

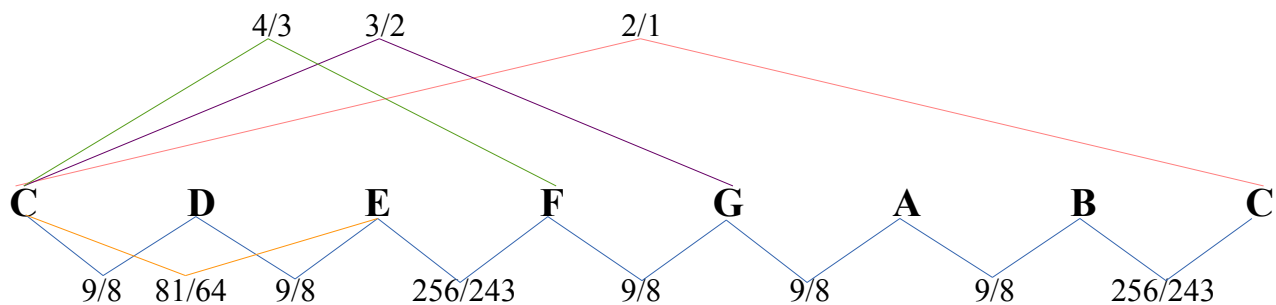
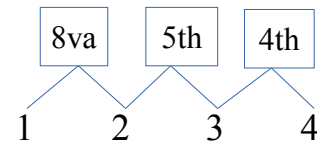
## Pythagorean Tuning

*All tones found by pure 5ths*

### Relationship in ratios:

OCTAVE: 2/1  
 FIFTH: 3/2  
 FOURTH: 4/3

Or



### Pythagorean Third: C-E

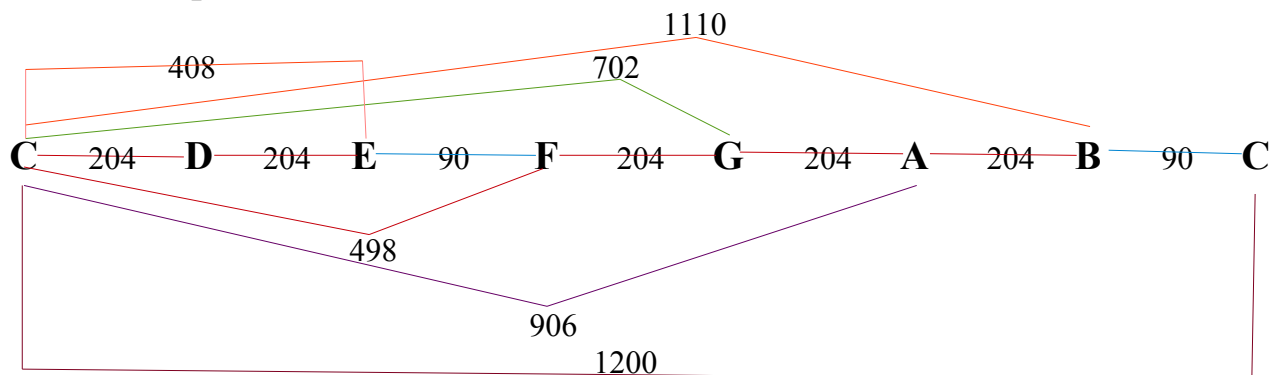
$C \times 3/2 = G \rightarrow G \times 3/2 = D \rightarrow D \times 1/2 = D \rightarrow D \times 3/2 = A \rightarrow A \times 3/2 = E \rightarrow E \times 1/2 = E$

Calculated out:

$3/2 \times 3/2 = 9/4 \rightarrow 9/4 \times 1/2 = 9/8 \rightarrow 9/8 \times 3/2 = 27/16 \rightarrow 27/16 \times 3/2 = 81/32 \rightarrow 81/32 \times 1/2 = 81/64$

**E = 81/64**

### Relationship in cents:



### Pythagorean Comma:

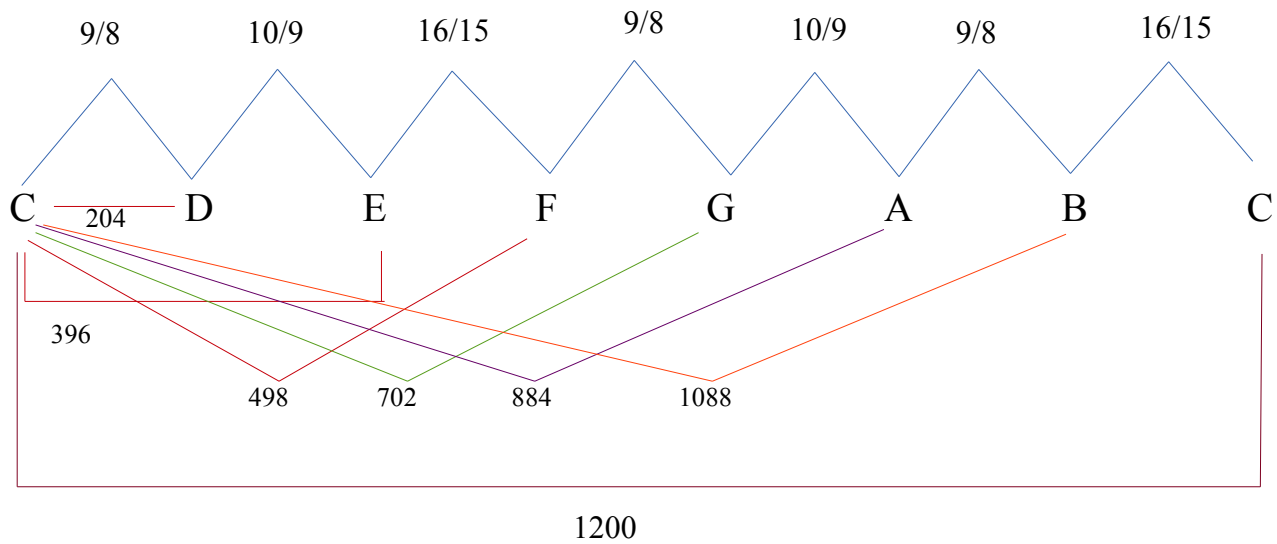
Difference between B# arrived at by twelve 5ths (702¢) and C arrived at by seven octaves (1200¢).

