



A Chronicle of Sound:
Establishing Community

by AnnA Zimmerman

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Introduction

“In the beginning was the Word, and the Word was with God, and the Word was God. He was with God in the beginning. Through him all things were made; without him nothing was made that has been made.”

John 1:1-3

In the world of Classical music performance, I can readily confess to being a nerd. Music Theory and Physics of Sound classes made a lot of my fellow musicians in school absolutely miserable, and I was that weirdo who enjoyed all of it. But beyond our scholastic experience, there is a growing interest in music and frequencies in various spiritual and inner healing circles world-wide, which has not necessarily been a good thing.

Numerologists, the New Age community, and cult organizations have explored with abandon through a crooked lens, pioneering frequency theories for inner healing, spiritual attunement, or attempted control, while trying to undermine A=440 Hz as the standardized concert pitch. These theories are grounded in pseudoscience, conspiracy theories, and spiritual revelations failing to hold up to Jesus Christ, our Plumbline.

Christian communities have been generally reactive by either believing it all, reappropriating the various frequencies while ditching some of the wonky spirituality, or ignoring it but remaining unproductive. There is no Christian frequency theory that I have found that has been innovated without the inspiration of these occultic communities to one degree or another.

This, however, is SLG, and we don't do reactive. In the fractals of music, the 12 chromatic pitches manifest the compound fractal of 7+5, 7 being the Redemptive Gifts, and 5 being the five things God made holy in scripture. Within that fractal, A=440 Hz lines up with Community; that's why orchestras tune to it. The establishment of God's design for this musical note and associated frequency required a process that took over 2500 years. So, the purpose of this paper is to do away with what is untrue, and to establish A=440 Hz as the appropriate tuning frequency.

Part 1

Elements of Music and Sound



Pythagoras and Ratios

This chronicle begins with ancient Greek culture, about 500 years before Christ. This people group expressed a Prophet design, perhaps, by being innovators in the realms of math and science, as well as politics and philosophy. While music existed before this time, it was this people group's verbal expressivity that brought forth more writings on music than any other ancient society.

One innovator in that society was Pythagoras, who is considered the founder of music theory. His understanding of scientific ratios not only led to the equation for the Pythagorean triangle ($A^2+B^2=C^2$),¹ but also to the ratios of the consonant intervals in music: the Octave, the Fifth, and the Fourth above it to complete the octave (These were not yet labeled as "Perfect" because they were the only intervals at the time considered consonant²). This was the first scientific substantiation for what "in tune" was, or how those intervals scientifically related to each other.

The easiest way for me to explain his ratios, and later the harmonic series, is based on Paul Hindemith's explanation in *The Craft of Musical Composition*. Pythagoras found that if you take a taut string for a musical instrument and place a bridge at the halfway point, then the pitches of the two halves will be an octave above the open string. Likewise, if you take two bridges and divide the string into thirds, they each will sound a 12th above the open string, or a 5th above the string divided by two: a 3:2 ratio. If you take a string and place three bridges to divide it into four equal sections, each of them will sound two octaves above the original open string. Compared to a string divided into thirds, this will sound a 4th higher for a 4:3 ratio (pp 17-19).

His discoveries of 2:1, 3:2, and 4:3 string ratios produced the foundation for Pythagorean intonation in which all fourths and fifths were perfectly tuned.³ One way the rest of the intervals could be mathematically established in this system is to tune out by fifths and then bring the ratio of that compound interval back down to one octave:

Figure 1.1

Interval by Fifths	Ratio calculation	Ratio
Unison	1/1	1:1
Fifth	3/2	3:2
Major 2nd	$(3/2)^2/2$	9:8
Major 6th	$(3/2)^3/2$	27:16
Major 3rd	$(3/2)^4/4$	81:64
Major 7th	$(3/2)^5/4$	243:128

1 No writings from Pythagoras survive. There are some quotes of his from students in other works. In this case, I have trusted the attribution that these discoveries came from him directly and not from a follower.

2 Grout 159.

3 Grout 159.

Here is a reorganized chart by intervallic order:

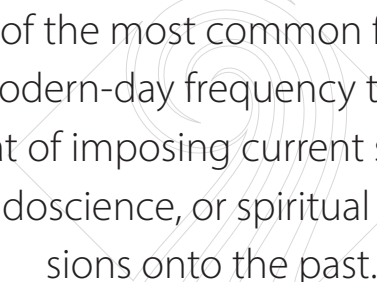
Figure 1.2

Interval	Unison	Major Second	Major Third	Fourth	Fifth	Major Sixth	Major 7th	Octave
Pythagorean Ratio	1:1	9:8	81:64	4:3	3:2	27:16	243:128	2:1

In order for global musical community to be established, there first needs to be an internal system that works. In this case, we are looking at the modern day Major scale. Until Pythagoras, there was no scientific foundation for how the scale worked, nor a language for it. It was Pythagoras' discovery of the ratios for consonant intervals that created the "half-baked potato" from which the rest of the scale could be refined, and more innovations down the road, like chords, could be developed.

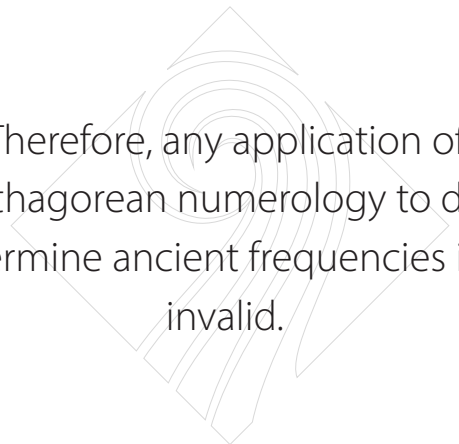
From a fractal perspective, the scale is a fractal of seven paralleling the Redemptive Gifts. What Pythagoras had discovered are the two most stable of the Redemptive Gifts, the Prophet, and Giver. To clarify, if we zoom ahead through music history a bit to when chords were developed, the Prophet pitch is the tonal center, and is a I or a i chord. The Giver is the Dominant, and generally a V chord (but by the 19th century could be a v, V^7 , v^{dim} , V^{b5} , V^+ , V^9 , V^{11} , V^{13} , etc., thus manifesting the chameleonic nature of the Giver Redemptive Gift). The relationship between the two scale degrees and their chord options reflects just about every Prophet-Giver relationship in creation in that it is the most fruitful relationship for kingdom building when it is done right. What Pythagoras did with ratios was to be the first in history to mathematically substantiate the beginnings of that Prophet-Giver relationship in music.

What we will find with any tuning system is that none of them are perfect, with any of them there will be micro-fluctuations between notes so that they sound better in tune. The Prophet scale degree, however, is what a musical work revolves around as the tonal center of a work, so there is the least amount of flux in that frequency. Likewise, with the Giver having the simplest intervallic ratio after the octave of 3:2, and developing the most important musical role after the Prophet, it also will fluctuate less than the others--although the fifth in Pythagorean tuning is slightly wide. The fractal of seven in the scale will be further explored in the section on Guido d'Arezzo.



One of the most common fallacies of modern-day frequency theories is that of imposing current science, pseudoscience, or spiritual expressions onto the past.

I would like to make a distinction here. Pythagoras lived about 500 years before Christ, and the Greek culture of the time had a very distinct spiritual flavor that the apostle Paul later commented on when he traveled to Athens (Acts 17). I have not studied Pythagoras' spiritual life beyond what *A History of Western Music* briefly describes, "For Pythagoras and his followers, numbers were the key to the universe, and music was inseparable from numbers" (Grout 13).



Therefore, any application of Pythagorean numerology to determine ancient frequencies is invalid.

One of the most common fallacies of modern-day frequency theories is that of imposing current science, pseudoscience, or spiritual expressions onto the past. Using Pythagorean numerology for ancient frequencies is one such mistake. Pythagoras' tuning already expressed his beliefs because he considered the 3:2 ratio spiritually significant, so that's why they tuned strings that way (And actually fell short of discovering the small-number ratios for the thirds and sixths, which we will explore in a little bit). Pythagorean numerology is an isolated numerical relationship then imposed with its assumed spiritual attributes onto other systems. In this case, theorists are applying it to frequencies,

which were unable to be calculated for another roughly 2300 years. Pythagorean numerology is not respecting God's design, but is instead attempting to force an external design onto sound and the product is coming out a misfit.

To expand on that, let's look at my violin playing. When I pull my bow across the string, I am pulling the bow sideways until the tension is too great for the string, and it snaps back in the other direction. As I continue to draw my bow across the A string, that pull and snap action is happening 440 times a second. So to the naked eye, it looks like a blur. It is impossible for anyone of ancient times to have been able to count the number of vibrations per second to get a frequency, and nobody today could do it without technology. To take this one step further, no one of ancient times could count 440 vibrations per second, and then determine that they need exactly 4 or 8 vibrations more or less (Unless there was something external with which to resonate. That topic will be explored in Part Two). And there was no way to associate a number to a frequency, because the Hertz is vibrations per second, and mankind was unable to track the duration of a second until the 16th century.⁴ Therefore, any application of Pythagorean numerology to determine ancient frequencies is invalid. This concept also applies to the Christian streams of numerology trying to discover long-lost frequencies in the Bible.

⁴ Andrewes paragraph 10

Ancient Instruments

There are a few different ancient instruments now rumored to have been tuned to 432 or 444 Hz. In the Christian sector, it's David's harp, or lyre. In others, it's Tibetan bowls, and Pythagoras' monochord. About seven years ago, the theory that David's harp was tuned to 432 Hz was popular. To be honest, I researched that, tried to get to the bottom of it, and couldn't. The websites that said so-and-so had plucked the harp's string and it sounded 432 Hz were quoting each other around in circles without ever getting down to a direct source. The David's harp theory is impractical when taking into account how wood fluctuates with temperature changes, the lifespan of a string, and again the issue that musicians of the time had no way to discern or calibrate to a certain frequency. But just for kicks, I contacted a museum in Israel focusing on ancient Hebraic instruments about the theory, and they replied in kind saying that the theory was unsubstantiated and that there was no tuning system established back then that could determine or standardize a certain frequency. None of the instruments were standardized, either, so each one would be slightly different from another.

The theory that David's harp was tuned to 432 Hz is fading out, and it looks like most Christian frequency theorists today are going with 444 Hz inspired by Horowitz's work. None of the sources that I have found lately have much to do with an actual instrument, or any historical or scientific justification, but are relying on Numerology. Michael Tyrrell, for instance, was inspired to use 444 Hz by roughly doubling the numbers from Isaiah 22:22, and doubling the page 222 from his Bible as an attempt at getting a couple of frequencies in Horowitz's ancient Solfeggio scale to work together.⁵ It is not based on David's actual instrument. The other Christian theorists working with 444 Hz that I have found are operating similarly.

Physics of Sound

What Pythagoras had stumbled upon was the first couple harmonics in the harmonic series of a string. When a string vibrates, it doesn't just vibrate as a whole back and forth, but also in an infinite number of fractional divisions.⁶ Our ear hears these different harmonics being activated, not as individual frequencies, but as a total package creating what we call timbre. Each instrument activates different harmonic frequencies in different ways, and it is those combinations of upper partials that lead our brains to differentiate between the sound of a cello, to a piano, to a celeste, etc.

Here are a few visuals. The first is of the divisions of a vibrating string. The second is a notation of the harmonic series.

⁵ Tyrrell chapter 11

⁶ Bain 3

Figure 2.1 (Image borrowed from Wikipedia Harmonic series (music))

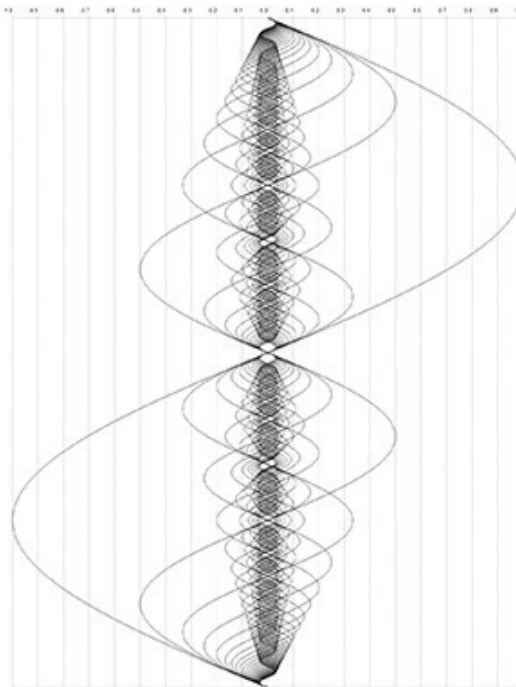
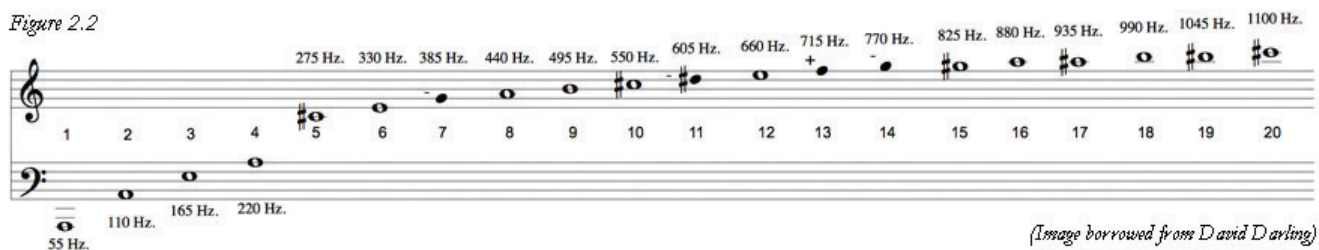


Figure 2.2



In the notated harmonic series, the intervallic ratios are inversely related to the string divisions. For example, Pythagoras divided the string by 1:2 to get a 2:1 octave ratio. So in the notated harmonic series, any fraction reduced to 2:1 will also create an octave (4:2, 8:4, 16:8, etc). Note the 3:2 ratios to create the Fifth, and the 4:3 ratios to create the Fourth. There is a little bit of a discrepancy in the frequencies for some of the pitches--the + and - signs show that they are either a little sharper or flatter than equal temperament tuning.

