
# MUZIKA 432
# TRUE FOURTHS JUST TEMPERAMENT TUNING

## A NEW UNEQUAL,
## JUST TEMPERAMENT TUNING
## AT CONCERT PITCH A 432 HZ.

GORDANA CULIG MICETA

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healthy
rendezvous inc.

For my mother Mirjana,
who has been the wind under my wing,

and for my three sons, Stefan, Alexander and Maxim,
you guys never know, it could turn out to be an interesting read.

"Without music, life would be a mistake."

Friedrich Nietzsche

# *Contents*

A NOTE TO THE READER…

In this study a serious problem has presented itself concerning a lack of collective music terms which refer to the natural (un-altered) notes, CDEFGAB, in the various octaves; and a collective term for all sharps and flats, or any altered note, (#,b,x,bb). The choice was whether to borrow terms or create new terminology. It has been decided to borrow two terms, “diatonic” and “accidental”. These two terms each, within the confines of this study alone will have a specific meaning assigned, to facilitate the argument in this study. But the reader is reminded that the terms have different meaning and, again, have been borrowed only to be used with new assigned meaning within the confines of this study.

Diatonic tones: all natural (un-altered) notes, such as the CDEFGAB tones within the entire unequal, Just music system of Muzika 432 TFJTT 1st form and 2nd form.

Accidental tones: all sharps and flats, or altered notes (#,b,x,bb), whether represented separately or together as one tone in the entire music system of Muzika 432 TFJTT 1st form and 2nd form.

Just and True: are taken to mean intervals which are perfect, the waves match perfectly with no beats, and tones which are in positions to procure such intervals can be said to be True and Just also.

The chosen title of this newly discovered tuning includes the word “temperament” which means to alter in the history of music, to adjust and temper the tones to compensate for the Pythagorean comma. This newly discovered unequal, Just tuning at A 432 Hz, requires no tempering of the music tones, non what soever. But “temperament” has also come to mean generally speaking a different and new form of tuning, and it is in this more broad sense that it has been used in the title and the designated name of Muzika 432 True Fourths Just Temperament Tuning.

Appendix: an appendix at the end of the book has been added, page 111, with various translated music terms in English, French, German, Serbian and Russian. The reader is required to learn the music letter notes, such as CDEFGAB, which is the form used in this study.

## …WITHOUT THE MUSICIAN THERE IS NO MUSIC…

Music is a field of study reminiscent of a super nova, it is magnificent to behold and everywhere one's gaze turns leads to infinity. The Pythagoreans were wrong in using 3/2 as a generating factor in their system of tuning; we have been misled by their approach for over 2,500 years. I have discovered that the generating factor in calibrating all the music tones in an unequal, Just music system, with the starting tone of C 256 Hertz, is the 4/3 interval. This seems very simple at first glance, but to think that we have been stuck in the 3/2 quandary for so long, and to presently witness the Muzika 432 music system manifest with such simplicity and elegance when calculating with the generating factor of 4/3, is truly a wonder to behold!

Recently there has been a renewed interest in music tuning at the lower frequency of A 432 Hertz and C 128 Hertz. Historically this has been known as the “philosopher’s C”, “scientific pitch” or “Verdi pitch”. Our own time, like that of the 16th century, is experiencing a search for a new music tuning closer to the ancient ideal. The ancients claimed that pure intervals gave music power to transform and uplift the human being both physically and spiritually. A new unequal, Just tuning at A 432 Hertz has been discovered, Muzika 432 True Fourths Just Temperament Tuning. This tuning may be found here, complete in its two forms, on page 16 and page 18 respectively. It is my belief that this newly discovered system of tuning, in its first form, may have been known to certain ancient high cultures such as the “Raseni” (Etruscans), as well as the ancient civilizations of the “Винча” (Vincha), “Лепенски Вир” (Lepenski Vir) and the ancient Egyptians. Muzika 432 True Fourths Just Temperament Tuning has re-established a living connection between our present and our most ancient past.

The key to calibrating the entire unequal, Just music system of tuning at A 432 Hz, is the 4:3 ratio. Using 4/3 as the generating factor, beginning with C 256 Hz, we can compute all the diatonic and accidental tones of the entire music system. The first form of Muzika 432 True Fourths Just Temperament Tuning, found on page 16, computes all the accidentals as one tone. In the 4th octave C is 256Hz, C#/Db 269.66 Hz, and D 288 Hz; thus, the accidental is represented as one tone. In using this form of calculation, with the generating factor of 4/3, the accidentals progressively go out of tune after the 4th octave. Therefore to rectify this problem the accidentals for Muzika 432 in the first form are computed via the Harmonic Mean formula ( 2(ab)/a+b ), making C#/Db 271.05 Hertz. In the second form of Muzika 432 found on page 18, the same music system becomes more elaborate and we have for example in the same 4th octave C 256 Hz, C# 270 Hz, Db 273.06 Hz, and D 288 Hz; as is evident, there is a separate tone for the sharp and another tone for the flat.

In the first chapter of this book, the reader is introduced to the new Muzika 432 True Fourths Just Temperament Tuning music system, complete in its two forms. This is the very core of the argument and the mathematics are meant to stand alone as proof of the validity of this system of tuning. This book has been arranged in such a way so that the reader may follow comfortably through the entire first chapter. Once the mathematics are clear, the rest of the book becomes a brief peek into our music history. Chapter II elaborates on the technical problems which arise in using the Pythagorean approach, and the Pythagorean generating factor of 3/2. The next chapter briefly examines the starting frequency of C 256 Hz, and chapter IV takes a brief look at the “Harmonics” of Claudius Ptolemy. Chapter V explores the colour spectrum and its relation to Muzika 432, chapter VI comments on the Baroque period, and chapter VII takes us through a brief analysis on the meaning of ‘dissonance’ in the philosophy of Nietzsche. In chapter VIII a new interpretation is introduced of the “Djed”, an ancient Egyptian symbol.

In this study, the “Djed" has been interpreted as representing four in its 4 bars and three as in the 3 spaces, the 4/3 generating factor of the entire music system in plain view. In the “Djed" we see the colours of the light spectrum in perfect sympathy with this music tuning, representing A 432 Hz for Red light, D 576 Hz for Green light and G 768 Hz for Violet light, and always in this order; thus we see the 4/3 interval represented by the “Djed". In the ancient language of the Egyptians “Djed" meant ancestor and was represented as the pillar of humanity, associated with the god Osiris and the goddess Ma’at. The ancient Egyptians relay a clear message that the “Djed" is connected to the very source of morality and ethics in the human being, but also to a cosmic energy and force reshaping chaos into civilized form. With the tones of Muzika 432 TFJTT in its first form an effort is made at deciphering the tones of some of the ancient modes while at the same time an attempt is made to illustrate that the letters designating these tones belong to both the Raseni (Etruscan) script and the “Винча” (Vincha) script.

