One Seventh Comma Modified Meantone As An All-Around Tuning System
Tim Farley, Registered Piano Technician - 2010 PTG Convention

Recommended Reading

Carhart, Thad. The Piano Shop on the Left Bank: Discovering a Forgotten Passion in a Paris Atelier. New York: Random House, 2001.

Daniélou, Alain. Music and the Power of Sound: The Influence of Tuning and Intervals of Consciousness. Rochester, VT: Inner Traditions International, 1943, revised edition 1995.

Duffin, Ross. How Equal Temperament Ruined Music and Why You Should Care.

Eskelin, Gerald. Lies My Music Teacher Told Me. Woodland Hills, CA: Stage 3 Publishing, 1994.

Hall, Donald. Musical Acoustics.

Hemholz, Herman. The Sensation of Tone. Published in 1890.

Jorgenson, Owen. Tuning Historical Temperaments by Ear. Northern Michigan University Press, 1977.

- This selection is out of print, but the author has granted permission to copy it. Copies are available for $25.
- *Note: See page 194 for the Jean Baptiste Romieu 1/7 comma meantone tuning used on Kvapil Chopin CD.*

Jorgenson, Owen. Tuning: The Perfection of Eithteenth-Century Temperament, The Lost Art of Nineteenth-Century Temperament, and the Science of Equal Temperanment, Complete with Instrumctions for Aural and Electronic Tuning. East Lansing, MI: Michigan State University Press, 1991.

McClain, Ernest G. The Myth of Invariance: The origin of the Gods, Mathematics and Music From the Rg Veda to Plato. York Beach, ME: Nicolas-Hays, Inc., 1976, 1984.

Ruland, Heiner. Expanding Tonal Awareness.

Steblin, Rita. A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries. Ann Arbor, MI: UMI Research Press. (Thesis may be obtained through University of Illinois-Champaign-Urbana inter-library loan.)

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Recommended Listening

The King's Singers" CD La Dolce Vita, Catalog #1226
- ❖ Available by CD mail order through 503-472-6971

Ton Koopman (any performances on organ or harpsichord)

Pieter Wispelway on Channel Classics 6494

Archibudille. Schubert, Beethoven, etc. Especially listen to any trios without piano, as they are wonderful examples of tuning.

Andrew Lawrence King CDs La Harpe Royale, ale, Harpe Royal. Pieces without piano are wonderful examples of string players' temperaments.

Andrew Lawrence King CDs La Harpe Royale, Italian Harpe Music and Harp of Lodovico.

Radoslav Kvapil. Czech pianist. Radoslav Kvapil Plays Frédéric Chopin CD produced at Farley's House of Pianos, February 2000. Tuning by Tim Farley.

Wha'd Ya Know radio show. The piano and bass on Michael Feldman's weekly program on National Public Radio has been in meantone for many years. The pianist prefers it.

One Seventh Comma Modified Meantone As An All-Around Tuning System

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How To Tune To 1/7 Comma MeanTone - Starting From Middle C

According to Jean Baptiste Romieu - As found in "Tuning the Historical Temperaments" by Owen Jorgensen