You can also use the harmonic series chart to find ratios.⁷ For example, to find a Major third, I would scan the chart from left to right until I found the first one. In this case, it would be between the A and C#, a 4:5 string division then inverted to make a 5:4 ratio. But this ratio is not the same as the Pythagorean ratio of 81:64 for the Major third!

The thirds and sixths of Pythagorean tuning were considered sharp, or dissonant, even to the point of being out of tune. Another problem Pythagorean tuning had was that because the fifth is slightly wide, tuning out by them gradually pushes everything sharper and sharper. For instance, calculating out by 12 fifths

⁷ Bain 5.

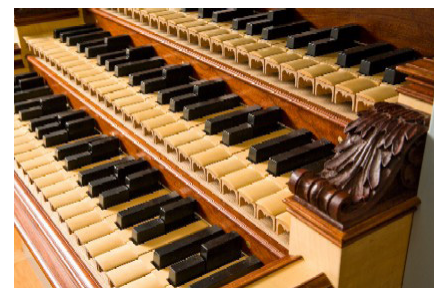
makes 8423.46 cents, but seven octaves is 8400 cents. One criticism from later scientists and musicians like Kepler was that Pythagoreans relied too heavily on numbers and disregarded the empirical data to answer the question of whether the theory actually sounded in tune or not⁸ --an issue Pythagorean numerologists still face today with their frequency theories. Nevertheless, it set the standard for about two thousand years. It wasn't until 1482 AD that the system was officially refined to a tuning system called Just Intonation. The major changes were that the thirds and sixths were adjusted to their closest small-number ratios, making them sound in tune, even consonant. Here is a chart of Just Intonation intervallic ratios:

Figure 2.3

Interval	Unison	Major Second	Major Third	Perfect Fourth	Perfect Fifth	Major Sixth	Major Seventh	Octave
Ratio	1:1	9:8	5:4	4:3	3:2	5:3	15:8	2:1

There are a couple problems with Just Intonation. One is that one third, one fourth, and one fifth must be out of tune. This caused problems because musicians were using more and more nondiatonic tones, so pitches like C# and Db would not be enharmonic. Keyboards were built with split keys to compensate.⁹

This led to the development of temperaments as a compromise. Mean-tone temperament was used by keyboardists from the 16th through the mid-18th century to lower the fifth so the Major thirds could sound in tune.¹⁰ Twelve Tone Equal Temperament (12TET) was popularized in the mid-19th century, and is the most common temperament of today in which all of the half-steps are mathematically, equally spaced. This also has its shortcomings in that only the octaves are perfectly in tune.



There are a couple more recent temperaments specifically associated with 432 Hz developed by Maria Renolds referred to as the Scale of Twelve Fifths, which is explained in her book, *Intervals, Scales, Tones and the Concert Pitch C = 128 Hz*. I would like to explore that system more fully after sharing the fractal of 12.

Different instruments function better with different tuning styles--keyboards today tend to use 12TET. String instruments like the violin or cello can use either Pythagorean tuning to have slightly wider fifths, and then make adjustments with the placed fingers so that the thirds and sixths don't go sharp in an ensemble setting. Other string instrumentalists will tune their strings individually with a tuner, reflecting the 12TET for the open strings, so sometimes there is room for personal preference. The bottom line is that none of the tuning systems are completely perfect--there is flux in all of them, and there continues to be flux as instru-

8 Walker 235.

9 Grout 159.

Image, "Keyboard with split keys".

10 Grout A10.

ments with different timbres and tuning systems create ensembles together. In an orchestra, it is still common practice to have sections of rehearsals dedicated to tuning to one another, adjusting certain pitches and intervals to resonate.

The point of boring you with all the mundane details of common tuning systems in use over the past 2500 years is primarily to shed light on the big picture. Pythagoras started Western music out with a couple intervals, and a tuning system that just barely worked in one key. In order to play in a different key the musician would have to retune between songs, and the dissonant thirds and sixths made chords impossible. But as more and more musical complexities were slowly brought into use, like harmony, and key modulations within a piece, tuning systems were slowly adjusted to allow access not just to the one diatonic key a musician started with, but to seamlessly access all 12 keys, all 12 chromatic pitches, all nondiatonic chords, and the ability to play all of that in a large ensemble. Because of the developments in tunings and temperaments, music performance went from a single singer and his lyre to very complex works for a full orchestra like “The Moldau,” by Smetana for example.

I initially expected most frequency theorists to center around Pythagorean tuning due to his mysticism, but some of them prefer Just Intonation, 12TET, or the most recent Renold temperaments. The specificity causes problems, though, in that unless they are Pythagorean loyalists or using the Renold temperaments, they either do not adhere to the tuning system they say they subscribe to, or they are vague and undecided about it in a way that negates their theory. There is an appropriate desire for specificity, since resonant frequencies need to be very accurate (as we will explore in Part Two), yet most frequency theories only say that they are using a certain tuning or temperament when they actually aren't. I have added some charts in Appendix III to demonstrate some of the inaccuracies, and how to calculate frequencies from the ratios yourself for future reference.

Healing Frequency Streams

Before continuing my views on frequencies through the grids of history, physics of sound, and the fractals, I would like to summarize the various frequency streams and where they come from. Generally, there are a couple different streams, the first centers around 432 Hz and sometimes 128, 256, or 528 Hz set to C as the “scientific frequency.” Bo Constantinsen published a timeline online that chronicles the history of 432 Hz beautifully.

Before 432 Hz started getting the hype it is associated with now, a couple different people were fascinated more so with the correlations between C as a tuning pitch, and pseudo-scientific astronomy. The first was a Theosophic Austrian named Rudolf Steiner (1861-1925). He is better known as the founder of Anthroposophy, but is referenced by Maria Renolds in her book, *Intervals, Scales, Tones and the Concert Pitch C = 128 Hz*, as suggesting 128 Hz as a tuning frequency to resonate with the sun based on pseudoscience and false

revelation. Steiner is not recorded to have had much of a musical background, but Renolds took the concept and fleshed it out with a couple modern temperaments focusing on C=256 Hz, A=432 Hz, and F#=362.04 Hz. Her work has a little bit of traction in the 432 Hz world, but is not widely known or adopted.

In the late 1980s, the Schiller Institute, a German think-tank under the wing of cult leader Lyndon LaRouche, pushed the political agenda of tuning to A=432 Hz (Appendix II). Jonathan Tennenbaum, the Institute's leading mathematician, published an article, "The Foundations of Scientific Musical Tuning," in which Tennenbaum very adamantly writes that C=256 Hz is the only appropriate tuning frequency due (incorrectly) to its correlations to Kepler's planetary motions, the Golden Ratio and other natural phenomena. It also is the first article to briefly detail the conspiracy theory regarding Goebbels standardizing A at 440 Hz. This

theory has been flagged by the musical community as being an incomplete or indecisive theory at best for being based on outdated science, and for being so adamant that A should be 432 Hz exactly, yet using a tuning system that actually supports A at between 427-430 Hz using either Just Intonation or 12TET.¹¹ This theory is drifting into obscurity as well.

The next person to further 432 Hz as a healing frequency is New Ager Ananda Bosman, who wrote, "Universal Dances: A Musical Congruence Towards the Global Song of the Omega Revolution."¹² Most

New Age, 432 Hz websites are just directly copying material from his article onto their site without necessarily giving him credit, so most people who have done any searching on 432 Hz have probably stumbled across sections of his material. Regardless, it has been the most thoroughly disproved of the frequency theories by both scientific and musical communities as not being grounded in any sort of reality (See Endnote 6 for a few recommended weblinks).

Today, the most popular 432 Hz promoter is probably Brian T. Collins with Omega432™. His website is under construction during the writing of this paper, but critics from secondary sources including Constantinsen generally say that while he promotes 432 Hz as a tuning frequency, he has only recently applied the Pythagorean tuning system to it.¹³

The last theory to mention in this paper includes just about every other healing frequency an internet search will yield, and is an attempt at a frequency system called the "ancient Solfeggio scale" started by two people, Dr. Joseph Puleo and Dr. Leonard Horowitz, in their conspiracy theory, *Healing Codes for the Biological Apocalypse*. The book describes their finding the frequencies through numerology and revelation by spirit visi-

11 Constantinsen 1988.

12 Bosman.

13 Constantinsen 2007.

tations, primarily using Numbers 7:12-83, and Psalm 119. The work of these two has been referenced widely across New Age communities, and most Christians involved in frequency theories have adopted aspects of their work to greater or lesser degrees.

Wholetones® is probably the most well-known Christian-based work using the same frequencies and a few of Dr. Horowitz's theories behind them. He also incorporates some of Schiller Institute's conspiratorial opposition to 440 Hz. Wholetones® founder, Michael Tyrrell, sets his key of David at 444 Hz by numerology compared with the theory of David's instrument being tuned to 432 Hz by others in the Christian frequency circle, as previously mentioned.

Dr. Horowitz went on to write a number of other conspiracy theories, articles, and books including *The Book of 528: Prosperity Key of Love*, and the conspiracy that Rockefeller used A=440 Hz to cause mass hysteria.¹⁴ Dr. Horowitz, however, has not proposed 432 Hz as a standardized tuning pitch, so these two frequency camps are not necessarily associated with each other. Both Dr. Horowitz and his material have been thoroughly discredited by many communities as being fraudulent (Appendix I).

Every Christian frequency theory that I have found so far draws from the works of Dr. Puleo, Leonard Horowitz, the Schiller Institute, or other occult materials.

Why Numerology Does Not Work With Frequencies

If we look back at the harmonic series chart (Figure 2.2) from a frequency perspective, we see that the harmonic series is a linear increase of, in this case, 55 Hz at every interval. However, the linear harmonic series does not equate to a linear intervallic series. In other words, as we look at the chart from left to right, the intervals are getting progressively smaller. If we continued the harmonic series beyond this chart, we would start seeing more and more microtones. That is because frequencies do not operate linearly, but by a logarithm. The easiest way to see it is with the octave. It's being doubled every time, so if we were to chart the octaves by frequency on a graph it looks like this:

¹⁴ Horowitz, "MUSICAL CULT CONTROL".

Figure 3.1

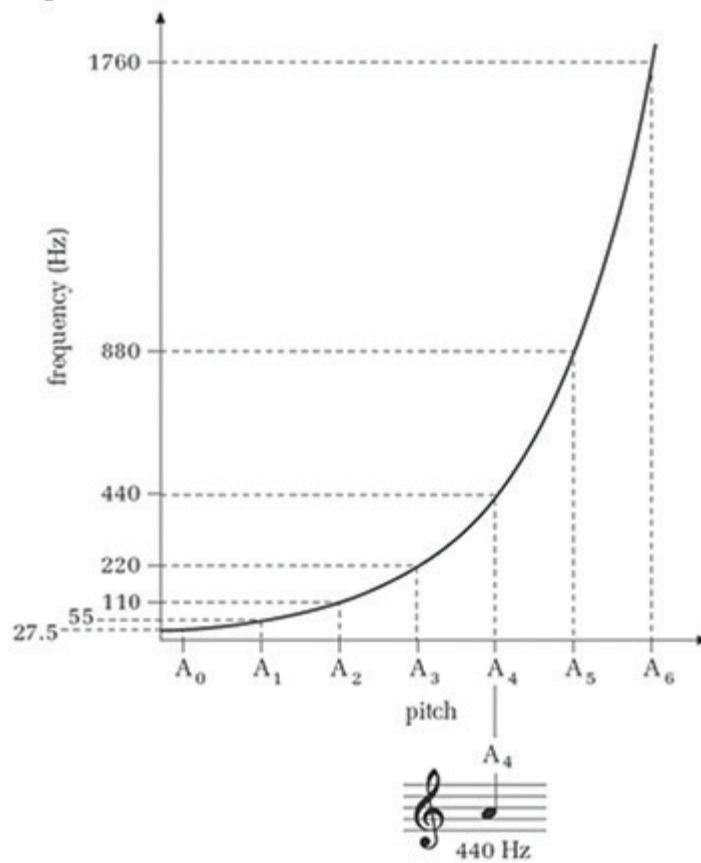


Image borrowed from Quora ("Graph of Octaves").

For the math nerds out there, there are many articles online going over the specific mathematics involved to calculate certain frequencies. Thankfully, for those of us who are mathematically disinclined, the internet has a number of websites to do the math for us (See Endnotes 1-3). But this complexity is why numerology does not work with frequencies--numerology is linear by either using basic addition at most, and frequencies are not. The only multiplication that works is the calculation for 256 Hz, the scientific pitch, which is 2^8 . Numerologists have hyped that up, but it is basically only a numerical convenience for physicists and 256 Hz is a single frequency that does not relate to any of the others as we will continue to explore in Part Three.

