Marc Sabat

To walk in this what came to pass

for mixed ensemble

415 Hz instruments: flauto traverso, baroque oboe, theorbo, positive organ; strings;

440 Hz instruments: bass flute, harp,
Fender Rhodes synth, violin, viola, cello, contrabass

PLAIN SOUND MUSIC EDITION
To walk in this what came to pass (2022)
remembering my grandparents’ flight
composed for and premiered by Zafraan Ensemble and the Akademie für Alte Musik Berlin

A short passacaglia: walking and a dance in the street.
Past and present hearing one another, each reprise once again distant, across a divide, spiraling notes and harmonies passing by.

Letters written in a time of war.

Berlin, May 2022
The Helmholtz-Ellis JI Pitch Notation (HEJI) | 2020 | LEGEND

PYTHAGOREAN JUST INTONATION | generated by multiplying / dividing an arbitrary reference frequency by PRIMES 2 and 3 only

\[
\ldots \ b \ b \ b \ b \ x \ \ldots \ 
\]

notate a series of perfect fifths above / below a reference

\[
\frac{3}{2} \approx \pm 702.0 \text{ cents (i.e. 8c wider than tempered)}
\]
each new accidental represents 7 fifths, altering by one apotome

\[
\frac{2187}{2048} \approx \pm 113.7 \text{ cents}
\]

Frequency ratios including higher prime numbers (5–47) may be notated by adding the following distinct accidental symbols. Custom indications for higher primes or various enharmonic substitutions may be invented as needed by simply defining further symbols representing the relevant ratio alterations.

PTOLEMAIC JUST INTONATION | PRIMES up to 5

\[
\ldots \ b \ b \ b \ b \ b \ b \ x \ \ldots \ 
\]

includes the consonant just major third

\[
\frac{5}{4} \approx \pm 386.3 \text{ cents (ca. 14c narrower than tempered)}
\]
alteration by one syntonic comma

\[
\frac{81}{64} \approx \pm 21.5 \text{ cents}
\]
alteration by two syntonic commas

\[
\frac{81}{64} \cdot \frac{81}{64} \approx \pm 43.0 \text{ cents}
\]
alteration by one schisma to notate an exact enharmonic substitution

\[
\frac{3280}{32768} \approx \pm 2.0 \text{ cents}
\]

SEPTIMAL JI | PRIME 7

\[
\ldots \ b \ b \ b \ b \ b \ b \ b \ b \ b \ b \ b \ x \ \ldots \ 
\]

includes the consonant natural seventh

\[
\frac{7}{4} \approx \pm 968.8 \text{ cents (ca. 51c narrower than tempered)}
\]
alteration by one septimal comma (Giuseppe Tartini)

\[
\frac{69}{64} \approx \pm 27.3 \text{ cents}
\]
alteration by two septimal commas

\[
\frac{69}{64} \cdot \frac{69}{64} \approx \pm 54.5 \text{ cents}
\]

UNDecimal | PRIME 11

\[
\ldots \ b \ b \ b \ b \ b \ b \ b \ b \ b \ b \ b \ b \ b \ b \ x \ \ldots \ 
\]

includes the undecimal semi-augmented fourth

\[
\frac{11}{8} \approx \pm 551.3 \text{ cents (ca. 51c wider than tempered)}
\]
alteration by one undecimal quartertone (Richard H. Stein)

\[
\frac{33}{32} \approx \pm 53.3 \text{ cents}
\]

TRIDECIMAL | PRIME 13

\[
\ldots \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ x \ \ldots \ 
\]

includes the tridecimal neutral sixth

\[
\frac{13}{8} \approx \pm 860.5 \text{ cents (ca. 59c narrower than a tempered major sixth)}
\]
alteration by one tridecimal thirdtone (Gérard Grisey)

\[
\frac{7}{4} \approx \pm 113.5 \text{ cents}
\]

PRIMES 17 THROUGH 47

\[
\ldots \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ d \ x \ \ldots \ 
\]
alteration by one 17-limit schisma

\[
\frac{2187}{2176} \approx \pm 8.7 \text{ cents}
\]
alteration by one 19-limit schisma

\[
\frac{5129}{512} \approx \pm 3.4 \text{ cents}
\]
alteration by one 23-limit comma (James Tenney / John Cage)

\[
\frac{736}{729} \approx \pm 16.5 \text{ cents}
\]
alteration by one 29-limit sixhtone

\[
\frac{261}{256} \approx \pm 33.5 \text{ cents}
\]
alteration by one 31-limit quartertone (Alimagh Vaziri)

\[
\frac{39}{32} \approx \pm 55.0 \text{ cents}
\]
alteration by one 37-limit quartertone (Ivan Wyschnegradsky)

\[
\frac{37}{36} \approx \pm 47.4 \text{ cents}
\]
alteration by one 41-limit comma (Ben Johnston)

\[
\frac{89}{81} \approx \pm 21.2 \text{ cents}
\]
alteration by one 43-limit comma

\[
\frac{129}{128} \approx \pm 13.5 \text{ cents}
\]
alteration by one 47-limit quartertone

\[
\frac{752}{729} \approx \pm 53.8 \text{ cents}
\]