E♭ – B♭ – F – C – G – D – A – E – B – F♯ – C♯ – G♯

1. Tune middle C_{40}.
2. Tune E_{44} from C_{40} (major 3rd) wide at **7.0 BPS**.
3. Tune G_{35} from E_{44} (6th) wide at **7.0 BPS**. Check that C_{40} - E_{44} and E_{49} - G_{35} are equal beating at 7.0 BPS.
4. Tune A_{37} from E_{44} (5th) narrow at **1.2 BPS**.
5. Tune D_{42} from A_{37} (4th) wide at **1.6 BPS**. Check that $G_{35} – D_{42}$ (5th) beats at 1.0 BPS. Check that $A_{37} – E_{44}$ (5th) beats at 1.2 BPS. Check that $G_{35} – C_{40}$ (4th) beats at 1.4 BPS. Check that $A_{37} – D_{42}$ (4th) beats at 1.6 BPS. Check that $C_{40} – E_{44}$ (major 3rd) beats at 7.0 BPS. Check that $G_{35} – E_{44}$ (6th) beats at 7.0 BPS. Test that the 4th $A_{37} – D_{42}$ beats 1 1/2 times as fast as the 5th $G_{35} – D_{42}$ (narrow), then test that the 4th $A_{37} – D_{42}$ beats 1 1/3 times as fast as the 5th $A_{37} – E_{44}$ (narrow).
6. Tune E_{32} from E_{44} **pure**. Check that the minor 3rd $E_{32} – G_{35}$ and the 6th $G_{35} – E_{44}$ are both equal beating at 7.0 BPS. Then check that the minor 3rd $A_{37} – C_{40}$ beats narrow at 9.3 BPS.
7. Tune $B♭_{38}$ from D_{42} (major 3rd) wide at **6.2 BPS**. Check that $G_{35} – B♭_{38}$ beats at 8.3 BPS.
8. Tune F_{33} from D_{42} (6th) wide at **6.2 BPS**. Check that the 3rd $B♭_{38} – D_{42}$ and the 6th $F_{33} – D_{42}$ both beat at 6.2 BPS. Check that $F_{33} – C_{40}$ beats at 0.9 BPS. Check that $G_{35} – D_{42}$ beats at 1.0 BPS. Check that $F_{33} – B♭_{38}$ beats at 1.2 BPS. Check that $G_{35} – C_{40}$ beats at 1.4 BPS. Check that $F_{33} – A_{37}$ beats at 4.7 BPS. Check that $G_{35} – E_{44}$ (6th) beats at 7.0 BPS.
9. Tune $E♭_{31}$ from $B♭_{38}$ (5th) narrow at **0.8 BPS**.
10. Tune $E♭_{43}$ from $B♭_{38}$ (4th) wide at **1.7 BPS**. Check the octave E♭ to E♭. Check that $E♭_{31} – G_{35}$ beats at 4.1 BPS. Check that $G_{35} – B♭_{38}$ and $G_{35} – E♭_{43}$ both beat at 8.3 BPS. Then check the 2nd inversion C minor chord. Check that $G_{35} – E♭_{43}$ (minor 6th) beats 8.3 BPS and that C – E♭ (minor 3rd) beats at 11.1 BPS.
11. Tune B_{39} from G_{35} (major 3rd) wide at **5.2 BPS**.
12. Tune $C♯_{41}$ from E_{32} (6th) wide at **5.9 BPS**. This 6th ($E_{32} – C♯_{41}$) should beat the same as A_{37} - $C♯_{41}$. Check the major 3rds: F – A = 4.7, G – B = 5.2, A - C♯ = 5.9, and B♭ - D = 6.2.
13. Tune $F♯_{34}$ from B_{39} (4th) wide at **1.3 BPS**. Test that the 4th $F♯_{34}$ - B_{39} beats 1 1/2 times as fast as the 5th $E_{32} – B_{39}$, then test that the 4th $F♯_{34}$ - B_{39} also beats 1 1/3 times as fast as the 5th $F♯_{34}$ - $C♯_{41}$. Check the minor 3rds: E – G = 7.0, F♯ – A = 7.8, G – B♭ = 8.3. Also check that F♯ - C♯ = 1.0 and F♯ - B = 1.3.
14. Tune $G♯_{36}$ from $C♯_{41}$ (4th) wide at **1.5 BPS**. Test that the wolf diminished 6th E♭ - G♯ beats at 3.7 BPS. Chromatically check the major 3rds from D_{30}. Then check the minor 3rds.