The result of frequency theories relying strictly on numerology without science is that the frequencies act basically as stand-alones and any functionality between them is happenstance. What all healing frequency musicians that I have come across do in this case is to tune to a certain healing frequency, but then revert the tuning system back to 12TET, or their preferred tuning system, with Western chords and musical styles. In other words, numerological theories are wildly incongruent in that they cherry-pick a convenient frequency or two out of the whole spectrum, and then say that their system works better than anything else out there when it doesn't actually work at all. It's like opening the dresser and pulling out one blue sock with a dog print, and another workout anklet, and believing that makes a professional outfit.

The Golden Ratio

Even the numerologists and New Agers who associate any particular frequency with the Golden Ratio admit that the numbers are not exact, it is an approximation at best. But that in itself nullifies the argument, because music necessitates precision.

Theorists have also tended to propose the Golden Ratio as an absolute in nature when it is not. They attribute the Golden Ratio to the cloud of a hurricane, but what about all of the other types of clouds? The golden Ratio has nothing to do with them. They associate the Golden Ratio to flowers and how they bloom, but what about the gnarly tree branches? They look at the waves, but what about the shape of the coastline?

Clouds, tree branches, coastlines and myriad other things don't follow the Golden Ratio at all. They follow the fractals that Mandelbrot discovered and mathematically substantiated in his paper, "The Fractal Geometry of Nature." They are not even constructed by Euclidean geometric shapes, but by shapes that people in general would deem ugly or undesirable for how lopsided or unusual they look.

Those that are trying to apply the Golden Ratio to music are looking at the exception more so than the rule when it comes to shapes. They look at the pattern in only one of the 7 diatonic modes, or one of the myriad arpeggio options, and are claiming that these make up all of music when that is a gross oversimplification not only of music, but of creation in its entirety. Again, it is an issue of incongruence. In this case, it is like getting one side of the Rubik's cube figured out and showing it to everyone as complete, while ignoring the other five mismatched sides.

Guido d'Arezzo, Solfege, and the 'Devil's Interval'

One of my frustrations with the healing frequencies movement is the consistently inaccurate data. If a statement is not altogether false, it is more likely to be based on some form of researchable reality, but is either then twisted to not be true, or is coming from a backward-thinking organization using outdated information. A lot of rumors have been spreading through the internet about various people or things to substantiate one frequency or another, and that's all they are--rumors. But because of that, while I am addressing them, it is not strictly for the purpose of throwing fact against "fact," but to express a bigger picture, and to bring certain people and musical developments to light in order to present an integral function of design.

This latter reason brings us back to Guido d'Arezzo, the father of music notation. According to Britannica, Guido was trained in a Benedictine Abbey in Pomposa, and while he was there, he developed his pedagogical ideas for music notation, an innovative system to reduce the time needed to train a singer from ten years down to one. Monks at the abbey rejected his ideas, though, wanting to maintain the tradition of learning music orally instead of by rote, so Guido left that community and was appointed by the Bishop of

Arezzo to implement his new system.¹⁵ Calling Guido the father of music notation is absolutely appropriate, as his system laid the foundation for the staff, clef signs, and the solmization that musicians use today.

Guido's most popular and most widely adopted innovation to the New Age circles is his solmization of the hexachord system. He created the syllables Ut, Re, Mi, Fa, Sol, and La based on the hymn Ut Queant Laxis. Ut was later changed to Do, and Ti was added much later. To put this in the perspective of fractals, Guido put names to the first six notes of the diatonic scale, and the fractal of seven. Ut (Do) being Prophet; Re, Servant; Mi, Teacher, etc. Here is a chart for the visually inclined. It also includes the interval names and Just Intonation ratios--remember Pythagoras had already mathematically substantiated Prophet and Giver:

Figure 5.1

Redemptive Gift	Prophet	Servant	Teacher	Exhorter	Giver	Ruler	Mercy
Solfege Syllable	Ut (Do)	Re	Mi	Fa	Sol	La	(Ti)
Interval from Tonic	Unison	Major 2nd	Major 3rd	Perfect 4th	Perfect 5th	Major 6th	Major 7th
Just Int. Ratio	1:1	9:8	5:4	4:3	3:2	5:3	15:8

Just like most facets of music, the identities and functions of these syllables and the solfege system took a long time to mature. It's much easier to see all of their unique expressions by the mid-1800s.

In general, though, one very easy marker for whether an evaluation of the fractal of seven is godly or not is to look at how the seventh is treated. The worldly, or sometimes religious response is to look at Mercy and say that because it is different, that it is wrong, or evil. The Godly perspective is that it is different, and holy.

"Pulchritude is relative," quoted Mandelbrot.¹⁶ The worldly perspective has been to listen to the seventh Mercy pitch, or tritone interval (The "Devil's interval," as it was called in the Middle Ages), and avoid it because it sounds so drastically different, and is even assumed to be unhealthy or dangerous to listen to. But the reality is that it has its own unique part to play, isn't dangerous or evil at all, and is just being completely misunderstood.

Since solfege was created well before the mid-1800s when frequencies were first discernable with technology, any statement that the solfege syllables were associated with any particular frequencies is false. The theory is actually a *non sequitur* based on how the solfege system worked, because Ut could have modulated by

¹⁵ "Guido d'Arezzo".

¹⁶ Mandelbrot, ch. 2 pg. 6, quoting from Richard Bentley, *The Works of Richard Bentley Vol. 3, A confutation of atheism, sermon VIII*, pg. 196

mutation to a number of different pitches to access the gamut, or the full range of pitches used at the time (See Figure 5.2). Even today, with the movable-do system, it does not work to assign one specific frequency to Do because it could be any of the 12 pitches.



If these particular solfege syllables in a frequency theory do not follow this particular whole-step and half-step pattern (WWHW/WH), then it is a misappropriation. The charts in Appendix III can be used to test for yourself if a frequency theory's application of solfege is accurate or not.

The Fractal of Twelve: A For Community

Now that Guido's solmization has been discussed, I would like to address some of his other innovations, and how they express the foundations for the fractal of 12 in music, but the easiest way for me to do that is to first zoom out to a complete picture, and then zoom back in.

The fractal of 12 is a compound fractal of 7+5, which would be the Redemptive Gifts and the five things God made holy. A is at the beginning of the alphabet, but trying to set A at the beginning of the fractal for Prophet leaves the sequence incongruent because the designs of the fractals don't match the functionality of the 12 pitches. Starting with C as Prophet, however, aligns all of the pitches really well--the functionality of the pitches and the designs of the fractals match. For example, C is at the top of the circle of fifths with no sharps or flats, around which the other keys relate. This kind of centrality is also demonstrated with Middle C on the keyboard and in the grand staff.

While the circle of fifths is a standard expression of how the keys function, trying to apply the fractal of twelve around the circle does not fit. The chromatic listing, however, aligns the fractal with the pitches perfectly as we will continue to explore (see Figure 6.1).

Figure 6.1

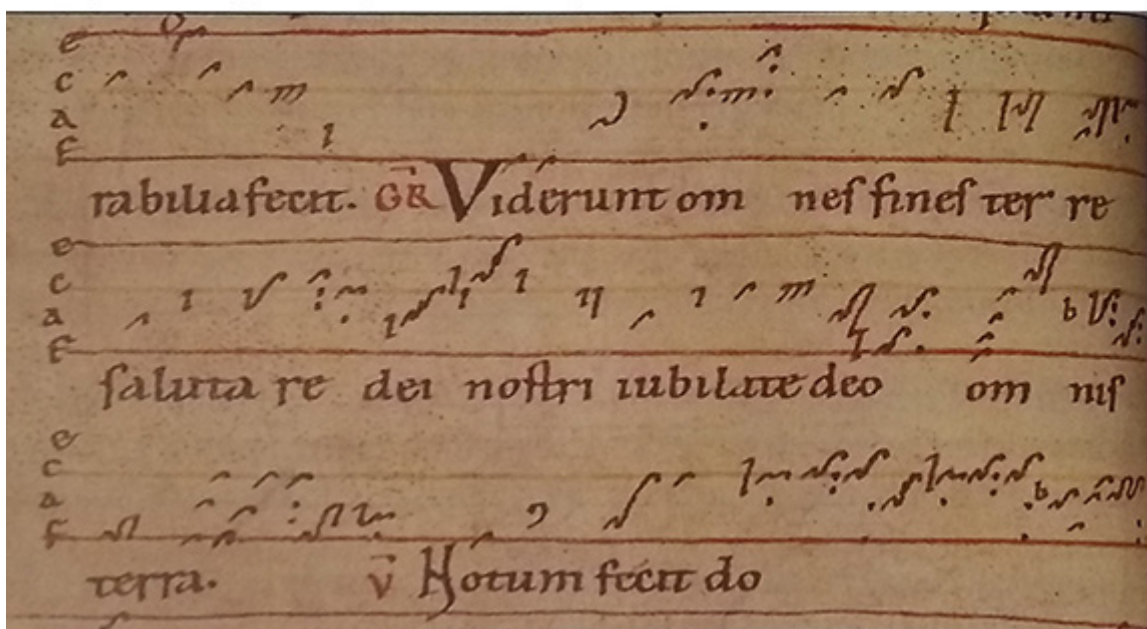
Compound Fractal	Pitch
Prophet	C
Servant	C#/Db
Teacher	D
Exhorter	Eb
Giver	E
Ruler	F
Mercy	F#/Gb
Time	G
Land	Ab
Community	A
Birthright	Bb
Office	B/Cb

For the sake of being more concise, I will only explore enough of the fractal of 12 to substantiate the sequence, and establish A as Community. This takes us back to Guido d'Arezzo, and the first music scribes.

The way music was first roughly notated was to basically mark dots above the text. The higher the spacing above the letters, the higher the pitch. One would not be able to read the music at sight, it just served as a rough reminder for people who had already learned it by ear. What scribes began to do was to draw a single line across the parchment as a reference point from which all of the neumes (notes) could relate. This line was most often labeled C or F because of the half-step leading up to them from B and E respectively. What Guido did was add staff lines above the C and F lines.¹⁷ Now, pitches weren't floating arbitrarily, but had a specific relation to the rest. He would draw the F line in red, and the C line in yellow, and label the pitches for the other lines as well. Here is an example from the Grout textbook pg 34:

¹⁷ Grout 35.

Figure 6.2 (Image borrowed from Grout textbook)



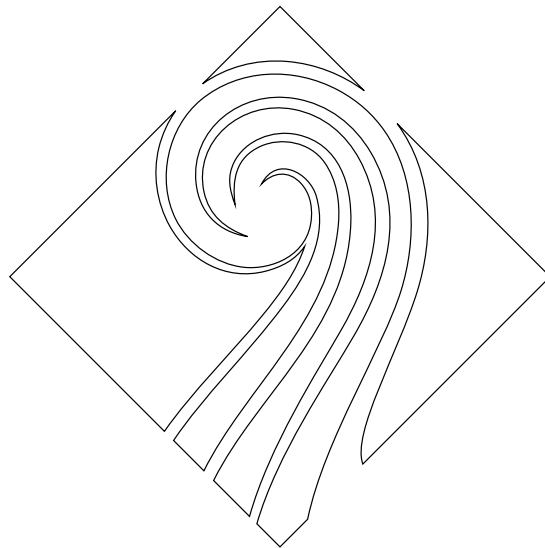
Guido's innovation of marking the C and F lines with color, and adding other staff lines was also the beginning of the C and F clefs. In Figure 6.2, the yellow line is designated as C. This matches the fractal sequence beautifully. With C as Prophet, the colored line, or the label of C, marks a foundation from which the other pitches can relate. With the F colored line, we are seeing the very beginnings of the Ruler pitch being used to create a standardized system for the rest of the pitches. This later became the F-clef, which is now much more popular than the C-clef in that it's used for many more instruments, and is also the lower of the two staves in the Grand staff.

The next pitch that clearly expresses its design in these beginning stages of notation was the Bb, which in the fractal of 12 would be Birthright. This was the very first flat to be employed (see Figure 5.2) primarily to avoid dissonance, especially the tritone in a hexachord system. A birthright, as we experience it, is a problem that God gives us to resolve, so the function of the Bb to resolve dissonance fits really well.

As with everything else in this slow process, many of the pitches took much more time to fully develop. The F#/Gb for Mercy, for instance, necessitated more time since it is loaded with all seven sharps or flats and needed a better tuning system to be accessed without sounding disjunct. The pitch for Community, A, also took much more time to come to fruition, but the basic explanation for Community is that ensembles tune to A--a very simple expression of its design that we will continue to explore in greater depth in Part Three.

Up to this point, frequencies still are not trackable, so the pitch A was not set to any particular frequency. All of the intervals up to this point are only relative to each other by ratios and by resonance, which we will talk about in greater detail in the next section.

In between the time of Guido d'Arezzo, and the standardization of A at 440 Hz in the mid-20th century, the functionality of music solidified so that not only did musicians have access to seven solfege syllables, but had access to all of the half-steps in between, along with the 7-chords, Neopolitan 6th, chromatic mediant, Augmented 6 chords, the chameleonic variations of the V chord, all the Pops and Jazz chords, and more. Music was no longer the “half-baked potato” of Pythagoras’ time, but a full, deep system, able to create a vast array of musical works in myriad ensemble settings across multiple genres.



Part 2

Visible Sound and Extra-Musical Resonance



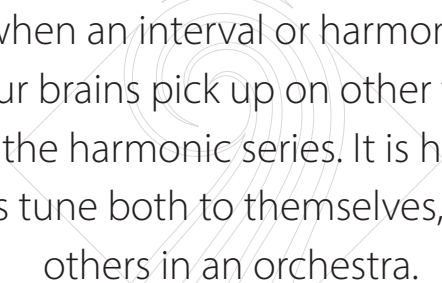
To Be (In Tune) or Not To Be (In Tune)?

