74	↑ G 32:21 729.22	↑ G♯/A♭ 14:9 764.92	↑ A 12:7 933.13	↑ A♯/B♭ 16:9 996.09	↑ B 49:27 1031.79
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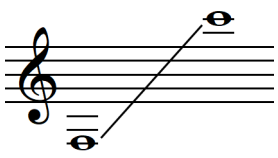
Flutes

- Workable fingerings for the quarter-tones can be found in James J. Pellerite's *A Modern Guide to Fingerings for the Flute*, as well as various online sources.
- The sixth-tones can be produced by simply rotating the lip plate/embouchure hole toward the lips.

Oboes

- The two melodicas must be the same kind and have at least the following range:



- The melodicas may be slightly out-of-tune with themselves, each other, and/or other instruments.
- Workable fingerings for the quarter-tones can be found in Libby Van Cleve's *Oboe Unbound*.

Clarinets

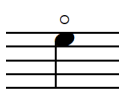
- Clarinet 2's bass clarinet must have a low-C extension.
- Workable fingerings for the quarter-tones can be found in Philip Rehfeldt's *New Directions for Clarinet*, as well as various online sources.
- The sixth-tones can be produced by simply changing the embouchure, though special fingerings may also be devised or found in various sources. The Rehfeldt text includes fingerings for approximate eighth-tones, which are very close to sixth-tones and may be used if more precise options are not found.

Horns

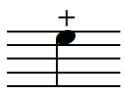
- The microtonal inflections are achieved through the use of natural harmonics 7, 11, 13, and 14. Those harmonics are specified by means of a fingering (e.g., F 12, B♭ 23) and partial number (e.g., 7., 11., 13.). Under no circumstances should alternate fingerings be used for these pitches, nor should their intonation be adjusted to more closely approximate equal temperament.
- All players need straight mutes and stop mutes.
- The "unpitched static sound" called for in m. 288 and elsewhere should be rough, diffused, and completely unfocused/uncentered. This can be accomplished by using an extremely tight embouchure, restricting the airflow to a minimal amount, and forcing the air through a very small aperture. The airstream must be very narrow and slow to produce an immediate and steady sound. Although there should be no pitch—only harsh, distorted, quasi-electronic "white noise"—best results can be achieved by the player "aiming" in the area of a second line G, or similar note.

Percussion 1

- Throughout the piece, all instruments must be allowed to ring.
- **Devil Chaser**
  - A devil chaser is a bamboo stalk that is split for about half of its length and that vibrates when struck against the hand or forearm. There is a small "tuning" hole near the place where the instrument is held that can be covered with the thumb to change the instrument's pitch.
  - The devil chaser must be higher in pitch than Player 3's.
  - The following special notations are used in the devil chaser part:



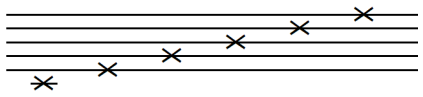
Strike the devil chaser with the tuning hole uncovered



Strike the devil chaser with the tuning hole covered

- **2 Cast Iron Pans**
  - The pans should be struck on the bottoms (i.e., convex sides).
- **Glockenspiel**
  - The glockenspiel sounds two octaves higher than notated.
- **Sleighbells**
  - The sleighbells must be lower in pitch than Player 3's.

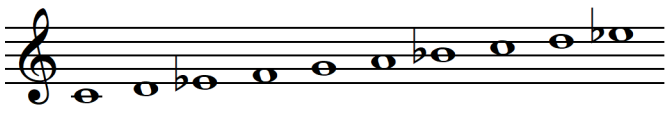
- **Tam-Tam**
  - The tam-tam must be very large and deep, with a tone that can be felt as well as heard.
- **Trine**
  - The trine is a triangular, aluminum instrument designed and produced by British cymbal-maker Matt Nolan. It can be purchased at Steve Weiss Music or directly from Matt Nolan.
  - The six triangular "levels" of the trine are notated on the following lines:



  - The trine must be suspended and then stabilized with fishing wire so that it doesn't spin when played.
- **Tri-Tone Samba Whistle**
  - The recommended model is the Latin Percussion LP352. Whichever brand is used, the samba whistle must be identical to Player 3's.
- **Xylophone**
  - The xylophone sounds an octave higher than notated.
  - A four-octave xylophone—extending down to notated C^3—is needed.
- **Mallets, Beaters, etc.**
  - The following supplies are needed, and the indicated abbreviations are used in the score:
    - 4 hard plastic mallets (H Pl)
    - 2 hard rubber mallets (H Rb)
    - 1 or 2 heavy triangle beaters (H Tr)
    - 2 small-headed brass mallets (Sm Br)
    - 1 superball (i.e., friction) mallet (Sbl)
    - 1 tam-tam beater (T-T Btr)

Percussion 2

- **10 Almglocken**
  - The almglocken sound an octave higher than notated.
  - The following notated pitches are needed:



  - The almglocken may be slightly out-of-tune with each other and/or other instruments.
- **Clave**
  - The clave should be placed on a foam pad or some similarly soft surface and played with mallets.
  - A synthetic clave, such as the Latin Percussion LP 597 King Klave, is strongly recommended.
- **2 Cowbells**
  - Both cowbells should be relatively large and low in pitch.
- **Crotales**
  - The crotales sound two octaves higher than notated.
  - A two-octave set of crotales is needed.
- **Glockenspiel**
  - The glockenspiel sounds two octaves higher than notated.
- **Slapstick**
  - The slapstick must be higher in "pitch" than Player 4's.
- **Tam-Tam**
  - The tam-tam must be very large and deep, with a tone that can be felt as well as heard.
- **Wind Wand**
  - A wind wand consists of a large rubber band stretched over a wooden shaft with a moveable bridge. When the instrument is spun, the rubber band vibrates, producing a harmonic drone reminiscent of a bullroarer and/or didgeridoo.

- A double wind wand—with two rubber bands, shafts, and bridges—is recommended.
- The bridge(s) should be positioned to create a thick, complex chord.

- **Mallets, Beaters, etc.**
  - The following supplies are needed, and the indicated abbreviations are used in the score:
    - 4 brass mallets (Br)
    - 2 chime hammers (Chm Hm)
    - 4 hard plastic mallets (H Pl)
    - 2 medium-hard yarn mallets (MH Yn)
    - 2 medium plastic mallets (M Pl)
    - 2 small-headed brass mallets (Sm Br)
    - 1 tam-tam beater (T-T Btr)

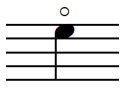
Percussion 3

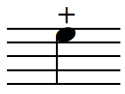
- Throughout the piece, all instruments must be allowed to ring.

- **Bass Drum**
  - The bass drum must be very large and deep, with a tone that can be felt as well as heard.

- **Bell Tree**
  - The bell tree must be large and resonant, with a fairly exotic-sounding, microtonal tuning.

- **Devil Chaser**
  - A devil chaser is a bamboo stalk that is split for about half of its length and that vibrates when struck against the hand or forearm. There is a small "tuning" hole near the place where the instrument is held that can be covered with the thumb to change the instrument's pitch.
  - The devil chaser must be lower in pitch than Player 1's.
  - The following special notations are used in the devil chaser part:


Strike the devil chaser with the tuning hole uncovered


Strike the devil chaser with the tuning hole covered

- **Sleighbells**
  - The sleighbells must be higher in pitch than Player 1's.

- **Tri-Tone Samba Whistle**
  - The recommended model is the Latin Percussion LP352. Whichever brand is used, the samba whistle must be identical to Player 1's.

- **Wind Wand**
  - A wind wand consists of a large rubber band stretched over a wooden shaft with a moveable bridge. When the instrument is spun, the rubber band vibrates, producing a harmonic drone reminiscent of a bullroarer and/or didgeridoo.
  - A double wind wand—with two rubber bands, shafts, and bridges—is recommended.
  - The bridge(s) should be positioned to create a thick, complex chord.