One Seventh Comma Modified Meantone As An All-Around Tuning System

Tim Farley, Registered Piano Technician - 2010 PTG Convention

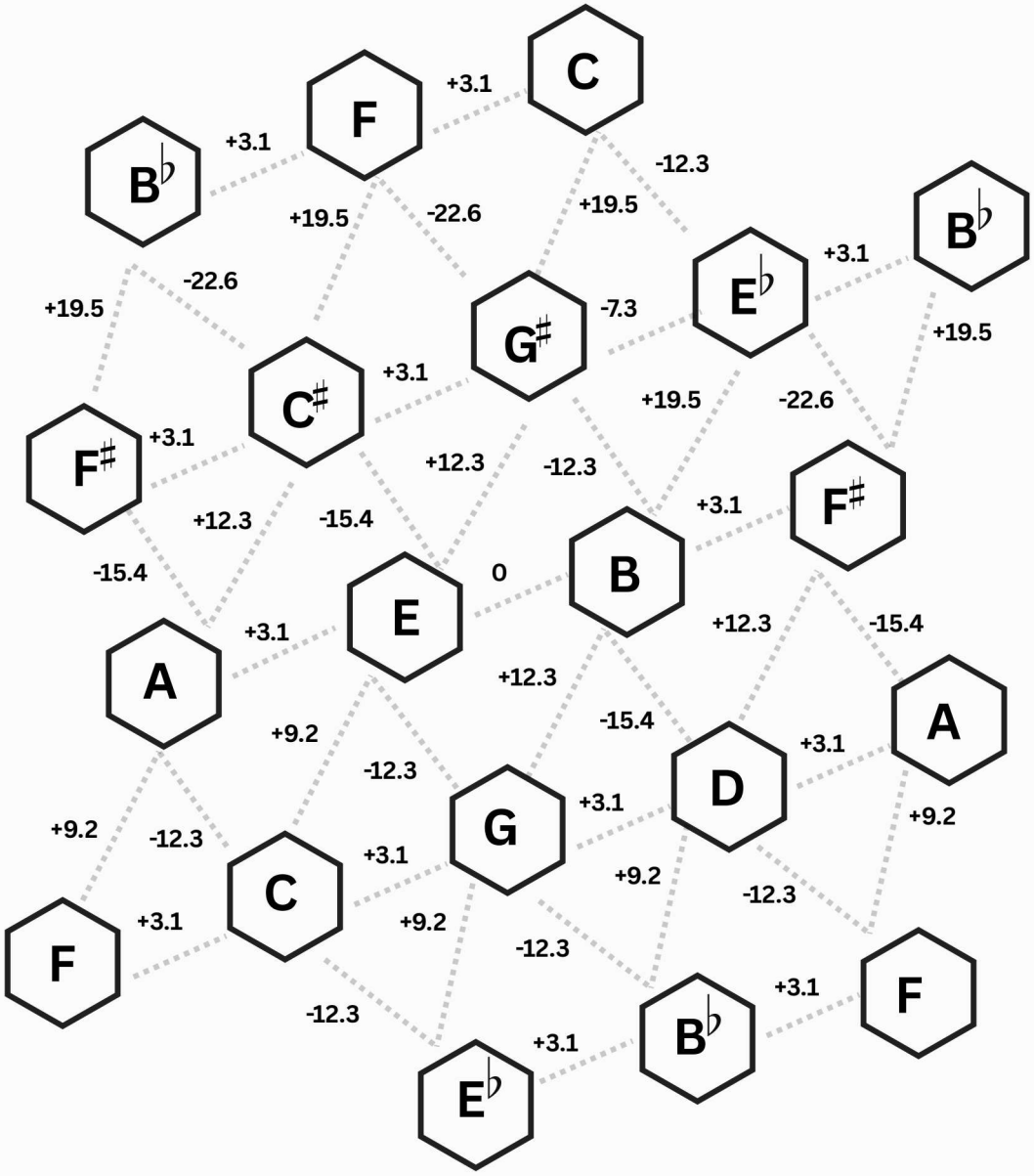
How To Tune To 1/7 Comma MeanTone - Starting From D Above Middle C

According to Jean Baptiste Romieu - As found in "Tuning the Historical Temperaments" by Owen Jorgensen