Even though frequency was not technologically trackable until about 800 years after Guido d'Arezzo, the Classical genre of music was in full swing by the 1700s, which, as a Teacher genre of music, necessitated the utmost precision in intonation.

In an orchestra, every violinist has to be playing at the same frequency in order to sound in tune as a whole. A lot of beginner violinists wish they could sometimes hide in the crowd if they don't know a passage very well, but if a violinist plays out of tune, the orchestra director can not only hear that one person is out of sync, but point out exactly who it is! Before technology could precisely track frequencies, musicians relied on empirical data for whether or not something was in tune.

As a violinist, there are a couple tricks. In Baroque style playing, violinists use a lot more open strings, and sometimes, to create greater resonance at a cadence, we might play a stopped D on the G string with the open D at the same time if that is the key we were playing in. This needs to be spot on in order to sound in tune; even a slight discrepancy will cause what physicists call acoustic beats. Our ear picks up the difference between two nearly similar frequencies as a third frequency. It is usually not fast enough to sound as a tone, but instead, will sound like a thumping in the ear. To lapse into scientific terms for a moment, if I were to play 1 Hz off from the open string, then I would hear one thump per second in my ear. If I'm two Hz off, then I would hear two thumps, etc. The interval can widen enough for there to be quite a few acoustic beats per second before the interval gets so wide that we don't hear the beats anymore. Even when frequencies were not trackable, violinists could recognize that they were more or less in tune depending on how fast the beats were thumping as they played. When the two notes are perfectly in tune there are no beats between them.

Violinists were also aware of resonant frequency. For example, if I play a G on the D string, then my open G string will vibrate without me exciting it with my bow or plucking it. Resonant frequencies with the string are also sensitive to register. For instance, if a bass player were to bow an open A, that A is much lower than the one on my violin, and it will not cause as much sympathetic excitation. If the note is the same octave, then the whole string will vibrate visually as one unit. If the note is an octave above the open string, then the whole open string will sympathetically vibrate in two sections with a node



But when an interval or harmony is in tune, our brains pick up on other frequencies in the harmonic series. It is how musicians tune both to themselves, and to others in an orchestra.

in the middle. The higher up in the octaves the played note goes, the less the open string will sympathetically resonate.

Likewise, when a violinist is playing double stops, or an orchestra is playing a harmony, musicians listen for the overtones. When the interval between two notes gets wide enough for the ear to no longer hear acoustic beats, what musicians hear instead is an activation of the overtones. Not all intervals activate strong overtones; when an interval is out of tune, the musician will basically only hear the two notes being actively played, and the overtones will either sound disjunct, or won't be very discernable. But when an interval or harmony is in tune, our brains pick up on other frequencies in the harmonic series. It is how musicians tune both to themselves, and to others in an orchestra. We start with the lowest note, and build pitches going up, matching each one slowly until the upper partials are unlocked and we can add the next pitch.

So, while musicians in the 1700s could not have determined the frequency of any particular note, they used a combination of the tuning systems that they had, along with empirical data to determine if they were in tune or not. Even without technology, musicians, especially Classical musicians, are ear-trained to be able to determine if a note is accurate within about $\pm 1/2$ Hz relative to other pitches.

Chladni Plates and Resonant Frequencies of Objects

Scientists have had a lot of fun experimenting with making sound visible. One pioneer in that field is Ernst Chladni (1756-1827). What he found was that if he took a bow and played it across the edge of a metal plate with sand or salt on top, the plate would ring, and the sand would shift into the nodes of the vibrating plate.

What this experiment brings to view is resonant frequencies. The metal plate has a resonant frequency, and as the bow plays across the edge, the plate vibrates, and the sections that oscillate push the particles into the still grooves in between. Chladni then could stop a node with his fingers and bow again to find harmonics of the fundamental frequency.

What is more common today is instead of using a bow, we use an electronic sound generator. The higher the frequency the generator produces, the higher up in the plate's harmonic series we would go, and the more complex the designs of the particles would be.

What the New Age community has focused on is a particular harmonic in the Chladni plate at 432 Hz. It is not the fundamental frequency of the plate, but a harmonic, and they are arguing that because it makes a pretty picture, that 432 Hz is a better tuning frequency than 440 Hz.

This argument is a *non sequitur* for a few reasons. The picture in the sand is not a picture of sound itself, but rather, how it is oscillating through a metal plate of specific proportions and density. If the plate were of even the slightest different proportions, then the resonant frequency and harmonic series would be different,

and 432 Hz would not be in the series. There is actually a YouTube video (Steve Mould's *Chladni Figures*) of a Chladni plate experiment that explains the process very well, and uses a plate that is massive. He uses a bow and his fingers to stop the harmonics, and the plate produces pitches at about 240 Hz, 324 Hz, 695 Hz, and 766 Hz, which are not associated with any tuning frequency.

The New Age community is also suggesting that because it makes a pretty picture here, that it is applicable to other mediums like the human body. But unless the human body has exactly the same dimensions and density as the metal plate, it will not have the same resonant frequency or harmonic series. Thankfully, the human body is much more complex than a metal plate. The bottom line is that we see the same level of incongruity here as we did with numerology of the frequencies, and the Golden Ratio. Frequency theorists

are taking one pretty picture generated by one plate and trying to make a miraculous absolute out of it when it is nothing of the sort.

Frequency theorists are taking one pretty picture generated by one plate and trying to make a miraculous absolute out of it when it is nothing of the sort.

The Christian community has also tried to apply Chladni plate experiments to their work, sometimes using the Hebrew Aleph-bet. This runs into the same problems in that they are not testing the sound itself, but how the sound propagates through the metal plate, the results are just as negligible in that only the first four letters of the Aleph-bet created the desired effect.

Physicists of sound since then have explored the concept of visualizing resonant frequencies in many other capacities. One of my favorites is Rubens' Flame Tube, which is basically filling a tube with propane gas, drilling some holes in the top and setting it on fire and seeing how different frequencies sent through the tube change the shape of the flames coming out of the drilled holes (See Endnote 4 for some YouTube links). They have also looked at resonant frequencies in bodies of water, which has also caught the New Age community's attention, but has the same faults as the Chladni plates.

The big picture is that everything has a resonant frequency. Engineers stumbled across that reality by catastrophes like the destruction of the Tacoma Narrows bridge.¹ When a frequency is activating sympathetic resonance with an object, but excites it beyond the material's elasticity, the object breaks. In the case of the bridge, the wind was exciting the bridge's resonant frequency, and it exceeded the bridge's elasticity, and it collapsed. Doctors also use this method to break up kidney stones. And one fun experiment demonstrating this is shattering a wineglass with your voice. These are all examples of frequencies exciting sympathetic resonance too great for an object to withstand.

¹ YouTube - Tacoma Narrows Bridge Collapse "Gallopin' Gertie"

But there is one concept that is important regarding resonant frequencies, and that is the necessity for specificity. Take the wineglass experiment, for example. Harvard has a good web link detailing the specifics of the experiment,² and notes that the only way for the experiment to work is to be within + or - 1/2 Hz of the wineglass' fundamental frequency. If the tone generator is off by more than that, then the wineglass will not sympathetically resonate, and won't break.

That amount of specificity is necessary for any sympathetic resonance in any capacity. If a musician is off by more than that, then a unison will not sound in tune and will produce acoustic beats. If it is off at the doctor's office, then the kidney stone won't shatter. If the Chladni sound generator is off, then the plate will not create a clear pattern with the sand particles.

In spite of the New Age community's desire to resonate with various aspects of creation, they fail the majority of the time by either picking a harmonic so high in the series that it is not likely to matter, or they are not within the necessary + or - 1/2 Hz for sympathetic resonance to occur.

A Static Frequency and a Dynamic Universe

That leads us to the New Age concepts of finding the resonant frequencies in nature and using music to attune to them. 432 Hz is one such frequency associated with a number of different extra-musical sources like the universe, the earth, and Schumann resonance to name a few. 128 Hz and 528 Hz are also very popular. The association of 432 Hz to most of these things is disproven even within the New Age community, however, I would like to look at the conceptual issues behind any extra-musical sympathetic resonance from a Christian perspective.

What is the "Frequency of the Universe?" If we think about this literally, the universe is an ever-expanding space, filled with galaxies, and stars, and collections of gas through which aural sound cannot propagate. It is also, apparently, expanding at an ever-accelerating rate.³ But assuming that the universe does have a resonant frequency, we run into a problem. It is the same problem we have with Chladni plates. Varying the size of the Chladni plate even minutely would change the frequencies at which they form solid visuals. Any variation, and the resonance with a static frequency is gone. According to Brian Greene, in his article, "Darkness on the Edge of the Universe," with the universe expanding at an ever-accelerating rate, the planets on the far reaches of the universe are moving away from Earth at "faster than the speed of light." This means that if there is a resonant frequency of the universe, it is unceasingly, exponentially changing. So, the resonant frequency cannot be a static 432 Hz.

On the other hand, most people promoting 432 Hz as the resonant frequency of the universe are not actually thinking of the literal, ever-expanding universe in its totality. They are thinking more from the New

² "Shattering Wineglass"

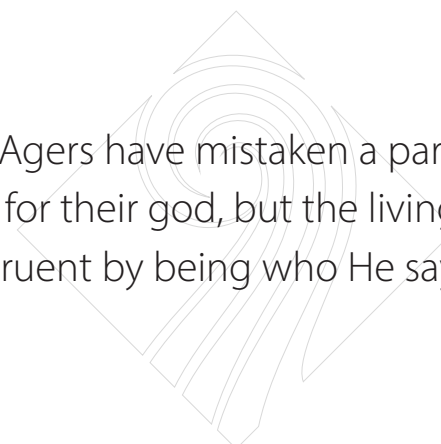
³ Greene paragraph 15.

Age perspective of an ever-present spiritual force that we all ought to be attuned to, but because of humanity's foibles, we are out of sync and need to get back in tune. This is one of the saddest tragedies, and a fundamental flaw, of the New Age movement--New Agers are trying so hard to be reconnected with God, but they are so disconnected that they are mistaking Him for something He created, and no amount of vibrational therapies is going to heal that disconnect. In other words, the whole of the New Age movement is incongruent; that's why all of its subsequent parts are also incongruent, like trying to apply Numerology to the frequencies, or believing in the Golden Ratio as an absolute, or relating the resonance of a metal plate to a human body. It's like an analog watch that will never track the time because all of the cogs inside are the wrong size and shape.

Healing frequencies are a New Age attempt to heal a person (and bring salvation, according to some) from the outside in, but if we are reconciled as believers, then we are transformed through Christ from the inside out (Or, we are in the process of it). One example of music's ineffectiveness for healing is David playing his lyre for King Saul in 1 Samuel 16:14-23. While it is true that David's music made Saul's tormenting spirit leave, Saul had not been inwardly healed of the causal issue, so the evil spirit kept coming back. Frequency theorists have exemplified this story, but the music was merely a bandaid for a wound that wasn't healing.

This use of vibrations to heal from the outside in creates a convenient market for various kinds of vibrational remedies, including essential oils and flower essences, that is akin to the pharmaceutical market--since the vibrational remedies are only acting as a pack of bandaids for a wound that isn't healing, it creates a dependence on the product for temporary relief and doesn't bring true resolution to the root of the problem. The root issue of the New Age movement mistaking the universe for God, and the subsequent problems of relying on vibrations for attunement results in dependence and not in true healing.

This is why Christian frequency theorists have no need to reappropriate any New Age material, because Christianity on its own is congruent on every level. New Agers have mistaken a part of creation for their god, but the living God is congruent by being who He says He is. New Agers attempt through Numerology to impose an incongruent design on the frequency spectrum, while God's creation of it has allowed the true design of frequencies to operate and become evident without imposition. New Agers are depending on healing modalities that don't resolve root problems, while Jesus as the savior of the world not only brings true closure to the wounds in our inner world and transforms us from the inside out, but reconciles *all* things back to the Father. Jesus basically takes the messed up Rubik's cube that we have made of everything and configures all six sides to match again when we couldn't for the life of us figure it out for ourselves.



New Agers have mistaken a part of creation for their god, but the living God is congruent by being who He says He is.

Different Kinds of Frequency

New Age frequency theorists have imposed certain emotional and spiritual purposes onto the healing frequencies based on Numerology. But as we have explored, Numerology is inapplicable to the frequencies, and the imposed purposes are negated. One reason for leaving this section unaddressed thus far is because there have, as of yet, been no studies done on the true emotional or spiritual characteristics of each frequency based on design. The reappropriation of New Age material is also causing a basic confusion of how frequencies work. So, I would like to make a few clarifications and distinctions regarding the different kinds of frequencies along the broader spectrum, and address some of the shortcomings in current Christian experimentation.

New Agers believe that everything tuned to 440 Hz is cerebral and disconnected from the heart. But let's look at some works with 440 Hz as the tonal center: "Farther Along" by Josh Garrels, "Love in the Dark" by Adele, or "Every Breath You Take" by The Police. The 440 Hz of each is not only connected to the heart, but conveys and elicits a very different emotion from the others. So even in this tiny microcosm, the New Age belief is false.

That is because there is a difference between emotional frequencies and aural frequencies.