However we name the harmonic phenomenon in music, whether Just, pure or True; from ancient times to the present Just meant that the musical intervals sounded pleasant and contained only simple ratios. When music tones do not coincide in perfect intervalic fashion the waves interfere with each other, we hear this as howling or a “wa-wa-wa” sound and call this phenomenon “beats”, and “dissonance”. We use these “beats” to measure the amount of dissonance; few beats per minute being acceptable and considered less dissonant. Irritability, aggression, stress, perhaps even fear may describe the feelings evoked in human beings when they experience dissonance. Maria Renold tells us that she discovered her “Twelve Fifth-Tones Scale” at C 128 Hz, of the chromatic scale in 1962 by ear and since then mathematically and acoustically set all the tones. She cites Plato’s

“Timaios” and the “Introductione Arithmetica” by the neo-Pythagorean Nicomachos of Gerasa, as her ancient sources. The diatonic tones she computes via the 3/2 interval, the sharps/flats Maria Renold computes by using the Geometric Mean formula, the square root of the two adjoining notes multiplied, $\sqrt{ab}$. She creates a combination of unequal intervals in reference to the diatonic tones at A 432 Hz, and equally spaced segments with reference to the sharps/flats. She expounds her music system in the original work in german, “*Von Intervallen, Tonleitern,* Tönen und dem Kammerton C=128 Hz”, and the english translation, “Intervals, Scales, Tones and the Concert Pitch C=128 Hz”. Maria Renold’s tuning is very close to Muzika 432 True Fourths Just Temperament Tuning in its first form, the difference being the generating factor of 4/3 and the accidentals are generated via the Harmonic Mean, 2(ab)/a+b. Both music systems compute from the lower starting position of C 256 Hz or A 432 Hz.

One of the most fascinating findings of Maria Renold’s various experiments while travelling throughout Europe and introducing audiences to her new tuning concerns her observations in the different responses people had to music played at her tuning, and music played at Equal Temperament tuning at A 440 Hz. Her results seem to provide supporting evidence to the ancient claim that music is capable of both ethically enhancing as well as ethically degrading human character. Her results showed the majority of people feeling calm and rejuvenation to music played in her tuning, while they felt stress and feelings of aggression when listening to music tuned to Equal Temperament at A 440 Hz. The people who preferred music tuned at Equal Temperament at A 440 Hz found such music stimulating and pleasantly aggressive, while they found music played at Maria Renold’s tuning at A 432 Hz, boring and sedate. She reports her findings in detail in her book cited above, notice that Maria Renold uses the generating factor of 3/2 and uses ancient sources to validate her discovery, also it should be reiterated that her discovery was found first by ear. Had Maria Renold been born during the early Baroque period of Vincenzo Galilei and Gioseffe Zarlino her system of tuning would have been adopted for it is mathematically and acoustically sound. As for our time, it came too late, it should have entered the scene just before 1939 in London England, when Equal Temperament tuning at A 440 Hz was proclaimed the international standard.

The use of the 4/3 as the generating factor reveals an entire music system, establishes all diatonic and accidental tones and reveals that one part of the entire system is perfect (lower octaves of 1,2,3 and 4), while the remaining, smaller part is less perfect (higher octaves of 5,6 and 7), where the accidentals progressively go out of tune. This observation explains certain "ancient" music terms which otherwise just simply do not make any sense. The descriptive "ancient" music terms in question are the συστημα τελιον μειζον (sustema telion meison), usually translated as the "Greater Perfect System", but we could also understand it as the greater tiled or stacked system. Then there is the συστημα μεταβολον (sustema metabolon) usually translated as the "Lesser Perfect System" ; "meta" meaning after and "bolon" has a negative connotation, διαβολος meaning to slander or defame. We can surmise that there is something wrong with this section of the system and must be adjusted in some way. Together the two systems are called the συστημα αμεταβολον (sustema ametabolon), usually translated as the "Immutable System", meaning something unchanging over time. We shall see in chapter IV that Claudius Ptolemy, the Alexandrian scientist and philosopher of the first and second century A.D., suggests that a tradition has been passed down to his time stating that the "ancients" had a much more elaborate system of music. When the word "ancient" is placed in quotation marks, this is to indicate that the ancients in question predate the ancient Greeks and Romans. When we look at Muzika 432 in its first form, we see clearly that the accidental tones go out of tune progressively in the last three highest octaves, 5, 6 and 7; but all the diatonic and accidental tones in the first four lowest octaves, 1, 2, 3 and octave 4, remain perfectly in tune. Therefore, the perfect section of the music system is larger, the lesser-perfect is smaller and the accidentals must be adjusted in the second lesser-perfect to be in tune; together the system is immutable. When we look at all the tones generated via the 4:3 ratio in the chart on page 16, the "ancient" music terms of the "Greater Perfect System" and "Lesser Perfect System" finally make sense.

From the fall of the Raseni (Etruscans) throughout our history to the very present, we have been entangled within the Pythagorean approach to calculating the intervals and tones of our music system, so much so that we have strayed away from the natural starting point of C 256 Hz or A 432 Hz, and adopted a much higher tuning at A 440 Hz. Additionally, we have adopted an Equal Temperament tuning, even though the glory of our Classical period in music attested to the fact that we needed to preserve the unequal form of the various music scales, which give to the music keys their unique character, colour and feeling. From the early Baroque period through the Classical period in music we see dozens of tuning temperaments created as Mean-tone Temperaments and Well Temperaments, such arduous attempts to find that perfect balance between perfect intervals and all the music tones never quite ceased. The reason for the difficulty was the Pythagorean approach and using the 3/2 as the generating factor. Finally, with Muzika 432 and the dawn of our new age the circle has closed with the discovery of the generating factor 4/3, which, when applied, brings to life the entire music system, all of the chromatic tones in their unequal, Just and perfect intervalic form.

This brings us back again to the question of whether we need a new unequal, Just music system at all, and why we would not be endlessly happy with Equal Temperament at A 440 Hz., or the various historical temperament and tunings we have, or the system of Maria Renold, the "Twelve Fifth-Tones Scale". This study, in other words, provides an answer to just this question. As the reader slowly ventures through this study there will be ample time to understand and decide. The final and most decisive step is to try this new unequal, Just temperament and tuning at A 432 Hz and experience this new dimension in music. Music history, music theory, the physics of music, anything to do with music for that matter, requires great effort and time in serious study. For most of us when we first approach this topic we become immersed in a storm of beauty and mysterious complexity, not knowing where to turn; and when we do step forward we find that we have embarked on an endless path. How do we venture through this labyrinth? We do so as we do in life, we try our very best and go forward intelligently and bravely. This is our journey, our history, our gift from the universe.

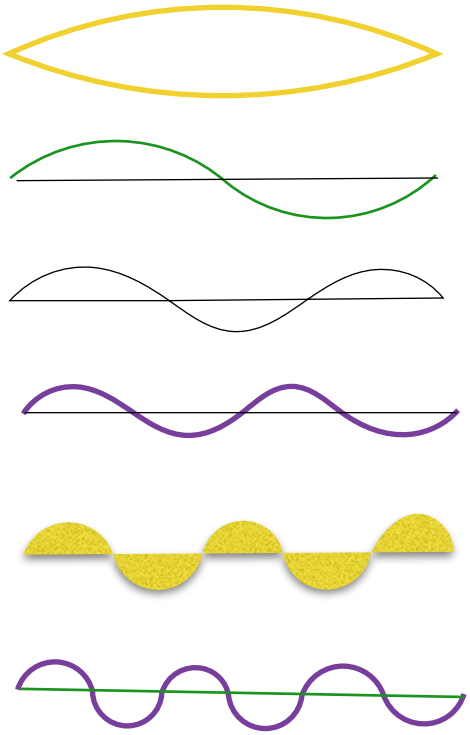
The Muzika 432 True Fourths Just Temperament Tuning music system is beautiful in the simplicity it portrays, the intervalic purity, the sympathy with the harmonic series and connection to our most ancient past, the adaptability to our music theory, and the pleasing consonant musical tones and perfect intervals. We need not be divided in our tastes, we can beg to differ, we can be gracious and benevolent, we can be all encompassing. There is still so much to be done, every aspect of music is absolutely inexhaustible. This has truly been a most thrilling adventure. I thank my readers for sharing a part of this journey with me and I hope I will not disappoint my readers in any way. What is most wondrous is that it all comes down to you, tuning your instrument and playing, while all the heavens, and all of nature, willingly, bow down, before you.