E♭ – B♭ – F – C – G – D – A – E – B – F♯ – C♯ – G♯

1. Assume the piano is at 400 HZ or desired pitch in equal temperament. Begin with D. Do not change pitch.
2. Tune G_{35} from D_{42} (5^{th}) narrow at **1.0 BPS**.
3. Tune C_{40} from G_{35} (4^{th}) wide at **1.4 BPS**.
4. Tune F_{33} from C_{40} (5^{th}) narrow at **0.9 BPS**. Check that F_{33} - D_{42} (6^{th}) beats 6.2 BPS (wide).
5. Tune A_{37} from D_{42} (4^{th}) wide at **1.6 BPS**. Check that $F_{33} – A_{37}$ beats at 4.7 BPS (wide). Also check that A_{37} - C_{40} beats at 9.3 BPS (narrow).
6. Tune E_{44} from A_{37} (5^{th}) narrow at **1.2 BPS**. Check that the minor triad $A_{37} – C_{40}$ beats at 9.3 BPS and that $C_{40} – E_{44}$ beats at 7.0 BPS. Then check that both $G_{35} – E_{44}$ and $C_{40} – E_{44}$ beat at 7.0 BPS.
7. Tune $B♭_{38}$ from F_{33} (4^{th}) wide at **1.2 BPS**. Check that $B♭_{38} – D_{42}$ and $F_{33} – D_{42}$ are both equal beating at 6.2 BPS. Check that $G_{35} – B♭_{38}$ (minor 3^{rd}) beats at 8.3 BPS (narrow).
8. Tune $E♭_{31}$ from $B♭_{38}$ (5^{th}) narrow at **0.8 BPS**.
9. Tune $E♭_{43}$ from $B♭_{38}$ (4^{th}) wide at **1.7 BPS**. Check the octave E♭ to E♭. Check that $E♭_{31} – G_{35}$ beats at 4.1 BPS. Check that $G_{35} – B♭_{38}$ (minor 3^{rd}) and $G_{35} – E♭_{43}$ (minor 6^{th}) both beat at 8.3 BPS. Then check the 2^{nd} inversion C minor chord. Check that $G_{35} – E♭_{43}$ (minor 6^{th}) beats 8.3 BPS and that $C_{40} – E♭_{43}$ (minor 3^{rd}) beats at 11.1 BPS.
10. Tune B_{39} from E_{44} (4^{th}) wide to beat at **1.8 BPS**. Check that $G_{35} – B_{39}$ (major 3^{rd}) beats at 5.2 BPS. Check that $B_{39} – D_{42}$ beats at 10.4 BPS (2:1 ratio).
11. Tune D_{30} from D_{42} **pure**. Check the octave D – D.
12. Tune $F♯_{34}$ from B_{39} (4^{th}) wide at **1.3 BPS**. Check that $D_{30} – F♯_{34}$ beats at 3.9 BPS (wide) and that $G_{35} – B_{39}$ beats at 5.2 BPS. Check that $F♯_{34} – A_{37}$ (minor 3^{rd}) beats at 7.8 BPS (narrow). Check that $F♯_{34} – D_{35}$ (minor 6^{th}) beats at 7.8 (narrow).
13. Tune E_{32} from E_{44} **pure**.
14. Tune $C♯_{41}$ from $F♯_{34}$ (5^{th}) narrow to beat at **1.0 BPS**. Check that $F♯_{34} – A_{37}$ beats at 7.8 BPS and that $A_{37} – C♯_{41}$ beats at 5.9 BPS (4:3 ratio). Check that $C♯_{41} – E_{44}$ beats twice as fast at 11.7 BPS as $A_{37} – C♯_{41}$ at 5.9 BPS. Check that $E_{44} – A_{37}$ beats at 1.2 BPS (narrow) and that $E_{32} – B_{39}$ beats at 0.9 BPS (narrow). Check that E_{32} - $C♯_{41}$ (6^{th}) and $A_{37} – C♯_{41}$ (minor 3^{rd}) both beat at 5.9 BPS.
15. Tune $G♯_{36}$ from $C♯_{41}$ wide at **1.5 BPS**. Check that $G♯_{34} – E♭_{33}$ (wolf diminished 6^{th}) beats at 3.7 BPS. Check that $E_{32} – G♯_{36}$ beats at 4.4 BPS (wide). Then check that G♯ – B and G♯ – E both beat 8.8 BPS. This is a 2:1 ratio.

1/7 Syntonic Comma Modified Mean Tone



One Seventh Comma Modified Meantone As An All-Around Tuning System

Tim Farley, Registered Piano Technician - 2010 PTG Convention

Tuning Jean Baptiste Romieu – 1/7 Syntonic Comma Meantone
As found in "Tuning the Historical Temperaments" by Owen Jorgensen