Various aural frequencies can also express the same emotion. For a darker example, if a musician or group decided to tune A to 444 or 432 Hz, and decided to play Shostakovich String Quartet no. 8, which was basically a suicide note, or Stravinsky's "Rite of Spring," the chronicle of a pagan child sacrifice, it really isn't going to matter. The emotional content is going to be awful regardless of the tuning frequency used.

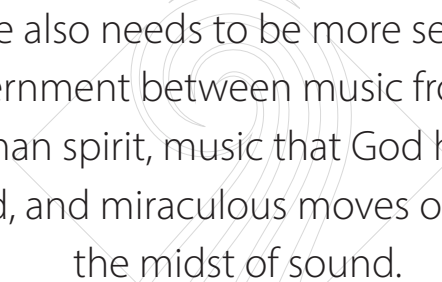
That is because there is a difference between emotional frequencies and aural frequencies. If there were no division, then it would mean that the slightly off B-flat that your fluorescent light is buzzing at would be like one of the robots in Douglas Adams' *Hitchhiker's Guide to the Galaxy*, and emitting a certain emotion all the time. But the general population doesn't hear a buzzing fluorescent light and think, "Why do they produce lights that are always so euphoric?"

So, any aural frequency, including 440 Hz, can be infused with any kind of emotion. The professional world of music generally looks at the assumed emotional and spiritual attributes of the healing frequencies (or the assumed lack thereof in 440 Hz) and interprets it as a lack of musicianship more than anything else. A high-level musician has a wide emotional pallet, and can apply different combinations of colors in different intensities to create a masterpiece. What the healing frequencies movement is doing is applying a single emotion or spiritual purpose onto one frequency and believing that's all that frequency has to offer. It is like a painter believing that a single shade of red is the only color option when it's not.

Another type of frequency higher up on the frequency spectrum that also acts as a battery of sorts for emotional or spiritual content, is electromagnetic waves. Frequency theorists have been hypothesizing about this type of frequency as well, and how it correlates to things like the Earth and Schumann resonance.

Along with those types of frequencies are spiritual sounds. Even a person who is not Christian notices when a person is engaging the music with their spirit or not. I had a professor once who was adamantly opposed to Christianity, but noticed a shift in one of my performances and said afterwards, “Your playing in that moment was next level--I saw your light. You need to play like that all the time!” Likewise, a person can be very technically accomplished without their spirit being engaged, and most people can tell because the music doesn’t have what a lot of what my former professors call, “it.” Regardless of not having the language for that special something, engagement from the human spirit is what they are looking for.

Then there is the worshiper’s hope, and that’s when God comes and either takes over the music itself, or inhabits the praises of the people. We recognize anointing and God’s presence as separate from aural frequencies because there are times when we sing a worship song and God comes. But then there are other times when we might sing the same song in the same key and it seems like God decided to go to the party next door instead. There are some frequency theorists associating a move of God in worship with the frequencies themselves, and that is an inaccurate assessment because God is not dependent on any of His frequencies, and the combination of elements in worship is so complex that there really is no way to get the same spiritual results with a song every time.

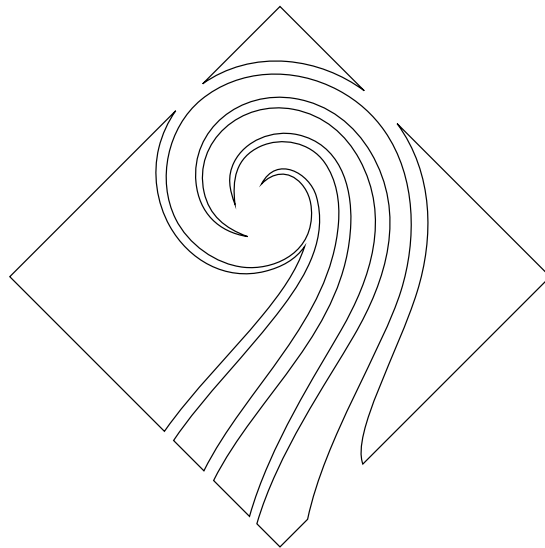


There also needs to be more sensitive discernment between music from the human spirit, music that God has hijacked, and miraculous moves of God in the midst of sound.

One problem that I am seeing consistently amongst Christian frequency theorists is a basic amalgamation or confusion of the different kinds of frequencies. While looking for new applications for music and frequencies (without digging through New Age trash to get it) is good, the lack of clarity is skewing any clear results that could be gained. If a musician wants to test the healing properties of an aural frequency, then they need to understand the different kinds of frequencies at work in music, and not allow a conglomeration of them, especially with emotion, to skew results or create a bias. There also needs to be more sensitive discernment between music from the human spirit, music that God has hijacked, and miraculous moves of God in the midst of sound.

The New Age community, in attempting to find the resonant frequency of the universe, has overtly tried to put their god in a box, and reduce their god to a formula by their Numerology. Christians have inadvertently also put the true and living God in a box by being unable to differentiate between what is an

effect from an aural frequency and therefore replicable, and what is a miracle. For example, there are some Christians who believe that it was the frequencies that Paul and Silas sang that liberated them from prison in Acts 16:25-26 when it was actually a miraculous move of God that physicists of sound cannot reproduce or explain.



Part 3

Standardization of $A=440\text{Hz}$



This section, which relies more on historical fact than physics of sound, is the most challenging for me to research and write specifically because there have been so many mistakes and perpetuations of false information. Even references like the *Grove Dictionary of Music* have been found to have errors. But I was very pleased in my research to find some legitimate sources to bring much needed clarity on the matter.

That being said, another fault from conspiracy theorists is sometimes taking what remains of accurate information, and misinterpreting it. So while there are some instances where the sources were similar, my goal as mentioned before, is to bring an alternative interpretation of the data.

Tuning Forks and Pitch Inflation

Before the tuning fork was invented in 1711, the easiest way for scholars of today to get an idea of the range of frequencies at which instruments tuned was with historic organs. In Lynn Cavanagh's article, "A brief history of the establishment of international standard pitch a=440 hertz," Cavanagh demonstrates the broad spectrum of pre-tuning fork concert pitches: "To take Germany prior to 1600 as an example, organ pitch there is thought to have varied from a high of A=567 Hz for the first simple pipe organs of the Middle Ages to a low of A=377 Hz for the early modern German organ around 1511" (p. 1).

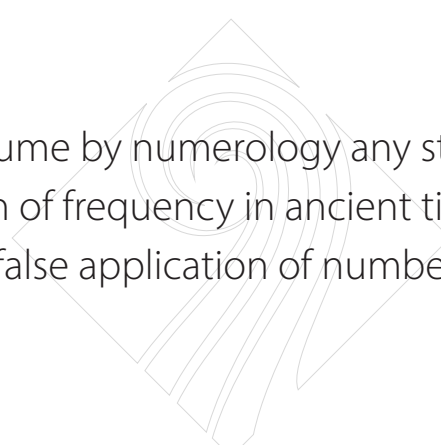
The tuning fork brought with it a number of very interesting shifts to the world of music. Musicians, orchestras, and other ensemble groups started tuning to one, but tuning forks still did not necessarily produce a standard frequency, and the discrepancy between them could be quite broad. Frequency could still not be discerned electronically, but the tuning forks used by various musicians and orchestras still exist, and we can

test them now, like the organs, to hear what they sounded back in the day.

The oldest tuning fork archived from history is Handel's, produced by inventor John Shore, which resonated at 423 Hz, but a second tuning fork of Handel's, used around 1780 is set to 409 Hz. Beethoven's tuning fork in 1800 was 455.5 Hz, while the tuning fork used in Dresden in 1815 was set to 423.3 Hz, and another in 1826 resonated with 435 Hz.¹ With such a disparity between tuning frequencies by the 19th century, due to a lack of technology and a lack of care, how can anyone assume that any ancient society, or person therein, had developed the means socially, musically, and scientifically, to set a tuning frequency?

What statistics of old organs and the archives of the first tuning forks show us is the impossibility of any ancient society tuning to any certain frequency. If people of the 18th and 19th centuries either weren't yet

¹ "Concert Pitch" Pre-19th century.



To assume by numerology any standardization of frequency in ancient times is a false application of numbers.

thinking about what other musicians or groups tuned to, or lacked the means to establish a certain concert pitch, even more so was an ancient society incapable of standardizing pitch even nationally or locally--they didn't have the means. To assume by numerology any standardization of frequency in ancient times is a false application of numbers.

What caused greater destabilization of the concert pitch between orchestras through the 19th century was what is now referred to as pitch inflation. Since music was less voice-centered, and more instrumental, connoisseurs of music wanted a higher and higher tuning frequency because they thought it made the music sound brighter.

One of the arguments from the A=432 Hz campaign is that humanity subconsciously prefers the lower frequency because it is more soothing and relaxing. While it is true that slightly lower frequencies are perceived as having a warmer timbre, just as a slightly higher frequency is usually perceived as a brighter timbre, the fact that Western civilization continuously raised the pitch for a brighter and brighter sound over the course of about a century proves the theory that humans as a whole generally are not going to find the lower frequency of 432 Hz more pleasing. Some people may like it, but those who are in favor of A being reset to 432 Hz are certainly not in the majority by this observation.

What is more interesting is that 444 Hz is now becoming more popular than 432 Hz in Christian circles because (along with the numerological significance) they now find the higher, brighter frequency more favorable, which goes to show that a lot of the hype about 440 Hz being too high is more a fad than anything.

The issue of pitch inflation through the 1800s caused a lot of stress in the vocal community, however. There were a number of orchestras using tuning forks set notably higher than 440 Hz, and it was the outcry from the vocalists that began the move towards standardizing concert pitch and ceasing inflation.²

Standardization of Concert Pitch

A number of sources credit the first national standardization of A to France in 1859, who set what they called the "*diapason normal*" to 435 cps (cycles per second were used instead of Hertz in most countries at the time).³ However, the Germans had standardized 440 Hz earlier. In 1834, Johann Heinrich Schiebler invented the tonometer, a device to calculate frequencies. It was by this invention that he proposed 440 Hz as the standard tuning frequency for A, which was adopted at the Stuttgart Conference that same year.⁴ By this fact alone, the theory of Hitler or Goebbels forcing 440 Hz into standardization is nullified because Hitler wasn't born until 1889, and Goebbels not until 1897.

In 1885, Vienna held the first conference to standardize A at 435 cps internationally. A number of countries were represented: "Italy, Austria, Hungary, Prussia, Russia, Saxony, Sweden, and Württemberg," and

² "Concert Pitch", Pitch Inflation.

³ "Concert Pitch", 19th- and 20th-century standards.

⁴ "Concert Pitch", 19th- and 20th-century standards.

they agreed to adopt the standard of 435 cps for all of their music (Weisenstein, “Musical Pitch and International Agreement.” 342).

The United States also had adopted 435 Hz, but were among the first to transition from *diapason normal*, to A at 440 Hz. The shift was first proposed in 1910 by J.C. Deagan, a musical innovator who invented a number of percussion instruments, and was an authority on acoustics.⁵ The American Federation of Musicians officially adopted A at 440 Hz in 1917.⁶ This was during World War I, so the tone of the conference was notably somber, but patriotic and hopeful. However, this statistic alone also counters the conspiracy that Rockefeller aided in standardizing A=440 Hz for the sake of causing mass hysteria in the 1940s. A=440 Hz had already been adopted with no ill effect (See Endnote 5).

In 1919, the standardization for A at 435 cps was written into the Treaty of Versailles in Article 282⁷ for the Germans and their allies to adopt. This was, perhaps, the first time that a frequency was attempted to be forced internationally. That kind of forced attempt at standardizing A at any frequency has thus far failed as far as my research goes. Its success has been only through mutual agreement, a beautiful picture of Community.

What made the most monumental shift for 440 Hz to be standardized internationally was Great Britain’s acceptance and then standardization of it for the first time in May of 1939. As a country with the Redemptive Gift of Ruler, this shift from the Prophet countries (Germany and the United States) supporting A at 440 Hz, to Great Britain standardizing it internationally is a pristine expression of design.

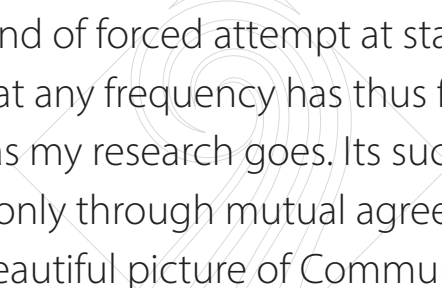
To elaborate, Prophet nations are known for new revelation, especially in the arena of the sciences. Ruler nations understand systems, and how to establish them ubiquitously. In this case, the Prophet nations were the forerunners to accept 440 Hz as concert pitch, but it was the Ruler nation of Great Britain who set the standard for the rest of the world to accept it. There is another positive layer to this in that Ruler nations are sometimes known to create systems of slavery instead of freedom. In this case, it is a system of freedom because no one is at all forced to accept the standard; anyone can defect any time without punishment (as the musicians supporting 432 or 444 Hz are doing). It just means that they will not as easily have community with the rest of the musical world.

In the struggle of finding accurate sources, I found an article, “INTERNATIONAL STANDARD MUSICAL PITCH,” in the *Journal of the Royal Society of Arts* that made my heart sing. It is an archive of a meet-

⁵ White 391.

⁶ American Federation of Musicians 287.

⁷ Weinstein 342.



That kind of forced attempt at standardizing A at any frequency has thus far failed as far as my research goes. Its success has been only through mutual agreement, a beautiful picture of Community.

ing led by Llewelyn Lloyd, a member of the British Standards Institution, discussing the details of the 1939 conference in thorough detail. This conference in particular has been labeled as key in the Hitler/Goebbels conspiracy theory of attempting to brainwash people, so having access to a source that brings such clarity on the matter is superb. The notes of the conference itself can be found in B. S. 880/49, although I wasn't able to find that one.