Comma = 24¢

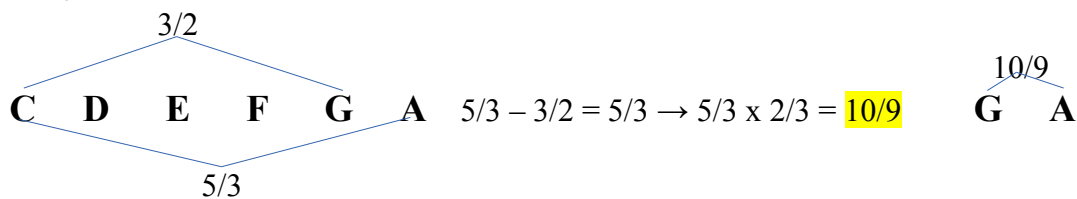
***Just Temperament***  
*Based on pure 5<sup>th</sup> plus pure 3<sup>rd</sup>*

**Relationship in ratios:**

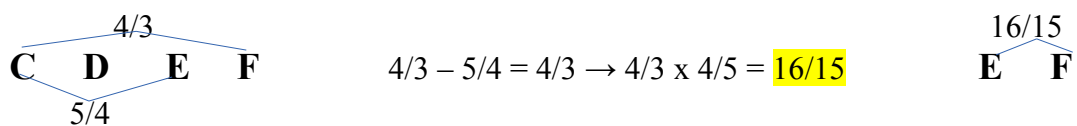
- OCTAVE: 2/1
- FIFTH: 3/2
- FOURTH: 4/3
- THIRD: 5/4
- MAJ SECOND: 9/8 (less preferred 10/9)
- MIN SECOND: 16/15



**Major Second: G-A**



**Minor second: E-F**



## Mean Tone Tuning

*Based on altering successive 5<sup>ths</sup> to get pure 3<sup>rd</sup>*

### Finding Pure 3<sup>rd</sup>:

- Spreading 1/4 Didymean Comma (80/81 or 22 cents) over each of the four 5<sup>th</sup>
- 1/4 of 22 cents is 5½ cents
- So each 5<sup>th</sup> is 696½ cents instead of 702 cents

Pythagorean: 702    702    702    702    = 2808

C        G        D        A        E

Mean tone: 696½    696½    696½    696 ½    = 2786

2768 – 2400 (two octaves) = 386

(Note: 2808 – 2786 = 22 cents too wide)

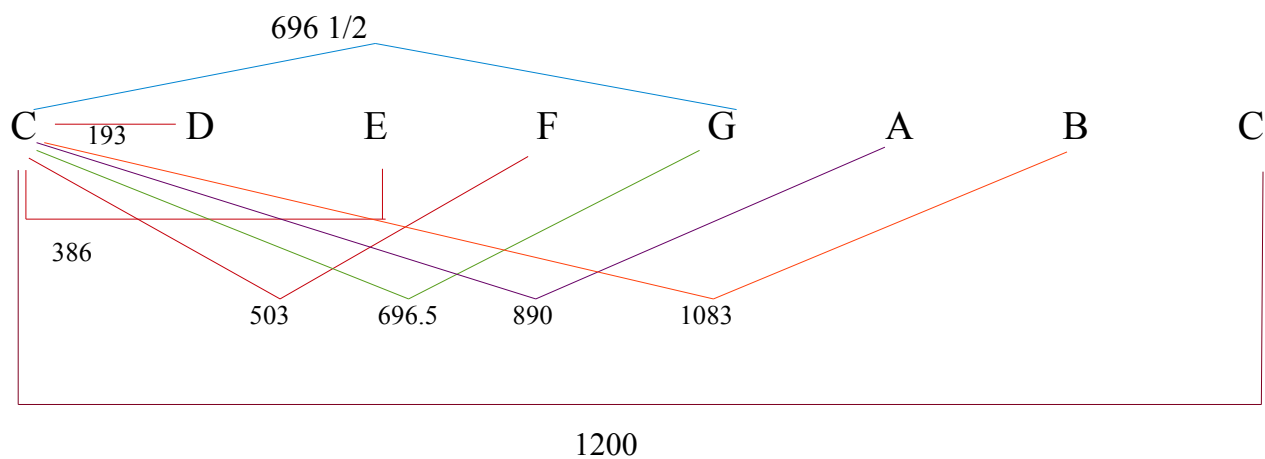
Pure 3<sup>rd</sup> = 386¢

OCTAVE: 1200¢

FIFTH: 696½¢

THIRD: 386¢

SECOND: 386/2 (meantone)\* = 193¢



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