Tuning 1/7 Modified Comma Meantone By Ear

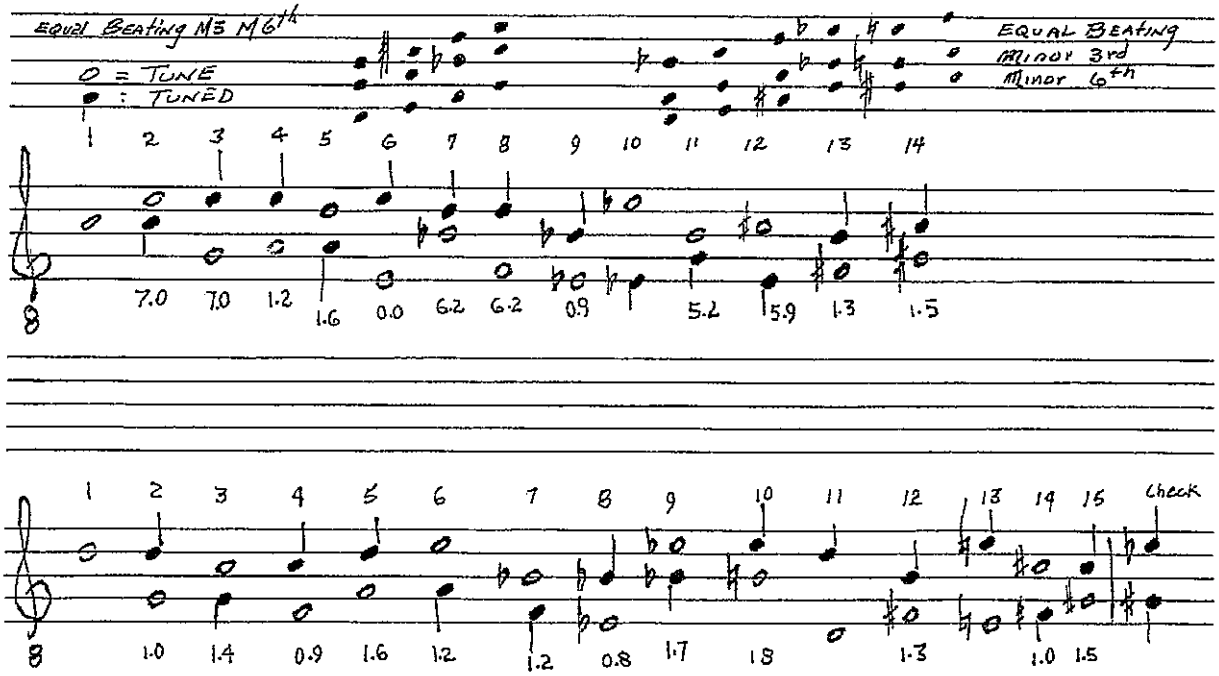
- All 4ths and 5ths are tempered by 3.1 cents. (1 cent more than equal temperament)
- All 4ths are wide
- All 5ths are narrow
- All major 3rds are wide
- All minor 3rds are narrow
- All major 3rds progress evenly from low to high
- All minor 3rds progress evenly from low to high
- There needs to be a wolf of 3.7 BPS (E♭ - G♯)
- All major 3rds are 4.5 cents narrower than equal temperament
- All minor 3rds are 3.4 cents wider than equal temperament
- All tritones are 6.8 cents narrower than equal temperament
- All major 6ths are 3.4 cents narrower than equal temperament
- All minor 6ths are 4.5 cents wider than equal temperament
- All whole tones are 2.2 cents narrower than equal temperament

Equal Beating Major 3rds – Major 6ths

G_{35}	C_{40}	E_{44}
F_{33}	B^{b}_{38}	D_{42}
E_{32}	A_{37}	$C^{\#}_{40}$
D_{30}	G_{35}	B_{39}

Equal Beating minor 3rds – minor 6ths

a_{37}	c_{40}	f_{45}
$g^{\#}_{36}$	b_{39}	e_{44}
g_{35}	b^{b}_{38}	e^{b}_{43}
$f^{\#}_{34}$	a_{37}	d_{42}
e_{32}	g_{35}	c_{40}
d_{30}	f_{33}	b^{b}_{38}



KEY COLOR 2001 *Appreciate the Differences*

Timothy Farley RPT and Daniel Eberhardy RPT PTG Annual Convention - Reno

Temperament Data

1200 cents = 1 octave, thus

$\frac{\log_x 2}{1200} = \log_x$ (1 cent, or rather the frequency-ratio of two tones once cent apart)

On a calculator,
$\sqrt[1200]{2} = 1.00057779$, $\log_{10} 0.00025085832\ldots$, $1.5 \div 2^{7/12} = 1.002239891$,
$\log_{10} = 0.000490428$, $\div 0.00250858\ldots = 1.955001$

81÷80 (the comma mentioned in "1/4 comma" "1/7 comma" etc.) = 1.0125,

$\log_{10} = 0.0053953188$, $\div 0.00490428 = 11.00065475$

Thus, Standard Equal is only negligibly different from 1/11 comma*.
For comparison, 1/12 comma has each major third nearly 14.9 cents wide. (1.2 cents wider than in Standard Equal); three such continuous thirds yield an octave about 3.7 cents wide.

In cents, $81/80 - 1.0125$, $\log_{10} = 0.0053953188\ldots$, $(\sqrt[12]{2})\log = 0.025085832\ldots$,

1.0125, $\log_{10} = 0.00539503188 \div 0.025085832 = 0.215062846\ldots = 21.5+$ cents

In such temperaments as 1/4 comma, 1/5 comma, 1/6 comma, and 1/7 comma, whole-tone sequences, if ranging from the first flat to the last sharp, will sound (according to Tim Farley) better than whole-tone sequences that contain a sharp-to-flat "whole tone" (really a diminished third).

*If I figured right, 1/11 c. treated thus yields octave about 1/400 cent narrow; each perfect fourth or fifth, 1/5000th cent different from Standard Equal's forth or fifth.

