

Day 25: Review

Wednesday, November 30, 2016

1:34 PM

- Most octave based top note = 2x pitch of bottom

Non: gamelan B-P tritone, African.

Just - frequency ratios - equal tempered
= even division

Pythagorean:

$$1 \quad \frac{4}{3} \quad \frac{3}{2} \quad 2$$

$$\textcircled{1} \quad \frac{4}{3} \times \frac{3}{2} = 2$$

$$1/4 \text{ ratio: } \frac{3}{2} \times \frac{3}{2} = \frac{9}{4} \quad (\frac{9}{4} > 2) \rightarrow \frac{9}{4} \times \frac{1}{2} = \frac{9}{8}$$

$$\frac{9}{8} \times \frac{3}{2} = \frac{27}{16}$$

$$\frac{27}{16} \times \frac{3}{2} = \frac{81}{32} \quad (\frac{81}{32} > 2) \rightarrow \frac{81}{32} \times \frac{1}{2} = \frac{81}{64}$$

$$\frac{81}{64} \times \frac{3}{2} = \frac{243}{128}$$

$$\textcircled{2} \quad T = \frac{9}{8}, \quad S = \frac{256}{243}$$

$$T \approx S^2 \quad T \neq S^2$$

Equal-tempered

$$S^{12} = 2$$

$$S = 2^{1/12} \quad T \approx S^2$$

Classical just:

$$1 \quad \frac{9}{8} \quad \frac{81}{64} \quad \frac{5}{4} \quad \frac{4}{3} \quad \frac{3}{2} \quad \frac{27}{16} \quad \frac{5}{3} \quad \frac{243}{128} \quad \frac{15}{8} \quad 2$$

$$\frac{81}{64} \approx \frac{80}{64} = \frac{5}{4}$$

$$\frac{27}{16} \approx \frac{25}{15} = \frac{5}{3}$$

$$\frac{243}{128} \approx \frac{240}{128} = \frac{15}{8}$$

Just intonation:

Hindi, bagpipe, portch

Transposition: Pythag:

$$\begin{array}{cccccccccccc} 1 & \frac{9}{8} & \frac{81}{64} & \frac{4}{3} & \frac{3}{2} & \frac{27}{16} & \frac{243}{128} & 2 \\ \text{C} & \text{D} & \text{E} & \text{F} & \text{G} & \text{A} & \text{B} & \text{C} \\ \text{T} & \text{T} & \text{S} & \text{T} & \text{T} & \text{T} & \text{S} & \\ \frac{3}{2} & \frac{27}{16} & \frac{243}{128} & 2 & \frac{9}{4} & \frac{81}{32} & \frac{81}{32} \times \frac{9}{8} & \\ \text{b} & \text{A} & \text{B} & \text{C} & \text{D} & \text{E} & \text{F\#} & \text{G} \\ \text{T} & \text{T} & \text{S} & \text{T} & \text{T} & \text{T} & \text{S} & \end{array}$$

Transposition: Classical just

$$1 \quad \frac{9}{8} \quad \frac{5}{4} \quad \frac{4}{3} \quad \frac{3}{2} \quad \frac{5}{3} \quad \frac{15}{8} \quad 2$$

$$\text{C} \quad \text{D} \quad \text{E} \quad \text{F} \quad \text{G} \quad \text{A} \quad \text{B} \quad \text{C}$$

$$\frac{3}{2} \quad \frac{3}{2} \cdot \frac{9}{8} = \frac{27}{16} \quad \frac{3}{2} \cdot \frac{5}{4} = \frac{15}{8} \quad \frac{3}{2} \cdot \frac{4}{3} = \frac{12}{6}$$

$$\text{G} \quad [\text{A\#?}] \quad \text{B} \quad \text{C}$$

Classical meantone:

$$\begin{array}{ccccccccc} 1^{\text{st}} & & 3^{\text{rd}} & & 4^{\text{th}} & & 5^{\text{th}} & & \\ \text{C} & \text{D} & \text{E} & \text{F} & \text{G} & \text{A} & \text{B} & \text{C} & \\ \hline \text{C} & \text{D} & \text{E} & \text{F} & \text{G} & \text{A} & \text{B} & \text{C} & \\ \hline \end{array}$$

$$S? \quad \frac{5}{4} \cdot S = \frac{5}{4} \cdot \frac{\sqrt{5}}{2} \cdot S = 2$$

$$S = \frac{8}{5^{3/4}}$$

$$T = \sqrt{\frac{5}{2}} \approx S^2$$

$$\text{G}: \frac{5}{4} \approx \frac{3}{2}$$

Chords (maj) thirds

$$1: \frac{5}{4} \quad 4:5$$

(maj) fifth

$$1: \frac{3}{2} \quad 2:3 \quad \text{or} \quad 4:6$$

(maj) triad

$$1: \frac{5}{4}: \frac{3}{2} \quad 4:5:6$$