At the beginning of the meeting, the chairman read a paper. The first paragraph was as follows:

In May 1939, some three months before the declaration of war on Germany, an unprecedented event occurred; for the first time in history Great Britain was represented at an international conference on standard musical pitch. But this country was even more in the limelight than that suggests. The conference met in London, and the business arrangements, which were conspicuously successful, were in the hands of the British Standards Institution. To that body, and to the chairman--the late Dr. G. W. C. Kaye, F.R.S., of the National Physical Laboratory--our thanks are due for a rather notable achievement. For more than a century Great Britain had been a law unto herself in the matter of orchestral pitch, "concert pitch", as it was commonly called. English musicians had not been unaware of happenings on the Continent, but an insular view of them had prevailed; and, as a result, they had been persistently misunderstood and, in consequence, misrepresented. For example, Great Britain ignored the findings of the international conference on pitch held in Vienna in 1885, at which she was not represented. This had unfortunate results as we shall see. It is therefore the more noteworthy that under Dr. Kaye's tactful guidance the 1939 conference reached complete unanimity. The countries represented were France, Germany, Holland, and Italy, in addition to Great Britain, while the official views of Switzerland and the United States of America were before the conference. (Lloyd 74-75)

According to this, there is a disparity regarding France's involvement. Conspiracy theorists supporting 432 Hz propose that France was opposed to 440 Hz and not represented. But as mentioned here, that is not the case.

Further along in the article, a disagreement with France arose over the temperature at which concert pitch was to be standardized, but that concern was ruled out. The big picture from the perspective of music's progress was that tuning forks were no longer necessary. As the article states, "The urge for a new attempt to bring about an international standard of musical pitch . . . came from the International Broadcasting Union" (76). Due to the new international sharing of sound through this new field, there was a newfound pressure for concert pitch to be internationally standardized, and in broadcasting and electronic sound, temperature is irrelevant.

One strategy Great Britain employed with standardizing A=440 Hz was to play the tone on the radio just before 6 o'clock for orchestras to tune to before rehearsals, along with anyone else who may have wished to use it. There was a certain way to electronically produce the tone, which was another reason 440 cps was preferred. There are a couple conspiracy theories that involve this fact as part of a ploy from Hitler to control people, but that theory doesn't follow because that was a decision by Great Britain for Great Britain. This

is not a surprising decision for a Ruler country to make, given Ruler's innate ability to systematize; I have no records indicating that any other country followed suit.

In spite of unanimous agreement for A=440 Hz with the nations involved, World War II followed shortly after and the standardization was put on hold. The next conference was with the International Standards Organization in November of 1955. Neither Hitler nor Goebbels had any influence on this standardization of A=440 Hz as they had both already been dead for ten years.

ISO 16 had been brought to a vote again in 1975 because humanity's trend for pitch inflation was still pushing some orchestras sharp, but A=440 Hz again found unanimous agreement. Sadly, the article through the ISO website is not free, but there is a preview available of the Forward, which reads:

ISO Recommendation R 16 was approved by the Member Bodies of the following countries :

Austria	Netherlands	Sweden
Chile	New Zealand	Switzerland
Denmark	Norway	United Kingdom
France	Pakistan	U.S.S.R.
Ireland	South Africa, Rep. of	Yugoslavia
Italy	Spain	

No Member Body expressed disapproval of the Recommendation.

No Member Body disapproved the transformation of ISO/R 16 into an International Standard.

(Table borrowed from International Standards Organization)

ISO also reviews this standard every five years or so as a periodical review. The dates for those reviews are also available on the ISO 16 web page.⁸

Setting A to a certain frequency internationally was a monumental shift in the world of music, and the clearest manifestation of A as Community in the fractal of 12. Whereas A, by the mid-1800s, expressed Community internally as the tuning pitch for which the other pitches within the system could relate, there was no standardization in the musical Community at large. An A in one country might be a Bb in another. But with orchestras world-wide agreeing for A to be set at 440 Hz, musicians could now perform with ensembles across the world, or someone could listen on the radio to music from other nations, and all of the musical frequencies and their harmonic series would be lined up. The manifestation of Community in A=440 Hz was globally affirmed.

⁸ International Standards Organization.

Scientific Tuning

While A is concert pitch, C has also been used as a frequency reference in the scientific community. Before Schiebler invented the tonometer, the earliest technological or scientific move towards being able to track frequencies that I have found is Joseph Sauveur (1653-1706). His material didn't completely stick because he tried to reinvent the musical wheel while studying a new field of his own invention: acoustics. While he was passionate about his work, musicians found his specificity impossible to adhere to--apparently he had divided the octave into over 3000 parts.⁹ He is credited as the first to try to establish a tuning frequency of C=256 Hz as a "scientific" or "philosophical" pitch, although I have only found that information in Wikipedia articles and conspiracy theories.

The next couple of people that supported C as a tuning pitch were Rudolf Steiner and Hans Cousto, although their frequencies were slightly different from each others' and questionably derived. Cousto's C was set to 126.22 Hz,¹⁰ while Steiner's is 128 Hz. Cousto's is not as popular because it doesn't fit very well with the other frequencies circulating today. Steiner's fits a little better, but his theory is based on a sun angel named Michael creating shooting stars out of sunspots, which is not scientifically accurate, and is rooted in Theosophy.¹¹

Maria Renolds, as mentioned before, was inspired by C=128 Hz, and is the first to create two temperaments using three tuning forks: C=256 Hz, A=432 Hz, and F#=362.04 Hz. These temperaments exist primarily to get the frequencies to work together, but do not provide an improvement for the tunings or temperaments most commonly used with 440 Hz tuning today.

Following their developments came Schiller Institute's article by Jonathan Tennenbaum, "The Foundations of Scientific Musical Tuning," which also promotes the "Scientific Pitch" of C as a musical frequency but does not establish a functional inner system, nor a way to incorporate 432 Hz like the Institute would like. The article references other sources that mention C=256 Hz as the Scientific tuning pitch, but outside of his article I have so far not found support for as much widespread adaptation in the musical community.

The article in the *Journal of the Royal Society of Arts* again came in handy regarding the involvement of C as a scientific pitch. There is a discussion following the meeting in which a Mr. Morrison asks:

I was wondering why the lecturer never told us just exactly to what pitch 440 for the A corresponded to the middle C. I was brought up in old fashioned physics where, in study of sound, 256 vibrations per second was always laid down for middle C. Was that ever a standard pitch or was it only because mathematically 256 is 2 to the power of 8? May I suggest that when the paper is being printed, it might be possible for the sake of old-fashioned physicists like myself, to put in brackets the pitch corresponding to middle C. It would make things a little bit easier because, in addition, the musician goes by the A above middle C, whereas the physicist usually considers the C. (p. 88)

⁹ "Joseph Sauveur" paragraph 7.

¹⁰ Cousto.

¹¹ Renolds 81.

Llewelyn Lloyd as the lecturer replied as follows:

256 was never a musical pitch at all. As a physicist I will agree with the questioner that it is a very useful one to start with, because it is really based, of course, on a pitch frequency of one. You move it up nine octaves and you get $C=512$. That has certain conveniences, but it never was a musical pitch. I think that, at the instance of Stainer, the organ in Lincoln Cathedral was once tuned to $C=512$, but it was found to be a little too low. The whole point about pitch is that you have to remember that when you fix one note, any tuning you do on a keyboard instrument is derived from that by equal temperament. Once you have fixed your A at 440, your C is derived from it on a keyboard instrument; it becomes 523.25, which is just a little more than the previous 522. (p. 89)

From a fractal standpoint, the reason why Scientific Tuning has not successfully been established as musical tuning reference is because of the Prophet design of C. Regardless of how weird, or cult-oriented, or how scientifically founded any of these theories are, while Prophet is associated with the sciences, it is not by design associated with bringing holistic integration of all parts like Community is. While there are aspects to the physicists tuning pitch that make sense, $C=256$ Hz doesn't correlate well with any of the other tuning pitches. Renolds' is the only one that, by a stretch, makes 256 Hz work with 432 Hz, but it's, as my brother would say, "not enough juice for the squeeze."

Community

In the fractals of music, A lines up with Community in the fractal of 12. So, the final question would be, do either 432 or 444 Hz express the essence of Community?

And neither does. 432 Hz is usually referenced either as a stand-alone frequency and any other frequency relationships are irrelevant, or it is used with a tuning system that is either outdated or dysfunctional. Some New Agers use Pythagorean tuning, which, as we have explored, is a very limiting platform. It only functions in one key, the thirds and sixths are out of tune, and chords are impractical. The Schiller Institute tried to force a new system with 432 Hz and 256 Hz and failed. No application of 432 Hz has established appropriate internal Community in the form of a functional musical system.

It has also failed to establish external Community. 432 Hz has at best been used for personal preference and gain, and that has nothing to do with community. As far as an official concert pitch, the Schiller Institute tried to impose 432 Hz in Italy with consequences of heavy fines for those that did not comply,¹² and the Bill failed to pass. The A=432 Hz campaigns have made a point to attack the A=440 Hz world with pseudoscience and conspiracy theories for the sake of destroying community with paranoia.

444 Hz does not manifest Community either. It was established by conspiracy theorists who themselves

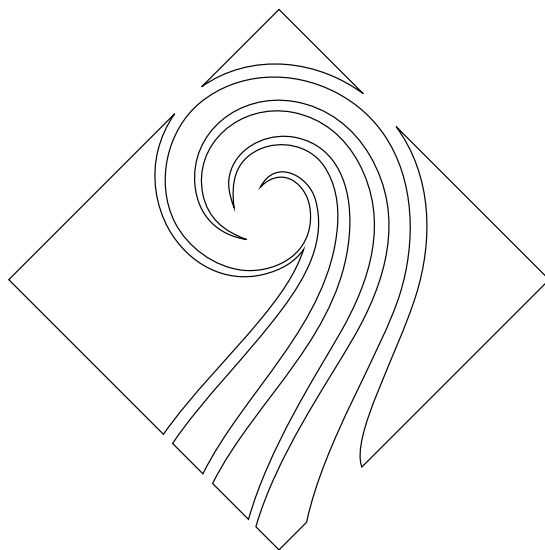
¹² Larouche, Lyndon. "Revive Verdi's Tuning to Bring Back Great Music."

are infamous for leaving a trail of brokenness behind them. The set of healing frequencies often associated with 444 Hz as a concert pitch do not function together as a holistic musical system, and never will.

Christians who have tried to appropriate these frequencies have generally not left behind all of the conspiracies associated with them and when choosing 432 or 444 Hz, are attempting to alienate A=440 Hz. Some have created a niche market for themselves as musicians. To have a niche expression isn't necessarily bad; the niche of healing frequencies is just unsubstantiated, and it alienates the musician from having community with other musicians who tune to 440 Hz. Some are trying to elevate their worship, but that doesn't have much to do with Community, either, since it's focusing on the vertical relationship instead of a horizontal one.

Regardless of the attempt for these frequencies to act as breakers, A=440 Hz continues to operate in its design as Community just as it has since its standardization without being deterred.

Beyond this is the bigger picture of where music is headed. The internal system of music is well established across genres. A=440 Hz manifests its design beautifully both internally and internationally. Music as a whole is moving in the direction of new external applications, but no one has truly found them yet. The New Age community and conspiracy theorists are more the forerunners in the field of musical innovations, but do not operate by principle, and do not accurately interpret musical or historical data without the reference point of Jesus Christ as the Cornerstone. Christians ought not to be reactive, nor build walls to block Godly innovations, but be the forerunners as ones that walk with the truth.



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Endnotes

1. One very simple website that I like to use for equal temperament with multiple frequency options for A is:
<https://pages.mtu.edu/~suits/notefreqs.html>
2. I love the following website for calculating frequencies and discrepancies between one and another. It has been wonderfully helpful not only for finding frequencies, but translating how far out of tune a frequency might be in cents compared to those in any established tuning system or temperament:
<http://www.sengpielaudio.com/calculator-centsratio.htm>
3. Here are a couple different approaches to frequency calculation:
<https://www.ams.jhu.edu/dan-mathofmusic/notes-intervals/>
<http://www.stem2.org/je/musicmath.pdf>
4. Here is a Rubens' Tube standard experiment:
<https://www.youtube.com/watch?v=sQ3DCe5fziY>
And a video of Rubens Tube set to Queen's Bohemian Rhapsody: <https://www.youtube.com/watch?v=UDzdUqHE3ns>
5. The conspiracy based on Rockefeller studying music to lead to mass hysteria in Horowitz's online article, "Musical Cult Control: The Rockefeller Foundation's War On Consciousness Through the Imposition of A=440 Hz Standard Tuning," is based primarily on the article, "Composing for the Media: Hanns Eisler and Rockefeller Foundation Projects in Film Music, Radio Listening, and Theatrical Sound Design," by James Tobias. There was a research program sponsored by the Rockefeller Foundation in which a man named Burriss-Meyer studied the effects of sound to control the masses through the media. He worked for the military for a time, developing speakers on aircraft to send messages to the enemy below to hopefully get them to surrender. He also developed the idea of using speakers with sounds of warfare planted on an enemy's turf to cause mass hysteria--the sounds were things like bomber planes flying overhead, explosions, and the like. Nowhere in this article, nor in any studies beyond, of the Rockefeller Foundation, nor of Burriss-Meyer and his work in the theater of war, nor the artistic theater, was there a mention of A=440 Hz at all. Burriss-Meyer's work was focused more on speakers, acoustics, and sound effects.
6. Here are a few links to websites debunking 432 Hz for further reading:
<https://ask.audio/articles/music-theory-432-hz-tuning-separating-fact-from-fiction>
<https://www.medson.net/A432hz-myth.html>
<https://jakubmarian.com/the-432-hz-vs-440-hz-conspiracy-theory/>

Appendix I

The “ancient Solfeggio scale” was initiated by Dr. Joseph Puleo, and Dr. Leonard Horowitz in a book published in 1998 entitled, *Healing Codes for the Biological Apocalypse*. This 537-page conspiracy theory describes the numerological process for getting some of the frequencies, and the revelation by spiritual beings to get the rest. The frequencies they developed are: 174, 285, 396, 417, 528, 639, 741, 852, and 963.