Guides to Assist in Setting Seventh Comma Meantone Temperament

As far as tuning the seventh comma or eighth comma meantone tunings, it is not much different from anything else you have experienced with two exceptions. 1) All fourths and fifths beat slightly faster 2) All fourths and fifths progress just as they do in equal temperament. As far as the thirds are concerned, as long as it is spelled a third, it progresses as even or more even than in equal temperament. Raised keys are F#, C#, G# and Bb and Eb. So there are four that spell diminished fourths, F# to Bb, G# to C, B to Eb, and C# to F. These intervals beat noticeably faster. They beat so much faster than in standard tuning that they are virtually only noticeable to the tuner.

The starting point is to set the beat speeds of the violin, viola and cello strings. (C, G, D, A, and E.) being careful not to move D from equal temperament. After this is established, keep tuning in a clockwise motion in fourths and fifths notes B, F# and G# This is the last sharp you will tune. (Clockwise tuning makes the raised keys low.) Now tune counterclockwise F from C above, Bb from F below, and Eb from Bb below. (Counterclockwise tuning makes the raised keys high.) All the fourths and fifths are slightly faster than equal temperament. If you are 100% successful, there should be 3.7 beats per second between the last flat and the last sharp that you tuned. This looks like a fifth, but it is a wolf diminished sixth. You have to have that to be successful. It is not a mistake.

But, in the same way that fourths and fifths progress in equal temperament, the progression is just as even, or more even in seventh comma. As far as the thirds are concerned, as long as it is spelled a third, it progresses as even or more even than in equal temperament. Raised keys are F#, C#, G# and Bb and Eb. So there are four that spell diminished fourths, F# to Bb, G# to C, B to Eb, and C# to F. These intervals beat noticeably faster. They beat so much faster than in standard tuning that they are virtually only noticeable to the tuner.

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KEY COLOR 2001 *Appreciate the Differences*