CENTS | HEJI accidentals may be combined with an indication of their deviation in cents from equal temperament as read on a tuning meter; At 440 Hz is usually defined to be ±0 cents. If this deviation exceeds ±50 cents, the nearest tempered pitch-class may be added: e.g. A♭ (−65 cents from A♮) could include the annotation A♭♭♭ placed above or below its accidental.

TEMPERED NOTES | may be combined with cents deviations to notate free microtonal pitches

\[
\ldots \ b \ b \ b \ b \ b \ b \ b \ b \ b \ x \ \ldots \ 
\]

indicate the respective equal tempered quartertone;
show which pitch is assigned a deviation of 0c
The Helmholtz-Ellis JI Pitch Notation (HEJI) | 2020
Harmonic / Subharmonic series 1–49 notated by modifications of Pythagorean notes
with dedicated microtonal accidental symbols for primes 5 through 47

Ratios represent the amount of modification of the Pythagorean notes by each additional symbol,
cents indications are deviations that would be shown on a tuning meter with A = 0 cents

Standard ontonal notation above =A

Standard ontonal notation below =E
To walk in this what came to pass: tuning charts

General Correlation between the 415 Hz and 440 Hz Instruments’ Notations and Tuning Systems

cents indicate deviations from 12-tone equal temperament with a reference A=415 Hz
uninflected fifths are tempered smaller than pure by 1/6 of a Pythagorean Comma, strokes alter by 1/6 comma to make pure 2:3 fifths (Vallotti Well-Temperament)

for the 415 Hz instruments, enharmonically spelled intervals are used to approximate septimal tunings based on the low natural 7°
in 1/6-Comma tuning the difference between enharmonic notes, i.e. G-sharp and A-flat, is approximately one Pythagorean Comma, ca. 24 cents
a single cross half-sharp (Zarlino’s diesis symbol), alteration ca. +43 cents, is used to approximate “quartertones” based on the natural 11° and 13°
tunings based on partials > 5° are shown above the notes using a style like 7°/F (see example below) to indicate a 7th partial tuned over fundamental F
please tune such pitches contextually, by ear, adjusting intervals / chords to match the harmonic series, maximising resonance and clarity even when dissonant!

Unison Tuning of the Organ and the Electric Piano Synth

cents indicate deviations from 12-tone equal temperament with a reference A=415 Hz
uninflected fifths are pure (2:3), strokes inflect by ca. 1/6 comma, based on 17° and 19° of the harmonic series (JI)

note that the actual Kammerton (tuning of A) is +6 cents, equivalent to 441.5 Hz
uninflected fifths are tempered smaller than pure by 1/6 of a Pythagorean Comma, ca. 24 cents
for the 415 Hz instruments, enharmonically spelled intervals are used to approximate septimal tunings based on the low natural 7°
in 1/6-Comma tuning the difference between enharmonic notes, i.e. G-sharp and A-flat, is approximately one Pythagorean Comma, ca. 24 cents
a single cross half-sharp (Zarlino’s diesis symbol), alteration ca. +43 cents, is used to approximate “quartertones” based on the natural 11° and 13°
tunings based on partials > 5° are shown above the notes using a style like 7°/F (see example below) to indicate a 7th partial tuned over fundamental F
please tune such pitches contextually, by ear, adjusting intervals / chords to match the harmonic series, maximising resonance and clarity even when dissonant!
Harp Scordatura

Harp Octave 7

Harp Octave 6

Harp Octave 5

Harp Octave 4

Harp Octave 3

Harp Octave 2

Harp Octave 1

Upper staff: tuning; please optimise in the pedal position(s) for which a boxed cents indication is given

Lower staff: pedalled notes
String Instruments

cents indicate deviations from 12-tone equal temperament with a reference $A = 415$ Hz
uninflected fifths are tempered smaller than pure by $\frac{1}{6}$ of a Pythagorean Comma

