

# Just Intonation with C as the Fundamental, P. Gallagher

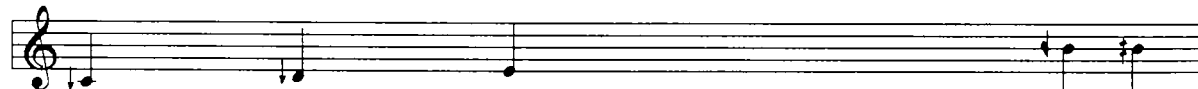
The harmony reflects an overtone series with C as the fundamental. Modal variants based on G, E, B $\flat$ , and D (the 3rd, 5th, 7th and 9th partials) are derived from the pitches present in the series on C. All intervals are just ratios - small number integer proportions - rather than the now standard equal temperament. The full range of inflection from most flat to most sharp is as follows:  $\flat$  (b)  $\flat\flat$  ( $\flat\flat$ )  $\natural$  ( $\natural$ )  $\sharp$  ( $\sharp$ ) but should not be interpreted as strictly linear divisions of the whole tone in equal temperament. In the end, the ear is the best judge, listening for the harmonic fusion that is characteristic of overtone tuning.

## Common Pitches



Partial (scale)	32	33	34	36	38	39	40	42	44	45	48	50	52	54	56	60
Partial (reduced)	1	33	17	9	19	39	5	21	11	45	3	25	13	27	7	15
Ratio to C	1:1	33:32	17:16	9:8	19:16	39:32	5:4	21:16	11:8	45:32	3:2	25:16	13:8	27:16	7:4	15:8
Hz	261.6	269.8	278	294.3	310.8	318.8	327	343.5	359.8	368	392.5	408.8	425.3	441.5	457.8	490.5
Cents from C	0	53	105	204	296	343	386	471	557	590	702	773	841	906	969	1088
Cents from E.T.	0	47<C#	5>C#	4>D	2<Eb	43>Eb	14<E	29<F	49<F#	10<F#	2>G	27<G#	41>Ab	6>A	31<Bb	12<B

## Additional Pitches



Partial	63	35	81	29	31
Ratio to C	63:32 (7:4:D)	35:32 (7:4:E)	81:64 (3:2:A, 9:8:D)	29:16	31:16
Hz	257.5	286.1	331	474.3	507
Cents from C	27<C	155	408	1030	1145
Cents from E.T.	27<C	45<D	8>E	30>Bb	45>B

## Series on C



Partial (scale)	8	9	10	11	12	13	14	15
Partial (reduced)	1	9	5	11	3	13	7	15
Ratio to C	1:1	9:8	5:4	11:8	3:2	13:8	7:4	15:8
Hz	261.6	294.3	327	359.8	392.5	425.3	457.8	490.5
Cents from C	0	204	386	551	702	841	969	1088
Cents from E.T.	0	4>D	14<E	49<F#	2>G	41>Ab	31<Bb	12<B

## Mode on G



Partial (scale)	24	27	30	33	36	39	40	42	45
Partial (reduced)	3	27	15	33	9	39	5	21	45
Ratio to G	1:1	9:8	5:4	11:8	3:2	13:8	5:3	7:4	15:8
Hz	392.5	441.5	490.5	539.5	588.5	637.5	654	687	736
Cents from C	702	906	1088	53	204	343	368	471	590
Cents from E.T.	2>G	6>A	12<B	47<C	4>D	43>Eb	14<E	29<F	10<F#

## Modes on E



Partial (scale)	40	45	50	56	60	66	72	76	20	21	24	27	30	32	36	38
Partial (reduced)	5	45	25	7	15	33	9	19	5	21	3	27	15	1	9	19
Ratio to E	1:1	9:8	5:4	7:5	3:2	33:20	9:5	19:20	1:1	21:20	6:5	27:20	3:2	8:5	9:5	19:20
Hz	327	368	408.8	457.8	490.5	539.5	588.5	620.2	327	343.5	392.5	441.5	490.5	523.2	588.5	620.2
Cents from C	386	590	773	969	1088	53	204	296	386	471	702	906	1088	0	204	298
Cents from E.T.	14<E	10<F#	27<G#	31<Bb	12<B	47<C#	4>D	2<Eb	14<E	29<F	2>G	6>A	12<B	0	4>D	2<Eb

## Mode on B $\flat$



Partial (scale)	14	16	18	20	22	24	25	27
Partial (reduced)	7	1	9	5	21	3	25	27
Ratio to B $\flat$	1:1	8:7	9:7	10:7	3:2	12:7	25:14	27:28
Hz	228.9	261.6	294.3	327	343.5	392.5	408.8	441.5
Cents from C	969	0	204	386	471	702	773	906
Cents from E.T.	31<Bb	0	4>D	14<E	29<F	2>G	27<G#	6>A

## Modes on D



Partial (scale)	36	81	45	50	54	56	64	68	18	81	21	24	27	28	32	34
Partial (reduced)	9	81	45	25	27	7	1	17	9	81	21	3	27	7	1	17
Ratio to D	1:1	9:8	5:4	25:18	3:2	14:9	16:9	17:9	1:1	9:8	7:6	4:3	3:2	14:9	16:9	17:9
Hz	294.3	331	368	408.8	441.5	457.8	523.2	556	294.3	331	343.5	392.5	441.5	457.8	523.2	556
Cents from C	204	408	590	773	906	969	0	105	204	408	471	702	906	969	0	105
Cents from E.T.	4>D	8>E	10<F#	27<G#	6>A	31<Bb	0	5>C#	4>D	8>E	29<F	2>G	6>A	31<Bb	0	5>C#

(1 cent = 1200th root of 2 = 1.0005778; difference in cents = log ratio/log 1 cent; log 1 cent = .0002509)