Timothy Farley RPT and Daniel Eberhardy RPT

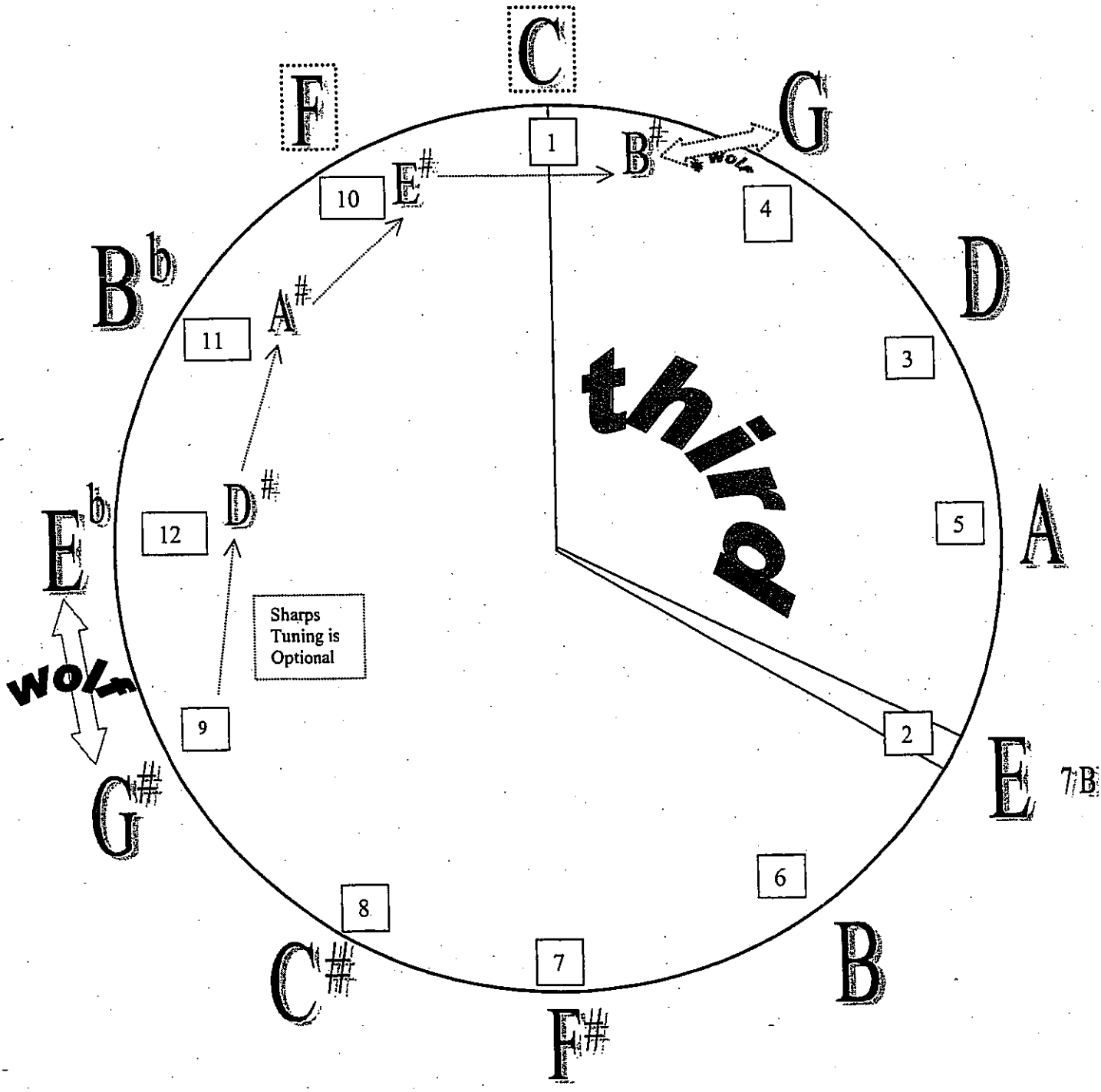
Circle Of Fifths: Seventh Comma

KEY

The Standard temperament for 3 Sharps and 2 Flats ($F^{\#}$ $C^{\#}$ $G^{\#}$ B^{b} E^{b}) ..... Re-tune Option

Jean Baptiste ROMIEU

(page 194 in Tuning the Historical Temperaments by Ear, Owen Jorgensen)



KEY COLOR 2001 *Appreciate the Differences*

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JEAN BAPTISTE ROMEIU ONE SEVENTH COMMA GERMAN MEAN TONE

Cents Deviation from Equal Temperament (Chart for F-A-C)

Key Color

Revised 2005

7th Comma unmodified Temperament

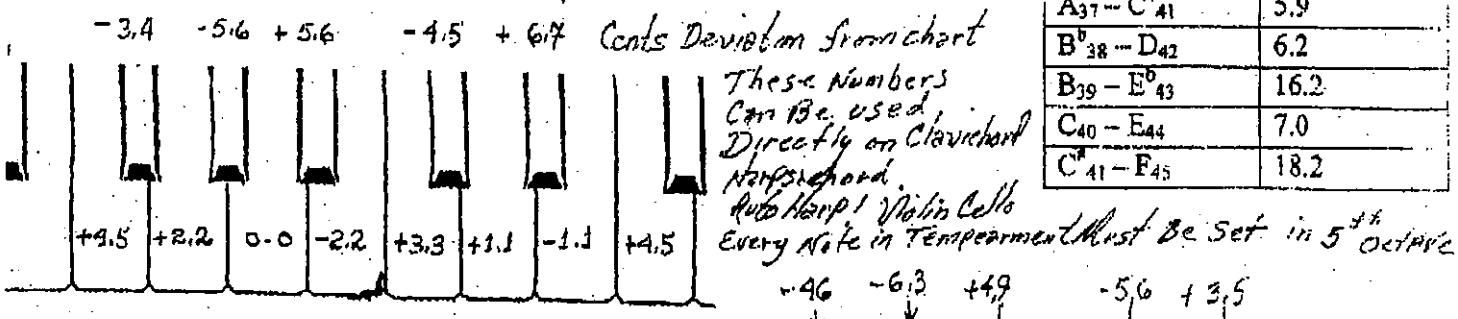
Interval	Beats/second
$C_{40} - E_{44}$	7.0 wide
$C_{40} - G_{35}$	1.4 wide
$G_{35} - D_{42}$	1.0 narrow
$D_{42} - A_{37}$	1.6 wide
$A_{37} - E_{44}$	1.2 narrow
$E_{44} - B_{39}$	1.7 to 1.8 wide
$B_{39} - F^{\#}_{34}$	1.3 wide
$F^{\#}_{34} - C^{\#}_{41}$	1.0 narrow
$C^{\#}_{41} - G^{\#}_{36}$	1.5 wide
$C_{40} - F_{33}$	0.9 narrow
$F_{33} - B^{\flat}_{38}$	1.2 wide
$B^{\flat}_{38} - E^{\flat}_{43}$	1.7 wide
$G^{\#}_{38} - E^{\flat}_{43}$	3.7 wide (wolf)