Гордана Чулиг Мичета

Gordana Culig Miceta

Grimsby, June 26, 2017

1:1…2:1…3:2….4:3….5:4…..6:5…..



These overtones, or more correctly, “higher-partial-tones”, are described as intervals or ratios; the first being the back and forth movement 1:1 called the unison and the second the doubling or octave at the ratio 2:1. If you look in the diagram you will see a two dimensional visual, 3:2 we call the perfect 5th, it has 3 loops and 2 crosses; then the perfect 4th as 4:3 has 4 loops and 3 crosses, 5:4 ratio or major third has 5 loops and 4 crosses and 6:5 ratio the minor third has 6 loops and 5 crosses and so on to infinity. Notice that the perfect 5th (third wave down or 3rd harmonic), and perfect 4th (fourth wave down or 4th harmonic), are quite different, ( if played a fifth interval up sounds the same as its reflecting fourth down, the tone is the same only the pitch is different )!

When we pluck a string for example, we hear all the overtones which go to infinity but we eventually stop hearing the effect of the sound. Above is a two dimensional demonstration but in nature the waves are in three diminutional real space and they go on to infinity. The harmonic series overtones give music its substance, its richness, what distinguishes the same sound of a violin to one of a flute for example. Listed in order from the top in the figure above the unison 1:1, the octave 2:1, the perfect 5th 3:2, the perfect 4th 4:3, the major 3rd 5:4 and the minor 3rd 6:5 ratio. “Overtones” or more precisely “higher-partial-tones” were first discovered and described by Hermann Von Helmholtz, in the original german, in “On the Sensations of Tone as a Physiological Basis for the Theory of Music”.

Lets take C7 2048 Hz and go through the harmonic series to test all the intervals and compare the results. The harmonic series begins with unison which is 1:1, the next interval is the octave or 2:1, 2048 x 2/1 = 4096 C8, this is correct, as can be seen there is a doubling effect in the harmonic series; the next ratio is the perfect 5th or 3:2 ratio, sometimes we call it the third harmonic. Lets see if this interval is perfect, 2048 x 3/2 = 3072 G7, yes it is perfect. The next harmonic is the 4:3 ratio, the perfect 4th, lets test this interval, 2048 x 4/3 = 2730.66 F7, this interval is also perfect. Lets continue then with 5:4, 6:5, 7:6 and so on and see how the results relate to our Just music system.

| C7 | | D7 | | E7 | F7 | | G7 | | A7 | | B7 | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2048 | 2168.47 | 2304 | 2439.52 | 2592 | 2730.66 | 2891.29 | 3072 | 3252.70 | 3456 | 3659.29 | 3888 | 4096 |

1. 2048 x 2/1 = 4096
2. 2048 x 3/2 = 3072
3. 2048 x 4/3 = 2730.66
4. 2048 x 5/4 = 2560
5. 2048 x 6/5 = 2457.6
6. 2048 x 7/6 = 2389.33
7. 2048 x 8/7 = 2340.57
8. 2048 x 9/8 = 2304
9. 2048 x 10/9 = 2275.55
10. 2048 x 11/10 = 2252.8
11. 2048 x 12/11 = 2234.19
12. 2048 x 13/12 = 2218.66
13. 2048 x 14/13 = 2205.53
14. 2048 x 15/14 = 2194.28
15. 2048 x 16/15 = 2184.53
16. 2048 x 17/16 = 2176
17. 2048 x 18/17 = 2168.47
18. 2048 x 19/18 = 2161.77
19. 2048 x 20/19 = 2155.78
20. 2048 x 21/20 = 2150.4
21. 2048 x 22/21 = 2145.52
22. 2048 x 23/22 = 2141.09
23. 2048 x 24/23 = 2137.04
24. 2048 x 25/24 = 2133.33
25. 2048 x 26/25 = 2129.92
26. 2048 x 27/26 = 2126.76
27. 2048 x 28/27 = 2123.85
28. 2048 x 29/28 = 2121.14
29. 2048 x 30/29 = 2118.62
30. 2028 x 31/30 = 2116.26
31. 2048 x 32/31 = 2114.06
32. 2048 x 33/32 = 2112

The intervals 2/1, 3/2 and 4/3 all generated perfect tones. Lets look at the 5:4 ratio, what we call the major 3rd, it does not generate in this case a perfect interval; but descending C 2048 x 4/5 = 1,638.4, this is Ab in the 6th octave, is a perfect interval. The interval 6/5 generated ascending Eb in the 7th octave at 2,457.6, is a perfect interval (check chart on page 18); thus

we see that 4/5 and 6/5 are refections of each other like the intervals 3/2 and 3/4, the main difference being that 5:4 and 6:5 generate accidentals,

Muzika 432 True Fourths Just Temperament Tuning, A 432 Hz

| C5 | | D5 | | E5 | F5 | | G5 | | A5 | | B5 | C6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 512 | 542.11 | 576 | 609.88 | 648 | 682.66 | 722.81 | 768 | 813.17 | 864 | 914.82 | 972 | 1024 |
| 540 | 546.12 | 607.50 | 614.40 | | 720 | 728.16 | 810 | 819.20 | 911.20 | 921.60 | | |

——Muzika 432 TFJTT diatonic tones
——Muzika 432 TFJTT accidentals, calibrated via the Harmonic Mean
——Muzika 432 TFJTT accidentals, separate tone for each sharp and flat

Equal Temperament at A 432 Hz

| C5 | | D5 | | E5 | F5 | | G5 | | A5 | | B5 | C6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 513.74 | 544.29 | 576.65 | 610.94 | 647.27 | 685.76 | 726.53 | 769.74 | 815.51 | 864 | 915.38 | 969.81 | 1027.47 |

——Equal Temperament concert pitch A 432 Hz, diatonic tones
——Equal temperament A 432 Hz accidentals

Equal Temperament at A 440 Hz

| C5 | | D5 | | E5 | F5 | | G5 | | A5 | | B5 | C6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 523.25 | 554.37 | 587.33 | 622.25 | 659.25 | 698.46 | 739.99 | 783.99 | 830.61 | 880 | 932.33 | 987.77 | 1046.5 |

——Equal Temperament concert pitch A 440 Hz, diatonic tones
——Equal temperament A 440 Hz accidentals

Above is a demonstration of Equal Temperament at A 440 and A 432, of all chromatic tones in the 5th octave from C5 to C6, and an example of our Just system, Muzika 432 TFJTT, also in the 5th octave from C5 to C6, showing all diatonic tones, all accidentals computed via the Harmonic Mean, and all separate accidentals showing individual sharps and flats. Notice how the natural intervals are disrupted when comparing our Just system at the top with the two examples of Equal Temperament below.

We have seen that the natural phenomenon of the Harmonic Series seems to influence what sounds consonant to us and what sounds dissonant, in other words there seems to be a natural human reaction to the octave, the perfect 5th, the perfect fourth, and perhaps the perfect 3rd intervals of the Harmonic Series, which causes humans to both identify these intervals but also experience them as pleasing. We have also seen that it does matter which starting frequency we choose, our C6 at 512 Hertz should be considered as the prime tone from which we orient ourselves, this includes all the other octaves of C from C1 at 32 Hz, C2 at 64, C3 at 128 and C4 at 256 and so on. The claim that musical taste is a learned response has insufficient factual evidence. There is far more evidence supporting the claim that there is a natural element to our taste in music, connected to the natural phenomenon of the harmonic series, but also connected to the tone C as prime. The tone C represents musically the colour yellow in our natural light spectrum, the colour of our sun. There is also archeological evidence, as well as evidence in present day experience that we naturally find the C tone by ear; for example, when someone builds a flute from reeds who has no musical knowledge, they tend to naturally find this C tone at 128 or 256 Hz.