The preface articulates some of the spiritual beliefs of the authors: “Both doctors feel justified in calling themselves ‘Christians’ in the Nasorean sense. Dr. Len Horowitz is a Hebrew who believes what few Jews believed, that Jesus Christ was a legitimate Messiah—the chosen ‘son of God.’”¹ But a search online for “Nasorean” offers scant results, the clearest definition comes from New Advent, the Catholic Encyclopedia, that writes Nasoreans are “pagan Gnostics:”

The name, however, most frequently used in their sacred literature is that of Nasoreans, *naswraya* which is also the usual Arabic (sing. *Nasrani*, pl. *Nasâra*) for Christians. The coincidence is striking, the more so as the Nasoræans have no leaning towards Christianity, but rather contempt and hatred for it; nor do their doctrines betray any approximation to Christian beliefs, except perhaps in that of the existence of a saviour, although some of their ceremonies bear a superficial resemblance to Christian mysteries. (Arendzen, “Names”.)

The statement then of being “‘Christians’ in the Nasorean sense,” followed by the statement of being Messianic, is a contradiction (and why he considers Jesus “a” Messiah and not “the” Messiah also perplexes me). But further along in the Preface, there is a “Limitations of This Book,” in which the authors write:

This book is not for everyone, but it is clearly for the prophesied 144,000 Israelites who will lead the earth’s intelligent, Godly minority into the messianic new age of peace and enlightenment. If you read the above sentence and balked at any of the Christian, Jewish and/or New Age themes, this work may not be for you . . . We make no apologies for this and challenge anyone who believes they can deliver a more certain explanation for the Bible revelations discussed. Those who believe that their religion holds an exclusive monopoly on God, we further presume, are less inclined to be “saved” themselves. . . Divisive beliefs and attitudes are commonly expressed by members of various religious persuasions. For example, people who call themselves “Christians” commonly assert that eternal salvation rests exclusively in a belief in Christ as Lord savior. All others, many Christians say, are doomed to suffer until they repent and turn their allegiance to Christ.

Yes, believing exclusively in the Lord Jesus Christ as savior is a fundamental belief of Christianity, and if a person does not believe in Jesus as such, then they are not Christian. So, after reading the Preface, it is clear that while Horowitz maintains the label of “Christian,” and will defend himself as Messianic, he isn’t one because he does not accept that Jesus Christ is Lord and the only way to the Father.

¹ A preview on Amazon includes all of these references for the Kindle version:
https://www.amazon.com/dp/B07J48V9YM/ref=dp-kindle-redirect?_encoding=UTF8&btcr=1

The first section of the book details the development of the supposed frequencies through Pythagorean Numerology, and revelation by spiritual beings referencing Numbers 7:12-83, Psalm 119, and Psalms 120-134. There is, however, no application for the frequencies, nor a theory on how to use them. The rest of the book is a conspiracy theory discussing covert manipulation by world powers and people of influence to suppress the people and make them sick, tying in topics as disparate as mad cow disease and the Knights Templar.

There seems to be no further collaborations between Dr. Puleo and Dr. Horowitz after the publication of this work. Dr. Puleo seems to have gone into obscurity, but Dr. Horowitz continued to publish a number of other conspiracy theories in the form of books, articles, and website pages centered around alternative health, and, of course, the healing frequencies.

The material has been propagating online mostly through the New Age community. His books and articles are what started the conspiracy theories on Rockefeller causing mass hysteria with A=440 Hz (Horowitz, *MUSICAL CULT CONTROL*), with 528 Hz and all of the pseudoscience behind it like being correlated to light and other aspects of creation (His book, *Book of 528: Prosperity Key of Love*, starts off with its own Preface, including bold statements like, “This book slam-dunks God’s existence, demystifies LOVE, and explains divine intervention, direction, and even “eternal salvation,” all administered musically-mathematically according to the laws of physics”), and all the paranoia about a reptilian race ruling the world.

In spite of the notable New Age and Christian following, Horowitz and his work has been thoroughly discredited. At the top of the list was a very direct online confrontation against Horowitz by Victor Hafichuk on his website,² detailing his direct correspondence with Horowitz, along with his own research to confront the man for saying he is a Christian when he doesn’t seem to be one. I hasten to say that through the comments, it looks like Hafichuk’s methods may have been questionable in that he went to Horowitz’s fan mail webpage, took all of the emails listed, and sent emails to warn them of Horowitz’s false teachings, which got a certain amount of backlash. But Hafichuk attempted to be clear about where Horowitz stood spiritually, including a quote of Horowitz’s on his now deleted fan mail site stating:

That the snake in the garden of Eden came into Eve. She bore his child, genetic defect. Started the Old Testament’s war against the non-Israelites. Didn’t you ever wonder why Yah had such a vendetta against certain ungodly people. He wanted them killed for the same reason he had Noah build his ark, to kill off the genetic defects. Were (sic) did the non-chosen people come from that Yah was not happy about. He took pride and joy in all creation, at the beginning. Remember Genesis? The mutants were not his creation, but born out of the manipulation and deception of the reptilian who had seduced Eve...

The epitome of their shame was their pregnancy. Eve and Adam were exiled for this reason mostly.

The basic perversion of the story of Eve is a good example not just of Horowitz’s non-Christian beliefs, but of the quality of his works as a whole in how the conspiracies are based in something real, but then

² www.thepathoftruth.com/false-teachers/len-horowitz.htm

turn into something wildly inaccurate. Most websites that have debunked the work of Dr. Horowitz tend to focus on one particular facet of his work, either the frequencies, his character, his conspiracies involving the government or the medical arena, or his fraudulent alternative health care practices.³

Scienceblogs posted a warning letter from the FDA regarding Horowitz's plethora of websites promoting alternative health care products.⁴ He had created upwards of fifty websites, all redirecting to a few, promoting his products with such high claims and testimonials that the FDA had to view them as mislabeled drugs. After articulating all of the code violations for his products, the letter reads, "The violations cited in this letter are not meant to be an all-inclusive list of violations that exist in connection with your products and their labeling. . . The unlawful disease treatment and prevention claims on your website were too numerous to list in this letter" (Science Blogs, 4th to last paragraph in letter). Horowitz wrote a public counter-letter to the FDA, including a link to the original FDA letter he had received, all available online.⁵

Upon further research, I found that trying to track the full extent of Horowitz's online presence is nearly impossible. Aside from the majority of the websites listed in the letter from the FDA covering all of his products, there are also the following:

- <http://www.528revolution.com>
- <http://www.tetrahedron.org/>
- <https://medicalveritas.org/>
- <https://revolutiontelevision.net/>
- <http://528Records.com>
- 528Radio.com
- Love528.com
- <http://www.medicalveritas.org>
- <http://WarOnWeThePeople.com>
- HealthyWorldAffiliates.com/1
- HealthyWorldStore.com
- DrLenHorowitz.com
- <http://www.PharmaWhores.com>
- <http://www.i528tunes.com>
- <http://www.FluScam.com>
- <http://www.TrueOtt.com>
- <http://www.PaulSullaFraud.com>
- <http://www.CureShoppe.com>
- <http://www.OxySilver.com>
- <http://www.LiquidDentist.net>
- <http://www.PrimoLife.net>
- <http://www.ZeoLife.net>
- <http://www.LoveMinerals.com>
- <http://www.InLiesWeTrust.com>
- <http://www.SilverSolFraud.com>
- <http://www.LoveCodeSeminar.com>
- <http://www.Love528Bar.com>
- <http://www.TheBookOf528.com>
- <http://www.HeavenlyKingdom.net>
- <http://www.BreathOfTheEarth.net>
- <http://TheWaterResonator.com>
- <http://528Rejuvenate.com>
- <http://paulsullacensured.com>

³ See also: <http://skeptdic.com/horowitz.html> and https://rationalwiki.org/wiki/Leonard_Horowitz

⁴ <https://scienceblogs.com/erv/2010/05/27/fda-warns-lenny-horowitz>

⁵ Horowitz's counter-article: <https://medicalveritas.org/fda-warning/>

And the original FDA letter: <https://medicalveritas.org/wp-content/uploads/2017/03/FDA-WARNING-LETTER.pdf>

The debunking article most relevant to this paper, comes from Roel's world--a thorough assessment of the ancient Solfeggio scale from multiple perspectives that debunks the work, supplies links for other youtube videos and websites that confirm the fallacies of the ancient Solfeggio scale, along with links to a number of New Age sites to be aware of that promote Horowitz's theories. (Although, he is pro-432 Hz, and references Jamie Buturff's material, which is beyond the scope of this work.)⁶

Dr. Horowitz's reputation for how he responds to the criticism precedes him. Any website that speaks against his work by debunking the pseudoscience, or the frequencies, or the historical inaccuracies, and Horowitz attacks them publicly. Roel's World was certainly not spared. The top of the article links to Horowitz's response to it, in which Horowitz writes, "He's not a scientist, his disclaimer reads. Nor a "certified specialist" in musicology or frequency math. He's not even a credentialed musician with expertise in tuning instruments. But if Roel's selected art is any indication, foreshadowing trashy demonic malicious intent, consumer fraud underlies Roel's World's public deception" (Horowitz, Leonard. "Roel's World Is Out to Lunch, Obsessed to Discredit 528"). The author of Roel's World seemed fairly unperturbed by Horowitz's typical, long-winded response.

Horowitz usually attacks the individual personally as an agent of evil in a counterintelligence propaganda campaign, using scripture and religious or political jargon, which some debunkers wear as a badge of honor, but has also led to a lot of other websites or YouTube videos being removed. Either way, the majority of the debunking sites that I have found make a point of mentioning his personal attacks.

Christian frequency theorists, nevertheless, have appropriated Horowitz's work, believing what he says to be true. I have not yet found a Christian frequency theorist who has not been influenced by his works. But while Horowitz says he is Messianic, the statements of faith in his works, along with the content of his character in rejecting and attacking accurate refutations, are not Christian. The conspiracy theories as a whole have been disproven by debunkers as being just as twisted as his conspiracy theory of Eve and the serpent, and the ancient Solfeggio scale is thoroughly dysfunctional.

⁶ Hollander, Roel. "Blog " Myth The Ancient Solfeggio Tone Frequencies." Roel's World, Roel Hollander, 29 Feb. 2020, roelhollander.eu/en/tuning-frequency/ancient-solfeggio-frequencies/.

Appendix II

“By their fruit you will recognize them. Do people pick grapes from thorn bushes, or figs from thistles? Likewise, every good tree bears good fruit, but a bad tree bears bad fruit. A good tree cannot bear bad fruit, and a bad tree cannot bear good fruit. Every tree that does not bear good fruit is cut down and thrown into the fire. Thus, by their fruit you will recognize them.” (Matthew 7:16-20)

Where most frequency theorists are infamous for presenting ideas not founded in any truth, the Schiller Institute took defilement much farther by taking design and principles and using them to further a dark agenda.

There are a number of online reports documenting the life and works of cult leader and political activist Lyndon LaRouche Jr and the groups that he formed. Wikipedia has a fairly safe, thorough catalog of his activities through the decades, by which this appendix generally tracks. The Washington Post seems to have reported on him the most consistently over time. There are also a number of websites and blog posts written by defectors that are less censored about how the cult operated, detailing his methods of brainwashing and reprogramming members, sometimes leading to their suicide or murder. Some of the direct sources are too graphic or offensive to directly quote in this paper. My research could only go so far before dealing with information I'd rather not know.

The life of Lyndon LaRouche Jr (1922-2019) is the story of an Exhorter who got it all backwards. As a kid, he had a rocky start--he was bullied a lot, and his parents were Quakers who insisted on pacifism as the appropriate response. He studied Philosophy as a coping mechanism. After graduating high school, he studied at Northeastern University in Boston, but dropped out because he felt the education was too far beneath him. A couple years later, during World War II, he joined the army as a non-combatant. While he was there, he developed his Marxist views and converted to Trotskyism.¹

When he came back, he joined the Socialist Workers Party, and a few years later, moved to New York City where he taught classes on Marxism. It was there that he began to attract a following of college students, and created the National Caucus of Labor Committees group. The objective of the group was ultimately to overthrow the national government by taking over the trade unions.²

Even in the beginning stages of his leadership in the 1960s, LaRouche expressed a carnal Exhorter's non-reality of having a dream that was not grounded in a godly core truth, and too big for immediate success. but his followers believed in him. Within just a few years, the internal workings became very militaristic--People were encouraged to break all ties with their parents, not get married or have children. There were dues to

¹ "Lyndon LaRouche"

² "Lyndon LaRouche"

pay, and people had to quit their jobs and leave behind any personal life to be fully dedicated to his group.³

LaRouche's means of operation relied mostly on magazine and news publications, and conferences--in other terms, he was a full-time pep-rally speaker creating a lot of hype as an intense verbal-expressive. Not all of it was trash, he was able to bring in some very intelligent young adults to work for him, but while some of the work is substantial, it is tarnished by the fact that while they are touching on principles, those principles are invariably twisted to suite LaRouche's cult agenda. Each morning, a briefing was sent out to the cult members that basically twisted reality with conspiracies and was used primarily to instill fear in them for the sake of greater control and obedience.⁴

The publication most relevant to this paper is his *Executive Intelligence Review*. Volume 15, no. 32 from 1988 contains the article, "Revive Verdi's Tuning to Bring Back Great Music," in which LaRouche proposes a bill to the Italian government not only setting A to 432 Hz, but forcing it with repercussions of confiscating alternative tuning instruments, and demanding hefty fines for those that do not comply.