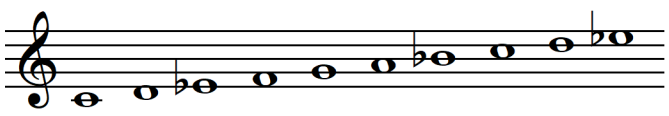
- **Mallets, Beaters, etc.**
  - The following supplies are needed, and the indicated abbreviations are used in the score:
    - 2 bass drum beaters (B-D Btr)
    - 2 chime hammers (Chm Hm)
    - 2 hard plastic mallets (H Pl)
    - 2 small-headed brass mallets (Sm Br)
    - 1 superball (i.e., friction) mallet (Sbl)

Percussion 4

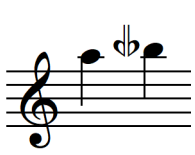
- Throughout the piece, all instruments must be allowed to ring.

- **Bass Drum**
  - The bass drum must be very large and deep, with a tone that can be felt as well as heard.

- **10 Button Gongs**
  - The following pitches are needed:



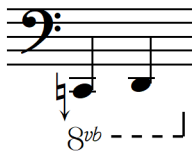
  - The button gongs may be slightly out-of-tune with each other and/or other instruments.
- **Crotales**
  - The crotales sound two octaves higher than notated.
  - A two-octave set of crotales is needed.
- **2 Rice Bowls**
  - These should be resonant porcelain bowls that produce the following pitches when struck. Ideally, the lower bowl will be about 10–15 cents sharp so that the two pitches are slightly less than a quarter-tone apart and the lower one sounds a bit sharp when played against other A's.



- **Slapstick**
  - The slapstick must be lower in "pitch" than Player 2's.
- **Starter Pistol**
  - A blank-firing starter pistol is needed. Only one blank is fired during the piece.
- **2 Timpani**
  - The drums should be 32" and 28".
- **Wind Wand**
  - A wind wand consists of a large rubber band stretched over a wooden shaft with a moveable bridge. When the instrument is spun, the rubber band vibrates, producing a harmonic drone reminiscent of a bullroarer and/or didgeridoo.
  - A double wind wand—with two rubber bands, shafts, and bridges—is recommended.
  - The bridge(s) should be positioned to create a thick, complex chord.
- **Mallets, Beaters, etc.**
  - The following supplies are needed, and the indicated abbreviations are used in the score:
    - 1 bass drum beater (B-D Btr)
    - 4 brass mallets (Br)
    - 2 chime hammers (Chm Hm)
    - 2 chopsticks made of melamine (Chp)
    - 2 hard yarn mallets (H Yn)
    - 4 medium plastic mallets (M Pl)
    - 2 medium-hard timpani mallets (MH Tmp)
    - 4 medium-hard yarn mallets (MH Yn)
    - 1 superball (i.e., friction) mallet (Sbl)
    - 2 wooden timpani mallets (W Tmp)

Harp

- All C, F, and G strings other than the ones in the top octave must be tuned down a sixth-tone (i.e., 33 cents). Natural C's and F's should match the solo retuned piano's C's and F's.
- The bottom two strings should be tuned as follows:



- A Philips screwdriver is needed in movements 2 and 4.
- Throughout the piece, all notes must be allowed to ring; there should be no damping or muffling.
- All harmonics sound an octave higher than notated.
- The "pedal buzz" called for in m. 146 and elsewhere is produced by shifting the pedal to a point halfway between positions and holding it there to create a sustained, metallic buzz.

- The “thunder effect” called for in m. 289 and elsewhere is produced by playing a glissando on the wire strings so forcefully that the strings buzz against each other.
- To “bend the pitch with a metal screwdriver” as indicated in m. 673, press the screwdriver firmly against the indicated string and then pluck the string below the screwdriver with the other hand. As soon as the string has been plucked, slide the screwdriver downward to create an ascending pitch bend.

Keyboards (piano/celesta)

- The celesta sounds an octave higher than notated.
- A medium timpani mallet is needed for the piano in movement 2.

Violins

- In addition to a regular mute, each player needs an Artino practice mute and a wood mute.

Violas

- In addition to a regular mute, each player needs an Artino practice mute and a wood mute.

Violoncellos

- In addition to a regular mute, each player needs an Artino practice mute and a wood mute.

Contrabasses

- If possible, at least half of the players should have low-C extensions.
- Each player needs an Artino practice mute.