The chart below shows the music frequencies from A4 to G5 of the MUZIKA 432 TFJTT music system, notice that the music frequencies coincide perfectly with the light spectrum.

| | | |
|---|---|---|
| Red | (A4 432 Hertz) 380-460 Terahertz | MUZIKA 432 |
| Orange | (B4 486 Hertz) 460-510 Terahertz | Diatonic Scale: |
| Yellow | (C5 512 Hertz) 510-530 Terahertz | from A4 432, |
| Green | (D5 576 Hertz) 530-600 Terahertz | B4 486, C5 512, |
| Blue | (E5 648 Hertz) 600-650 Terahertz | D5 576, E5 648, |
| Indigo | ( F5 682.66 Hertz) 650-700 Terahertz | F5 682.66, |
| Violet | (G5 768 Hertz) 700-790 Terahertz | and G5 768 |

When you convert Hertz, say 768, to Terahertz you multiply by 10 to the power of 12, for example,

$$768 \text{ Hertz} \times 10^{12} = 768 \text{ Terahertz}$$

Chapter II

PYTHAGOREAN CIRCLE OF FIFTHS

4,151.85 : 4096 is the Pythagorean comma

⬇

Should be: $C_8$ 4096 Hz

2,767.9 x 3/2 = 4,151.85 ? $C_8$
(C Just is 4096 Hz, there is
a difference of 55. 85 Hz. )

1,845.27x 3/2 = 2,767.9 ? $F_7$

1,230.18 x 3/2 = 1,845.27 ? $Bb_6$

820.12 x 3/2 = 1,230.18 ? ? $Eb_6$

546.75 x 3/2 = 820.12 ? $Ab_5$

$C_1$ 32 x 3/2 = 96/2 = 48 $G_1$

48 x 3/2 = 144/2 = 72 $D_2$

72 x 3/2 = 216/2 = 108 $A_2$

108 x 3/2= 324/2 = 162 $E_3$

162 x 3/2 = 486/2 = 243 $B_3$/$Cb_3$

243 x 3/2 = 729/2 = 364.5 ? $F_4$#/$Gb_4$

364.5 x 3/2 = 546.75 ? $C_5$#/$Db_5$

⬆

In the above demonstration we see how we eventually overshoot the intended high C tone, multiplying continuously by the perfect fifth or 3:2 ratio. We start from the right moving clockwise. The question marks indicate a problem occurring in the calculations, where the results are off or out of tune. The final result is compared with the Just $C_8$ tone at 4096 Hz. The result of the multiplication with the 3/2 interval, compared to what should be the correct tone 8 octaves higher, is what is called the Pythagorean comma.

That the Pythagoreans made the mistakes they had and chose their particular approach is perhaps more clear at this point and quite obvious that this was easily done, for their method yielded some good results. As has been demonstrated above, often it was the mathematics which were misleading. This was the very crux of the problem, the fact that there were only some good results, leaving us with a number of conundrums to battle and solve in a myriad of creative ways. Anyone who has taken the time to look at the vast number of Mean-tone Temperaments and Well Temperaments, created from the 16th century on through to the present, is witness to the gruelling work, persistence and creative brilliance involved in forever trying to resolve the Pythagorean comma dilemma by creating finer and finer temperament and tuning systems which approached the ancient ideal of perfect Just intervals. The Pythagorean approach needed to be abandoned, completely, and as we have demonstrated, a completely new approach had to be attempted, using the 4:3 ratio to compute all the music tones, unraveling and making manifest the entire Just chromatic music system.

## Chapter III Why 432?

As we have seen in our comparison with the light spectrum, the tone A at 432 Hz, is equivalent to the spectral frequency of red, but this is not the orienting frequency in our music system but rather C at 512 Hz corresponding to the spectral colour yellow, the colour of our life giving sun. There is good reason for this, for if we use the number one as a starting point, we have hit right on the correct Just frequency of the musical tone C or "do", we may only be able to hear the frequency at 16 Hz or higher, nevertheless we can feel frequencies if we cannot hear them. For example, 1…2…4…8…16…32….64…128…256…512, we see that $C_1$ is 32 Hz, $C_2$ is 64 Hz and so on through the Just C octaves until we reach the highest tone of the piano, the $C_8$ at 4096 Hz. It is this C or "do" tone at 128 or 256 Hz that should be considered as the foundation or starting frequency in calibrating all of the Just tones using our 4:3 ratio.

Where we start and what particular frequency we choose as our starting point in calibrating the entire Just music system, makes all the difference in the world. It must be noted also that although the Schumann frequency is at 7.83 Hz, it is merely close to 8 Hz, and that the Schumann resonance can vary slightly may suggest that it may go up to 8 Hz at times. Nevertheless it is most fascinating how much this frequency is tied to our wellbeing, and if disrupted, which is so easily done in our present world, how quickly and drastically our health is adversely affected. No one today can afford to take this matter lightly. The Schumann resonance is the measure of extra low frequency (ELF), which are global electromagnetic resonances generated by lightning discharges between the surface of the earth and the earth's ionosphere.

When W.O.Schumann, who was a professor of physics at the University of Munich, published his findings in the journal , " Technische Physik", Dr. Ankermueller made the connection between the Schumann resonance and the rhythm of brain waves. The earth was found to have the same natural resonance as the human brain. He contacted Schumann who assigned Dr. König to look into the matter, and the latter found that when comparing human EEG recordings with natural electromagnetic fields there was a correlation, between the Schumann resonance and human brain rhythms.

## Chapter V The Colour of Music

Is there such a thing as a colour palette to our music scales and chord progressions and do the different keys correspond to different spectral colours? We can also say perhaps that what makes one scale different than another can be associated with the different colours in light. Can we sense the difference in the feelings evoked within us of different musical keys? The answer is a tentative yes, and the final word is for the musician to decide and each individual as to whether they actually feel such differences and find them pleasing and rejuvenating. We seem to be divided, some people seem to prefer music played at Equal Temperament at A 440 Hz, they find this music stimulating, energizing and pleasing, and these same people find music played at unequal, Just temperament A 432 Hz boring, too calm, and rather sedate. Others on the other hand who prefer music played at the unequal, Just temperament A 432 Hz, find such music alive, empowering, rejuvenating and calming; these same people also find music played at Equal Temperament at A 440 Hz, aggressive, irritating, disturbing and stress inducing. This was one of the great achievements of Maria Renold who travelled all over Europe conducting experiments with people, exposing them to music played at Equal Temperament at A 440 Hz and her own Just temperament at A 432 Hz. Her findings were astounding, people were quite distinctly divided in their preference.

Thus we seem to be divided in our tastes and preferences, which brings us to the question of the ancients and their belief in music's ability to affect a person's character. Is there any truth to the ancient Greek polemic between the "kithera" and the "aulos" and the Greek decision that the stringed kithera was superior? We can answer that question by referencing our harmonic series and showing that string instruments produce a richer sound because they encompass all of the overtones of the harmonic series, in the above example this would mean the "kithera", while the "aulos" or similar flute instruments would have only a limited amount of overtones. Our different key scales today resemble what the ancients called the "modes" in music; authors greatly differ in their determination of what these ancient modes may have been exactly, they include primarily the Lydian, Phrygian and Dorian modes.