Note	Cents
F	+4.5
$F^{\#}$	-3.4
G	+2.2
$G^{\#}$	-5.6
A	0.0
$B^{\flat}$	+5.6
B	-2.2
C	+3.3
$C^{\#}$	-4.5
D	+1.1
$E^{\flat}$	+6.7
E	-1.1
F	+4.5

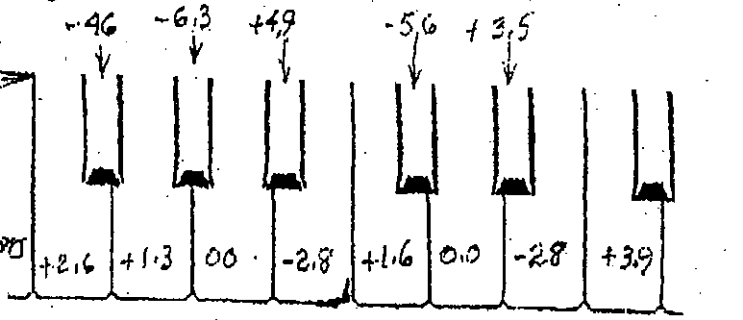
These Figures Do Not Appear in any Book this is the first Time they Have Appeared in Print, These Figures CAN Be entered in SAnderson Accutuner III and with one can Create An 88 Note Tuning for Any Piano

lified), checks are about as follows:

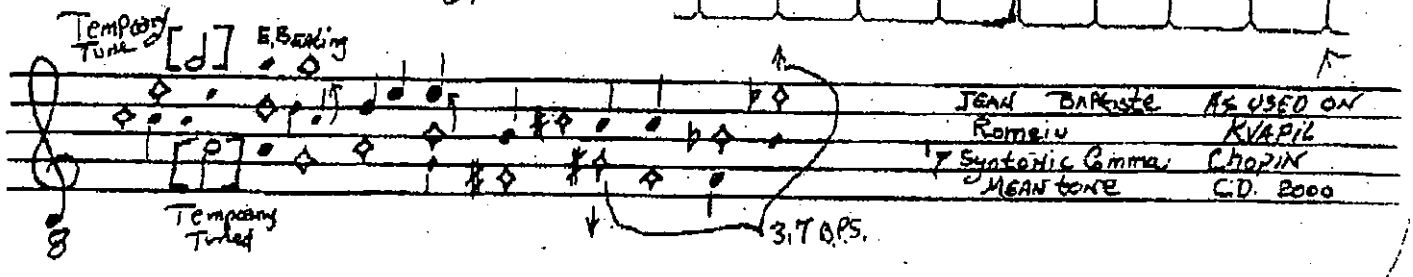
Interval	Beats/second
$F_{33} - C_{40}$	0.93 N
$F^{\#}_{34} - C^{\#}_{41}$	0.98 N
$G_{35} - D_{42}$	1.04 N
$G^{\#}_{36} - E^{\flat}_{43}$	3.7 W
$A_{37} - E_{44}$	1.17 N
$B^{\flat}_{38} - F_{45}$	1.24 N
$F_{33} - B^{\flat}_{38}$	1.24 W
$F^{\#}_{34} - B_{34}$	1.31 W
$G_{35} - C_{40}$	1.39 W
$G^{\#}_{36} - C^{\#}_{41}$	1.47 W
$A_{37} - D_{42}$	1.56 W
$B^{\flat}_{38} - E^{\flat}_{43}$	1.65 W
$B_{39} - E_{44}$	1.75 W
$F_{33} - A_{37}$	4.7
$F^{\#}_{34} - B^{\flat}_{38}$	12.2
$G_{35} - B_{39}$	5.2
$A^{\#}_{36} - C_{40}$	13.6
$A_{37} - C^{\#}_{41}$	5.9
$B^{\flat}_{38} - D_{42}$	6.2
$B_{39} - E^{\flat}_{43}$	16.2
$C_{40} - E_{44}$	7.0
$C^{\#}_{41} - F_{45}$	18.2



These Numbers Can Be used Directly on Clavichord Harpsichord Auto Harp! Violin Cello Every Note in Temperament Must Be Set in 5th Octave



This is The 7th Comma Mean tone Tuned on Steinway 6'2" A Due to in Harmonicity The following Numbers Arent The Same as The Theoretical These were Mersured A1C5 When The Accutuner Moves from B5 to C C6 Appears in The Window Correct it to C-5.



JEAN BAPTISTE AS USED ON
Romeiu KVAPIL
7 Syntonic Comma CHOPIN
MEAN TONE C.D. 2000

AT ANY Rate Your Tuning on Steinway Should Be More Like The Second Keyboard