<table>
<thead>
<tr>
<th>Strings</th>
<th>415 Cb</th>
<th>415 Vlc</th>
<th>415 Vla</th>
<th>415 Vlns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>-2</td>
<td>-4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-6</td>
<td>-4</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>-6</td>
<td>-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

cents indicate deviations from 12-tone equal temperament with a reference $A = 440$ Hz
uninflected fifths are pure (2:3); note that the actual Kammerton (tuning of A) is +6 cents, equivalent to 441.5 Hz

<table>
<thead>
<tr>
<th>Strings</th>
<th>440 Cb</th>
<th>440 Vlc</th>
<th>440 Vla</th>
<th>440 Vln</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-8</td>
<td>-6</td>
<td>-4</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td>-4</td>
<td>0</td>
<td>-2</td>
<td>-4</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>-6</td>
<td>-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-8</td>
</tr>
</tbody>
</table>
Transposing Score

415 instruments are notated in 1/6-Pythagorean-Comma Meantone; $A = 0$ cents = 415 Hz; 440 instruments are notated in HEJI, $1/1 = C = 0$ cents, $A = +6c = ca. 441.5$ Hz.

Theorbo to be fretted in 1/6-Pythagorean-Comma Meantone; Organ to be tuned in Vallotti (1/6-Pyth-Comma between F-C-G-D-A-E-B and pure 3/2's otherwise); Harp tuning see chart.

415 and 440 refer to the settings used on an electronic tuning meter to obtain cents. The two tuning systems share the same cents deviations a semitone apart; see chart.

cc 2022 Plainsound Music Edition

To walk in this what came to pass

composed for and premiered by Zafraan Ensemble in collaboration with Akademie für Alte Musik Berlin

Marc Sabat

Transposing Score

415 instruments are notated in 1/6-Pythagorean-Comma Meantone, $A = 0$ cents = 415 Hz; 440 instruments are notated in HEJI, $1/1 = C = 0$ cents, $A = +6c = ca. 441.5$ Hz.

Theorbo to be fretted in 1/6-Pythagorean-Comma Meantone; Organ to be tuned in Vallotti (1/6-Pyth-Comma between F-C-G-D-A-E-B and pure 3/2's otherwise); Harp tuning see chart.

415 and 440 refer to the settings used on an electronic tuning meter to obtain cents. The two tuning systems share the same cents deviations a semitone apart; see chart.

To walk in this what came to pass

remembering my grandparents’ flight

composed for and premiered by Zafraan Ensemble in collaboration with Akademie für Alte Musik Berlin

Marc Sabat

Transposing Score

415 instruments are notated in 1/6-Pythagorean-Comma Meantone, $A = 0$ cents = 415 Hz; 440 instruments are notated in HEJI, $1/1 = C = 0$ cents, $A = +6c = ca. 441.5$ Hz.

Theorbo to be fretted in 1/6-Pythagorean-Comma Meantone; Organ to be tuned in Vallotti (1/6-Pyth-Comma between F-C-G-D-A-E-B and pure 3/2’s otherwise); Harp tuning see chart.

415 and 440 refer to the settings used on an electronic tuning meter to obtain cents. The two tuning systems share the same cents deviations a semitone apart; see chart.

cc 2022 Plainsound Music Edition
To walk in this what came to pass | Transposing Score

Poco ritenuto

Tempo primo
To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score

415 Fl  
415 Ob  
415 Vn  
415 Vc  
415 Ch  
415 Org  
440 B Fl  
440 Hp  
440 Vln  
440 Vla  
440 Vlc  
440 Cb  
440 Theorbe  
440 Rhodes  

strokes = ca. 1/6 Pythagorean Comma  

\[ 5°/B \]  
\[ 7°/E \]  
\[ 5°/I \]  
\[ 7°/D \]  
\[ 4°/III \]  
\[ 4°/IV \]  
\[ 4°/V \]  

5°/II  
7°/C  
7°/D  

5°/III  
7°/E  
7°/F  

5°/IV 
5°/V  
7°/G  

To approximate the Vallotti Well-Temperament  
using 37° and 19° (please see tuning table)
To walk in this what came to pass | Transposing Score
415 Fl
415 Db
415 Vn1
415 Vn II
415 Vn
415 Vn
415 Ch

415 Org

440 Fl
440 Hp
440 (snd)
440 Rhodes
440 (synth)
440 Vln
440 Vla
440 Vlc
440 Cb
440 Org
440 Theorbe

To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score
To walk in this what came to pass | Transposing Score

Tempo primo

Poco ritenuto

match 440 Eb