A Comparison Between the Light Spectrum and Our Just Music Tones

| | | |
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| Red | (A4 432 Hertz) 380-460 Terahertz | MUZIKA 432 |
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When you convert Hertz, say 768, to Terahertz you multiply by 10 to the power of 12, for example,

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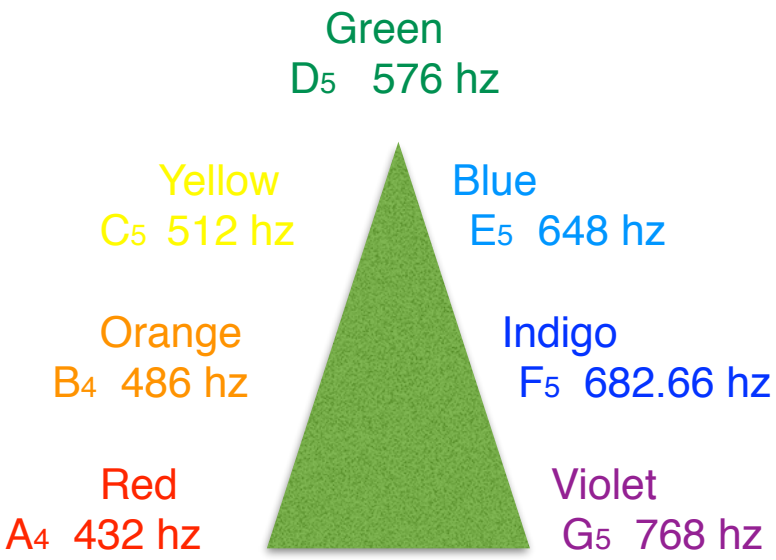


In the above demonstration we are reminded of the light spectrum colours and the corresponding music Just tones, and in this comparison the assertion is made that the music tones evoke similar feelings, and have similar effects to that of the different colours, that is to say, waves or frequencies of our light spectrum. If we try to visualize the music tones and

has all perfect intervals and when we play this chord the feelings which it evokes are of imposing danger, fear, and at best apprehension. We finally come to the tone G represented by the spectral colour violet. The tone G like the light frequency of violet is the coldest colour in the spectrum, it is the tone of pure spirituality devoid of all earthly life, the human soul after it has been released from its earthly body. It is a happy key, as there is nothing to fear in death and this new state of being, G major is very reminiscent of the C major key, its only when we play the G major chord and then the G minor chord after it do we notice some finality, a sense that this is it, there is no turning back to life.

Lets turn now to some music scales to serve as an example and see if the colours of our light spectrum could help us understand why our music scales sound different, how each may have a unique character and how different feelings may be evoked. We have below and examples of some major scales and their natural relative minor scale, we include the Harmonic minor but not the Melodic minor scales. All the tones are designated their respective colours, and the sharps and flats are also represented in the corresponding colour.

| | | |
|---|---|---|
| C major scale<br>C D E F G A B | A minor scale<br>A B C D E F G | A minor harmonic<br>A B C D E F G# |
| G major scale<br>G A B C D E F# | E minor scale<br>E F# G A B C D | E minor harmonic<br>E F# G A B C D# |
| D major scale<br>D E F# G A B C# | B minor scale<br>B C# D E F# G A | B minor harmonic<br>B C# D E F# G A# |
| A major scale<br>A B C# D E F# G# | F# minor scale<br>F# G# A B C# D E | F# minor Harmonic<br>F# G# A B C# D E# |
| E major scale<br>E F# G# A B C# D# | C# minor scale<br>C# D# E F# G# A B | C# minor harmonic<br>C# D# E F# G# A B# |

The colours of the tone plus sharp is left for the reader to imagine the two colours mixing, as G# above would be Violet plus a bit of Red making the colour Magenta, a vibrant pink; or F# the indigo with some violet making an

## Chapter VIII The Djed of Ancient Egypt

For all civilizations both modern and ancient, Egypt has been an endless source of mystery and inspiration. Modern archeologists are discovering a much older ancient Egypt than we ever imagined.[1] Even Alexander J. Ellis who translated into English “On the Sensations of Tone” by Herman Von Helmholtz, commented in a footnote in Chapter XIV of this book, that a flute was found in the royal tombs at Thebes, which gave an almost perfect scale of semitones, and that representations of such flutes are to be found in“the very oldest Egyptian monuments”.[2] Judging by the extant evidence of ancient Egyptian archeological remains we see a myriad of instruments from what looks like the “aulos” to the single flute, tambourines of different shapes and sizes, to a hand held lyre type instrument and large harps as tall as the individual holding it or taller. We see all sorts of percussion instruments, as well as such strange instruments as the sistrum. How are we to believe that these ancient Egyptians had no system of music theory before Pythagoras. The “aulos" players for all ancient Egyptian and Raseni (Etruscan) extant examples not only portray the “aulos” as two flutes but as much shorter and thus more practical than the ancient Greek “aulos”, and as the latter had straps attached to the head to secure the long flutes to the mouth, this is the case only with the ancient Greek examples and not the others.

The question we would like to bring forward in this study does not concern different types of musical instruments so much as it involves the actual calibration of the musical tones. Is it possible that the ancient Egyptians may have had the knowledge needed to calibrate the Just music system, the knowledge of the 4:3 ratio? Is it possible that this knowledge was lost as the ancient Egyptians were conquered and absorbed by other nations such as the ancient Greeks, the ancient Romans and others, and is it possible that the clues to this knowledge remains, still today, in plain site.

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[1] Many authors today from archeologists, historians, engineers and geologists are bringing forward evidence in support of the premise that the age of ancient Egypt goes much further back in time, up to 26,000 years B.C.

[2] Herman Helmholtz, On the Sensations of Tone. Trans. by Alexander J. Ellis, (New York: Dover Publications 1954), republication of the second 1885 edition; this text is still actively used at the university level. Ellis explains this point in a lengthy footnote on page 271.

the entire Just music system. Can the ancient Egyptians be saying that music calibrated via the 4:3 ratio, the Just music system, is the basis of human morality and ethics, can this be the true meaning of the ancient Egyptian symbol of the “Djed"?

The reader will remember that this is the order of our colours that make up white light, red-green-violet. In the representations of the “Djed" indigo or blue is used most likely because semi-precious stones in violet are very rare so blue stones are used instead. The “Djed" is relaying to us the message of the colour spectrum, from these spectra all the others are made. But why must the four bars stand or jut out and why four? The reason is that our light spectrum is intimately related to our musical tones, red being A at 432 Hz, green being D at 576 Hz and violet represented as indigo/violet being G at 768 Hz. The “Djed" does seem to indicate, the importance of the number 4 as in numbering the musical scale in fours, and 3 is specifically associated with the three colours in between the four bars; the 4 bars embracing the 3 spaces of colour frequencies. We know very well the ancients organized their music into tetrachords, groups of 4 notes or tones. The four bars of the “Djed" are very obvious and suggest a specific emphasis on this number 4, and again the 4 bars embracing the 3 spaces, specifically three colours are represented, and in a specific order, the order of the light spectrum, the three primary colours of the light spectrum. The key to unraveling the entire music system the 4/3 interval, 4 bars and the 3 spaces, is clearly seen in the form of the ancient Egyptian symbol of the “Djed”.

The meaning of the word “Djed” goes back to the ancient language of the Egyptians, meaning ancestor [3]; interestingly enough,only in present day Serbian, does the word “Djed", “ Ђед” mean grandfather, and this letter “Ђ “ in fact the very shape of this letter resembles the “Djed". What is also most fascinating is that the meaning has not changed from ancient Egypt to

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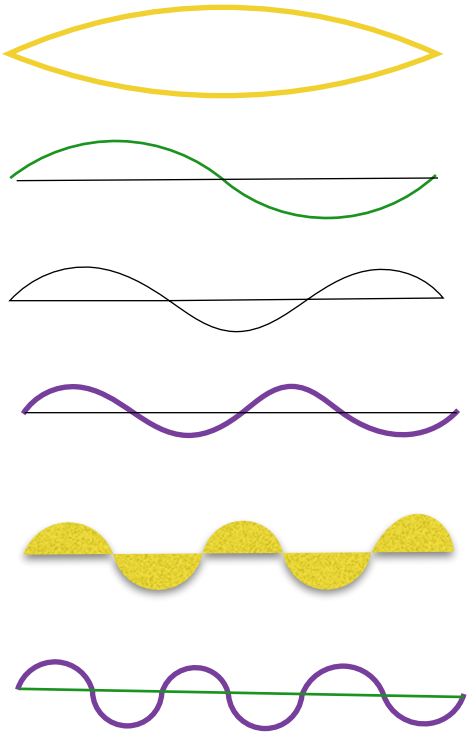
[3] Carmen Boulter, *The Pyramid Code, in the documentary, episode one, ABD’EL HAKIM AWYAN, (an archeologist trained in the west, and an Egyptian Indigenous Wisdom Keeper), explains the meaning of the “Djed “ is, ancestor, in the ancient language of the Egyptians.*

1:1…2:1…3:2….4:3….5:4…..6:5…..



These overtones, or more correctly, “higher-partial-tones”, are described as intervals or ratios; the first being the back and forth movement 1:1 called the unison and the second the doubling or octave at the ratio 2:1. If you look in the diagram you will see a two dimensional visual, 3:2 we call the perfect 5th, it has 3 loops and 2 crosses; then the perfect 4th as 4:3 has 4 loops and 3 crosses, 5:4 ratio or major third has 5 loops and 4 crosses and 6:5 ratio the minor third has 6 loops and 5 crosses and so on to infinity. Notice that the perfect 5th (third wave down or 3rd harmonic), and perfect 4th (fourth wave down or 4th harmonic), are quite different, ( if played a fifth interval up sounds the same as its reflecting fourth down, the tone is the same only the pitch is different )!

When we pluck a string for example, we hear all the overtones which go to infinity but we eventually stop hearing the effect of the sound. Above is a two dimensional demonstration but in nature the waves are in three diminutional real space and they go on to infinity. The harmonic series overtones give music its substance, its richness, what distinguishes the same sound of a violin to one of a flute for example. Listed in order from the top in the figure above the unison 1:1, the octave 2:1, the perfect 5th 3:2, the perfect 4th 4:3, the major 3rd 5:4 and the minor 3rd 6:5 ratio. “Overtones” or more precisely “higher-partial-tones” were first discovered and described by Hermann Von Helmholtz, in the original german, in “On the Sensations of Tone as a Physiological Basis for the Theory of Music”.

Lets take C7 2048 Hz and go through the harmonic series to test all the intervals and compare the results. The harmonic series begins with unison which is 1:1, the next interval is the octave or 2:1, 2048 x 2/1 = 4096 C8, this is correct, as can be seen there is a doubling effect in the harmonic series; the next ratio is the perfect 5th or 3:2 ratio, sometimes we call it the third harmonic. Lets see if this interval is perfect, 2048 x 3/2 = 3072 G7, yes it is perfect. The next harmonic is the 4:3 ratio, the perfect 4th, lets test this interval, 2048 x 4/3 = 2730.66 F7, this interval is also perfect. Lets continue then with 5:4, 6:5, 7:6 and so on and see how the results relate to our Just music system.

| C7 | | D7 | | E7 | F7 | | G7 | | A7 | | B7 | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2048 | 2168.47 | 2304 | 2439.52 | 2592 | 2730.66 | 2891.29 | 3072 | 3252.70 | 3456 | 3659.29 | 3888 | 4096 |

1. 2048 x 2/1 = 4096
2. 2048 x 3/2 = 3072
3. 2048 x 4/3 = 2730.66
4. 2048 x 5/4 = 2560
5. 2048 x 6/5 = 2457.6
6. 2048 x 7/6 = 2389.33
7. 2048 x 8/7 = 2340.57
8. 2048 x 9/8 = 2304
9. 2048 x 10/9 = 2275.55
10. 2048 x 11/10 = 2252.8
11. 2048 x 12/11 = 2234.19
12. 2048 x 13/12 = 2218.66
13. 2048 x 14/13 = 2205.53
14. 2048 x 15/14 = 2194.28
15. 2048 x 16/15 = 2184.53
16. 2048 x 17/16 = 2176
17. 2048 x 18/17 = 2168.47
18. 2048 x 19/18 = 2161.77
19. 2048 x 20/19 = 2155.78
20. 2048 x 21/20 = 2150.4
21. 2048 x 22/21 = 2145.52
22. 2048 x 23/22 = 2141.09
23. 2048 x 24/23 = 2137.04
24. 2048 x 25/24 = 2133.33
25. 2048 x 26/25 = 2129.92
26. 2048 x 27/26 = 2126.76
27. 2048 x 28/27 = 2123.85
28. 2048 x 29/28 = 2121.14
29. 2048 x 30/29 = 2118.62
30. 2028 x 31/30 = 2116.26
31. 2048 x 32/31 = 2114.06
32. 2048 x 33/32 = 2112

The intervals 2/1, 3/2 and 4/3 all generated perfect tones. Lets look at the 5:4 ratio, what we call the major 3rd, it does not generate in this case a perfect interval; but descending C 2048 x 4/5 = 1,638.4, this is Ab in the 6th octave, is a perfect interval. The interval 6/5 generated ascending Eb in the 7th octave at 2,457.6, is a perfect interval (check chart on page 18); thus

we see that 4/5 and 6/5 are refections of each other like the intervals 3/2 and 3/4, the main difference being that 5:4 and 6:5 generate accidentals,

Muzika 432 True Fourths Just Temperament Tuning, A 432 Hz

| C5 | | D5 | | E5 | F5 | | G5 | | A5 | | B5 | C6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 512 | 542.11 | 576 | 609.88 | 648 | 682.66 | 722.81 | 768 | 813.17 | 864 | 914.82 | 972 | 1024 |
| 540 | 546.12 | 607.50 | 614.40 | | 720 | 728.16 | 810 | 819.20 | 911.20 | 921.60 | | |

——Muzika 432 TFJTT diatonic tones
——Muzika 432 TFJTT accidentals, calibrated via the Harmonic Mean
——Muzika 432 TFJTT accidentals, separate tone for each sharp and flat

Equal Temperament at A 432 Hz

| C5 | | D5 | | E5 | F5 | | G5 | | A5 | | B5 | C6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 513.74 | 544.29 | 576.65 | 610.94 | 647.27 | 685.76 | 726.53 | 769.74 | 815.51 | 864 | 915.38 | 969.81 | 1027.47 |

——Equal Temperament concert pitch A 432 Hz, diatonic tones
——Equal temperament A 432 Hz accidentals

Equal Temperament at A 440 Hz

| C5 | | D5 | | E5 | F5 | | G5 | | A5 | | B5 | C6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 523.25 | 554.37 | 587.33 | 622.25 | 659.25 | 698.46 | 739.99 | 783.99 | 830.61 | 880 | 932.33 | 987.77 | 1046.5 |

——Equal Temperament concert pitch A 440 Hz, diatonic tones
——Equal temperament A 440 Hz accidentals

Above is a demonstration of Equal Temperament at A 440 and A 432, of all chromatic tones in the 5th octave from C5 to C6, and an example of our Just system, Muzika 432 TFJTT, also in the 5th octave from C5 to C6, showing all diatonic tones, all accidentals computed via the Harmonic Mean, and all separate accidentals showing individual sharps and flats. Notice how the natural intervals are disrupted when comparing our Just system at the top with the two examples of Equal Temperament below.

We have seen that the natural phenomenon of the Harmonic Series seems to influence what sounds consonant to us and what sounds dissonant, in other words there seems to be a natural human reaction to the octave, the perfect 5th, the perfect fourth, and perhaps the perfect 3rd intervals of the Harmonic Series, which causes humans to both identify these intervals but also experience them as pleasing. We have also seen that it does matter which starting frequency we choose, our C6 at 512 Hertz should be considered as the prime tone from which we orient ourselves, this includes all the other octaves of C from C1 at 32 Hz, C2 at 64, C3 at 128 and C4 at 256 and so on. The claim that musical taste is a learned response has insufficient factual evidence. There is far more evidence supporting the claim that there is a natural element to our taste in music, connected to the natural phenomenon of the harmonic series, but also connected to the tone C as prime. The tone C represents musically the colour yellow in our natural light spectrum, the colour of our sun. There is also archeological evidence, as well as evidence in present day experience that we naturally find the C tone by ear; for example, when someone builds a flute from reeds who has no musical knowledge, they tend to naturally find this C tone at 128 or 256 Hz.

The chart below shows the music frequencies from A4 to G5 of the MUZIKA 432 TFJTT music system, notice that the music frequencies coincide perfectly with the light spectrum.

| | | |
|---|---|---|
| Red | (A4 432 Hertz) 380-460 Terahertz | MUZIKA 432 |
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When you convert Hertz, say 768, to Terahertz you multiply by 10 to the power of 12, for example,

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Chapter II

PYTHAGOREAN CIRCLE OF FIFTHS

4,151.85 : 4096 is the Pythagorean comma

⬇

Should be: $C_8$ 4096 Hz

2,767.9 x 3/2 = 4,151.85 ? $C_8$
(C Just is 4096 Hz, there is
a difference of 55. 85 Hz. )

1,845.27x 3/2 = 2,767.9 ? $F_7$

1,230.18 x 3/2 = 1,845.27 ? $Bb_6$

820.12 x 3/2 = 1,230.18 ? ? $Eb_6$

546.75 x 3/2 = 820.12 ? $Ab_5$

$C_1$ 32 x 3/2 = 96/2 = 48 $G_1$

48 x 3/2 = 144/2 = 72 $D_2$

72 x 3/2 = 216/2 = 108 $A_2$

108 x 3/2= 324/2 = 162 $E_3$

162 x 3/2 = 486/2 = 243 $B_3$/$Cb_3$

243 x 3/2 = 729/2 = 364.5 ? $F_4$#/$Gb_4$

364.5 x 3/2 = 546.75 ? $C_5$#/$Db_5$

⬆

In the above demonstration we see how we eventually overshoot the intended high C tone, multiplying continuously by the perfect fifth or 3:2 ratio. We start from the right moving clockwise. The question marks indicate a problem occurring in the calculations, where the results are off or out of tune. The final result is compared with the Just $C_8$ tone at 4096 Hz. The result of the multiplication with the 3/2 interval, compared to what should be the correct tone 8 octaves higher, is what is called the Pythagorean comma.

That the Pythagoreans made the mistakes they had and chose their particular approach is perhaps more clear at this point and quite obvious that this was easily done, for their method yielded some good results. As has been demonstrated above, often it was the mathematics which were misleading. This was the very crux of the problem, the fact that there were only some good results, leaving us with a number of conundrums to battle and solve in a myriad of creative ways. Anyone who has taken the time to look at the vast number of Mean-tone Temperaments and Well Temperaments, created from the 16th century on through to the present, is witness to the gruelling work, persistence and creative brilliance involved in forever trying to resolve the Pythagorean comma dilemma by creating finer and finer temperament and tuning systems which approached the ancient ideal of perfect Just intervals. The Pythagorean approach needed to be abandoned, completely, and as we have demonstrated, a completely new approach had to be attempted, using the 4:3 ratio to compute all the music tones, unraveling and making manifest the entire Just chromatic music system.

## Chapter III Why 432?

As we have seen in our comparison with the light spectrum, the tone A at 432 Hz, is equivalent to the spectral frequency of red, but this is not the orienting frequency in our music system but rather C at 512 Hz corresponding to the spectral colour yellow, the colour of our life giving sun. There is good reason for this, for if we use the number one as a starting point, we have hit right on the correct Just frequency of the musical tone C or "do", we may only be able to hear the frequency at 16 Hz or higher, nevertheless we can feel frequencies if we cannot hear them. For example, 1…2…4…8…16…32….64…128…256…512, we see that $C_1$ is 32 Hz, $C_2$ is 64 Hz and so on through the Just C octaves until we reach the highest tone of the piano, the $C_8$ at 4096 Hz. It is this C or "do" tone at 128 or 256 Hz that should be considered as the foundation or starting frequency in calibrating all of the Just tones using our 4:3 ratio.

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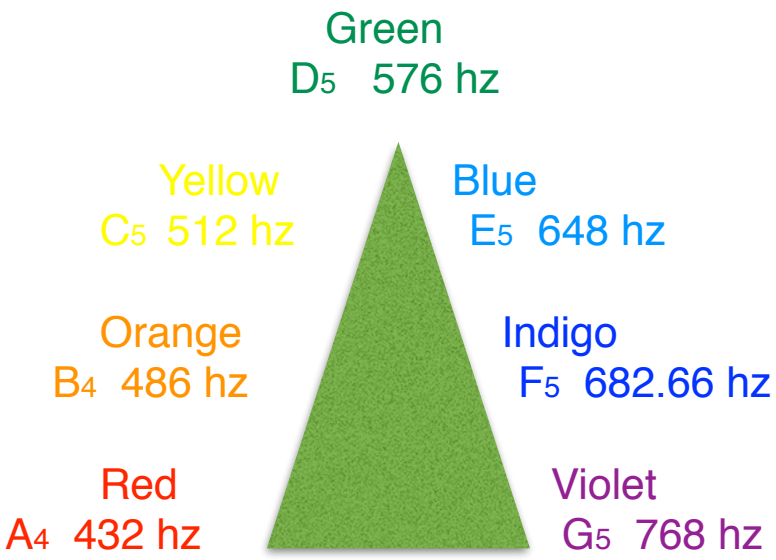


In the above demonstration we are reminded of the light spectrum colours and the corresponding music Just tones, and in this comparison the assertion is made that the music tones evoke similar feelings, and have similar effects to that of the different colours, that is to say, waves or frequencies of our light spectrum. If we try to visualize the music tones and

has all perfect intervals and when we play this chord the feelings which it evokes are of imposing danger, fear, and at best apprehension. We finally come to the tone G represented by the spectral colour violet. The tone G like the light frequency of violet is the coldest colour in the spectrum, it is the tone of pure spirituality devoid of all earthly life, the human soul after it has been released from its earthly body. It is a happy key, as there is nothing to fear in death and this new state of being, G major is very reminiscent of the C major key, its only when we play the G major chord and then the G minor chord after it do we notice some finality, a sense that this is it, there is no turning back to life.

Lets turn now to some music scales to serve as an example and see if the colours of our light spectrum could help us understand why our music scales sound different, how each may have a unique character and how different feelings may be evoked. We have below and examples of some major scales and their natural relative minor scale, we include the Harmonic minor but not the Melodic minor scales. All the tones are designated their respective colours, and the sharps and flats are also represented in the corresponding colour.

| | | |
|---|---|---|
| C major scale<br>C D E F G A B | A minor scale<br>A B C D E F G | A minor harmonic<br>A B C D E F G# |
| G major scale<br>G A B C D E F# | E minor scale<br>E F# G A B C D | E minor harmonic<br>E F# G A B C D# |
| D major scale<br>D E F# G A B C# | B minor scale<br>B C# D E F# G A | B minor harmonic<br>B C# D E F# G A# |
| A major scale<br>A B C# D E F# G# | F# minor scale<br>F# G# A B C# D E | F# minor Harmonic<br>F# G# A B C# D E# |
| E major scale<br>E F# G# A B C# D# | C# minor scale<br>C# D# E F# G# A B | C# minor harmonic<br>C# D# E F# G# A B# |

The colours of the tone plus sharp is left for the reader to imagine the two colours mixing, as G# above would be Violet plus a bit of Red making the colour Magenta, a vibrant pink; or F# the indigo with some violet making an

## Chapter VIII The Djed of Ancient Egypt

For all civilizations both modern and ancient, Egypt has been an endless source of mystery and inspiration. Modern archeologists are discovering a much older ancient Egypt than we ever imagined.[1] Even Alexander J. Ellis who translated into English “On the Sensations of Tone” by Herman Von Helmholtz, commented in a footnote in Chapter XIV of this book, that a flute was found in the royal tombs at Thebes, which gave an almost perfect scale of semitones, and that representations of such flutes are to be found in“the very oldest Egyptian monuments”.[2] Judging by the extant evidence of ancient Egyptian archeological remains we see a myriad of instruments from what looks like the “aulos” to the single flute, tambourines of different shapes and sizes, to a hand held lyre type instrument and large harps as tall as the individual holding it or taller. We see all sorts of percussion instruments, as well as such strange instruments as the sistrum. How are we to believe that these ancient Egyptians had no system of music theory before Pythagoras. The “aulos" players for all ancient Egyptian and Raseni (Etruscan) extant examples not only portray the “aulos” as two flutes but as much shorter and thus more practical than the ancient Greek “aulos”, and as the latter had straps attached to the head to secure the long flutes to the mouth, this is the case only with the ancient Greek examples and not the others.

The question we would like to bring forward in this study does not concern different types of musical instruments so much as it involves the actual calibration of the musical tones. Is it possible that the ancient Egyptians may have had the knowledge needed to calibrate the Just music system, the knowledge of the 4:3 ratio? Is it possible that this knowledge was lost as the ancient Egyptians were conquered and absorbed by other nations such as the ancient Greeks, the ancient Romans and others, and is it possible that the clues to this knowledge remains, still today, in plain site.

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[1] Many authors today from archeologists, historians, engineers and geologists are bringing forward evidence in support of the premise that the age of ancient Egypt goes much further back in time, up to 26,000 years B.C.

[2] Herman Helmholtz, On the Sensations of Tone. Trans. by Alexander J. Ellis, (New York: Dover Publications 1954), republication of the second 1885 edition; this text is still actively used at the university level. Ellis explains this point in a lengthy footnote on page 271.

the entire Just music system. Can the ancient Egyptians be saying that music calibrated via the 4:3 ratio, the Just music system, is the basis of human morality and ethics, can this be the true meaning of the ancient Egyptian symbol of the “Djed"?

The reader will remember that this is the order of our colours that make up white light, red-green-violet. In the representations of the “Djed" indigo or blue is used most likely because semi-precious stones in violet are very rare so blue stones are used instead. The “Djed" is relaying to us the message of the colour spectrum, from these spectra all the others are made. But why must the four bars stand or jut out and why four? The reason is that our light spectrum is intimately related to our musical tones, red being A at 432 Hz, green being D at 576 Hz and violet represented as indigo/violet being G at 768 Hz. The “Djed" does seem to indicate, the importance of the number 4 as in numbering the musical scale in fours, and 3 is specifically associated with the three colours in between the four bars; the 4 bars embracing the 3 spaces of colour frequencies. We know very well the ancients organized their music into tetrachords, groups of 4 notes or tones. The four bars of the “Djed" are very obvious and suggest a specific emphasis on this number 4, and again the 4 bars embracing the 3 spaces, specifically three colours are represented, and in a specific order, the order of the light spectrum, the three primary colours of the light spectrum. The key to unraveling the entire music system the 4/3 interval, 4 bars and the 3 spaces, is clearly seen in the form of the ancient Egyptian symbol of the “Djed”.

The meaning of the word “Djed” goes back to the ancient language of the Egyptians, meaning ancestor [3]; interestingly enough,only in present day Serbian, does the word “Djed", “ Ђед” mean grandfather, and this letter “Ђ “ in fact the very shape of this letter resembles the “Djed". What is also most fascinating is that the meaning has not changed from ancient Egypt to

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[3] Carmen Boulter, *The Pyramid Code, in the documentary, episode one, ABD’EL HAKIM AWYAN, (an archeologist trained in the west, and an Egyptian Indigenous Wisdom Keeper), explains the meaning of the “Djed “ is, ancestor, in the ancient language of the Egyptians.*

## MUZIKA 432 TODAY AND TOMORROW

Whoever has come this far should certainly be pleased to have experienced how beautifully simple, elegant and true our unequal, Just Muzika 432 music system is. The reader will remember how the chart on page 16 in the first chapter, displays the 4/3 calculations of all the accidentals in blue, clearly revealing what may have been termed by the ancients the “Greater Perfect System” in the first four lowest octaves and the “Lesser Perfect System” in the three highest octaves. Whether this is true or not, we would all agree that such a polemic could continue for a few more millennia. The matter of fact is that we have unveiled the secret key to the calibration of the entire unequal, Just music system at A 432 Hertz, with the 4:3 ratio. We have demonstrated fully this unequal, Just music system, the Muzika 432 True Fourths Just Temperament Tuning in two forms. In the introduction it was stated that the mathematics stand as proof of the validity of this system, but having reached the end of this journey the reader must realize that so much more is involved, so many factors play a role from the personal experience of music which is the most important, to the physics of music. This musical encounter must make us stop and wonder what treasure we posses, what wonder of God’s grace has been placed in our hands.

With the music that has been recorded in this unequal, Just temperament and tuning more people are finding the courage to venture from the old into the new. The Muzika 432 App gives that added advantage of being able to tune to the system wherever one may go, or wherever one may be. The Muzika 432 website gives the inquiring individual a general explanation to what this Just music system is all about, and finally this study satisfies the reader who wishes an in-depth explanation, to see the entire system as it unfolds into its most complete forms. There is so much more to be said about every aspect of music touched on in this study, about the ancient high cultures of our past, Nietzsche’s ideas on music and tragedy, there is so much more to be said on the potential ethical aspect of music, on the history of music and on the physics of music. Every aspect of music seems to reach into an endless expanse.

From our ancient Egyptian ancestors, from the ancient high civilizations of Lepenski Vir and Vincha, from ancient Crete and the Raseni, from the ancient Lydians and Phrygians, from the Trojans of Illias and many other ancient high cultures, to our present day, the circle has finally closed. We have again what we once had, we are perhaps finally ready to know ourselves as the god Apollo had advised, “Know Thyself”; to be authentic in all our creative endeavours and laugh as Nietzsche charged, to live life as true human beings and to know what it means to be one, not just by one’s words but by one’s actions. Muzika 432 is here today in all its brilliance closing that circle with our most ancient past by weaving that golden thread through our present and on into the future which awaits.

**WWW.MUZIKA432.COM**

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