But it was during the 70s, after his first marriage failed, that the inner workings of the cult took a nasty turn. From that season, he produced his "Beyond Psychoanalysis" series, which was a collection of three publications detailing how to brainwash and reprogram members of the cult to deny all sense of self and be completely dedicated to LaRouche and his agenda. The process was violent, sexually shaming, and misogynistic to the point of referring to the mother of Jesus as Satan. While only one reference that I have found uses such strong language as calling his work satanic, the similarities between his process and SRA are obvious. This season also included Operation Mop-up, which basically consisted of cult members attacking members of Communist party groups and was the start of a long history of violence by his followers.⁵

LaRouche through the '70s also continued to expand on his political activism, using publications and research to network with the far right, connecting with groups like the KKK, and Liberty Lobby apparently as a means of uniting to overthrow opposition. Whoever the opposition was--this was a season when he switched from being far left to far right.⁶ It was also during this decade that LaRouche started running for President of the United States, and continued to run in every election from 1976 to 2004 totalling eight times, although he never had much favor.

LaRouche remarried in 1977 to Helga Zepp-LaRouche, who founded the Schiller Institute, which is the organization by which their frequency theories were generated. The Institute is inspired by the works of Friedrich Schiller, and his "Letters on the Aesthetical Education of Man," which promotes humanism, and the idea that only the Classical arts and sciences are founded on universal principles. The Schiller Institute thus promotes his ideals as the only means to be able to establish true political and economic justice and freedom.⁷ So, what they say they promote on the surface, and how they operate as an institution under LaRouche is wildly incongruent.

³ "Lyndon LaRouche"

⁴ "Lyndon LaRouche," 1971: Intelligence network

⁵ Kronberg

⁶ Mintz

⁷ "Who is Schiller?"

The '80s marked a very slow descent. Through Lyndon's campaigning and striving for greater political influence, he developed a reputation as a conspiracy theorist and created all sorts of paranoid stories involving international governments, drug dealers, and banking institutions.⁸ He usually had a death threat of some sort forcing him into hiding. But through all of his story-telling, the IRS caught on that he had not been handling finances appropriately. Their investigation revealed that he was over \$30 million in debt, so he was sentenced to 15 years in prison in 1989.⁹

The Schiller Institute seems to have remained in full swing during the time of his imprisonment. Helga Zepp-LaRouche started publications of *Fidelio* in 1992, the first issue containing Jonathan Tennenbaum's, "The Foundations of Scientific Musical Tuning." This article is one of the primary publications detailing Tennenbaum's scientific research of frequencies as they relate to planetary motion, the Golden Ratio, and the human singing voice.

As mentioned before, while LaRouche failed to develop his own core truth on the nature of God, he had a knack for recruiting intelligent people to work for him. A number of them were Jews, which many people find odd, considering LaRouche's blatantly antisemitic and racist beliefs and practices. Nevertheless, Tennenbaum is one such devotee, a math genius who was hired to lead LaRouche's Fusion Energy Foundation, and was the Science Advisor for the Schiller Institute. In spite of his deep understanding of numbers, he also did research into physics, in which he was not quite so knowledgeable. There is an infamous video of him refuting the first and second laws of thermodynamics on YouTube that a lot of physicists and engineers find comical. It is, unfortunately, less comical when noting that his language reflects LaRouche's misogynistic ideals, and shows full belief in LaRouche and his principles.¹⁰

In 2003, the cult was brought to public attention when Jeremiah Duggan was found dead after attending a Schiller Institute conference in Wiesbaden, Germany. He presumably was murdered after defending himself as being a Jew.¹¹ The inner operations of the cult were brought to greater light after Lyndon's release from prison after only serving for five years. He had certain restrictions, like staying in the state, that he didn't meet. He immediately went back to international travel, and kept up his work as a political activist. But his paranoia caused things to fall apart. He liked targeting the youth, especially intellectual college students because of their vulnerability, but by the early 2000s, the baby boomers among his first generation of followers weren't so young anymore. He was apparently afraid that they would not want to follow him anymore, so as an expression of dominance, he created blatant division between the older and younger generations among his followers, fired groups of baby boomers off at a time, and used cruel tactics of manipulation against them. Jonathan Tennenbaum was among one such group that got fired, which caused even defectors perplexity because he was so integral to some of the cult's scientific and mathematical research.¹²

8 "Lyndon LaRouche," 1984: Schiller Institute, television spots, contact with Reagan administration

9 "Lyndon LaRouche," 1986-1988: Raids and criminal convictions

10 OaklandLYM

11 Kirby

12 Bélantozorius

Another older member was the editor of *Fidelio*, Kenneth Kronberg, who had served for about thirty years. He knew after LaRouche's release from prison that he would be targeted because of the extraordinary amount of debt his department was in--and he was. A morning briefing by LaRouche directly addressed his department, shredded him, and suggested that he kill himself--and he did.¹³

Since Duggan's and Kronberg's deaths, a number of defectors have made their experience in the cult public. There are a number of websites, books, and articles detailing in various degrees what it was like. LaRouche passed away in 2019, he is succeeded by his wife, who continues to operate the Schiller Institute, focusing more so on international economic infrastructure than on Classical arts and science culture.

To close, the Schiller Institute has been given due credit as a primary source for A=432 Hz. However, most sources are not taking into account what the Schiller Institute really is. Most people see Schiller Institute's influence on the surface and assume, as I did, that it is a German research and development institution that is probably credible. But digging below the surface reveals it as not being an appropriate source for new truth at all given its blatantly cultic operations mirroring satanic practices.

Furthermore, as has been already addressed in other articles, they mathematically calculated a frequency for C to be 256 Hz, yet A=432 Hz only works with a Pythagorean ratio, and they prefer A at 427-430 Hz by Just Intonation or 12TET, which makes their trying to impose within +/- 1/2 Hz of 432 Hz through Italian law a complete *non sequitur*. The Schiller Institute has promoted these frequencies like they are a finished product, when the reality is that it is maybe a baseline of an idea at best.

But as Gamaliel says, "if their purposes or activity are of human origin, it will fail" (Acts 5:34-39). So it is that looking back on LaRouche's life and influence, that he had a lot to say, but nothing notable was successful.

Relevant sources for this section include:

- <https://www.washingtonpost.com/wp-srv/national/longterm/cult/larouche/main.htm>
- <https://www.hamhigh.co.uk/news/crime-court/shadowy-world-of-larouche-the-far-right-cult-that-hides-behind-veil-of-left-wing-political-movement-1-4091305>
- <https://books.google.com/books?id=DQiIDAAAQBAJ&pg=PT507&lpq=PT507&dq=Schiller+institute+jonathan+tennenbaum&source=bl&ots=-MFSPcLF3&sig=ACfU3U0zkzpsT7-vphkzKW2R0b0aGEXLw&hl=en&sa=X&ved=2ahUKEwjju9P2k9rnAhVnlHIEHZ2iC6A4ChDoATAJegQIBBAB#v=onepage&q=Schiller%20institute%20jonathan%20tennenbaum&f=false>
- <http://www.holocaustresearchproject.org/essays&editorials/larouche2.html>
- <http://american-lycurgus.blogspot.com/2009/05/confessions-by-someone-who-is-not.html>
- <https://www.youtube.com/watch?v=0eCP7jVU9kc>
- http://american_almanac.tripod.com/larsdi.htm
- <http://laroucheplanet.info/pmwiki/pmwiki.php?n=Library.LYMwhyweleft>
- <https://www.theguardian.com/uk/2007/mar/25/world.germany>
- <https://nymag.com/intelligencer/2019/02/political-cult-leader-lyndon-larouche-dies-at-96.html>

¹³ Kronberg

Appendix III Charts

Chart 1: A copy of equal temperament frequencies set to A=440 Hz borrowed from <https://pages.mtu.edu/~suits/notefreqs.html> (Suits).

Note	Frequency(Hz)	Wavelength (cm)
F ₃	174.61	197.58
F [#] ₃ /G ^b ₃	185.00	186.49
G ₃	196.00	176.02
G [#] ₃ /A ^b ₃	207.65	166.14
A ₃	220.00	156.82
A [#] ₃ /B ^b ₃	233.08	148.02
B ₃	246.94	139.71
C ₄	261.63	131.87
C [#] ₄ /D ^b ₄	277.18	124.47
D ₄	293.66	117.48
D [#] ₄ /E ^b ₄	311.13	110.89
E ₄	329.63	104.66
F ₄	349.23	98.79
F [#] ₄ /G ^b ₄	369.99	93.24
G ₄	392.00	88.01
G [#] ₄ /A ^b ₄	415.30	83.07
A ₄	440.00	78.41

Note	Frequency(Hz)	Wavelength (cm)
A [#] ₄ /B ^b ₄	466.16	74.01
B ₄	493.88	69.85
C ₅	523.25	65.93
C [#] ₅ /D ^b ₅	554.37	62.23
D ₅	587.33	58.74
D [#] ₅ /E ^b ₅	622.25	55.44
E ₅	659.25	52.33
F ₅	698.46	49.39
F [#] ₅ /G ^b ₅	739.99	46.62
G ₅	783.99	44.01
G [#] ₅ /A ^b ₅	830.61	41.54
A ₅	880.00	39.20
A [#] ₅ /B ^b ₅	932.33	37.00
B ₅	987.77	34.93

Chart 2: A copy of equal temperament frequencies set to A=432 Hz borrowed from <https://pages.mtu.edu/~suits/notefreq432.html> (Suits).

Note	Frequency(Hz)	Wavelength (cm)
F ₃	171.44	201.24
F [#] ₃ /G ^b ₃	181.63	189.94
G ₃	192.43	179.28
G [#] ₃ /A ^b ₃	203.88	169.22
A ₃	216.00	159.72
A [#] ₃ /B ^b ₃	228.84	150.76
B ₃	242.45	142.30
C ₄	256.87	134.31
C [#] ₄ /D ^b ₄	272.14	126.77
D ₄	288.33	119.66
D [#] ₄ /E ^b ₄	305.47	112.94
E ₄	323.63	106.60
F ₄	342.88	100.62
F [#] ₄ /G ^b ₄	363.27	94.97
G ₄	384.87	89.64
G [#] ₄ /A ^b ₄	407.75	84.61
A ₄	432.00	79.86

Note	Frequency(Hz)	Wavelength (cm)
A [#] ₄ /B ^b ₄	457.69	75.38
B ₄	484.90	71.15
C ₅	513.74	67.15
C [#] ₅ /D ^b ₅	544.29	63.39
D ₅	576.65	59.83
D [#] ₅ /E ^b ₅	610.94	56.47
E ₅	647.27	53.30
F ₅	685.76	50.31
F [#] ₅ /G ^b ₅	726.53	47.49
G ₅	769.74	44.82
G [#] ₅ /A ^b ₅	815.51	42.30
A ₅	864.00	39.93
A [#] ₅ /B ^b ₅	915.38	37.69
B ₅	969.81	35.57

Chart 3: A copy of equal temperament frequencies set to A=444 Hz borrowed from:
<https://pages.mtu.edu/~suits/notefreq432.html> (Suits).

Note	Frequency(Hz)	Wavelength (cm)
F ₃	176.20	195.80
F [#] ₃ /G ^b ₃	186.68	184.81
G ₃	197.78	174.44
G [#] ₃ /A ^b ₃	209.54	164.65
A ₃	222.00	155.41
A [#] ₃ /B ^b ₃	235.20	146.68
B ₃	249.19	138.45
C ₄	264.00	130.68
C [#] ₄ /D ^b ₄	279.70	123.35
D ₄	296.33	116.42
D [#] ₄ /E ^b ₄	313.96	109.89
E ₄	332.62	103.72
F ₄	352.40	97.90
F [#] ₄ /G ^b ₄	373.36	92.40
G ₄	395.56	87.22
G [#] ₄ /A ^b ₄	419.08	82.32
A ₄	444.00	77.70

Note	Frequency(Hz)	Wavelength (cm)
A [#] ₄ /B ^b ₄	470.40	73.34
B ₄	498.37	69.23
C ₅	528.01	65.34
C [#] ₅ /D ^b ₅	559.40	61.67
D ₅	592.67	58.21
D [#] ₅ /E ^b ₅	627.91	54.94
E ₅	665.25	51.86
F ₅	704.81	48.95
F [#] ₅ /G ^b ₅	746.72	46.20
G ₅	791.12	43.61
G [#] ₅ /A ^b ₅	838.16	41.16
A ₅	888.00	38.85
A [#] ₅ /B ^b ₅	940.80	36.67
B ₅	996.75	34.61



Chart 4: “Solfeggio Scale” - these are the frequencies numerologists are claiming make up the ancient solfeggio scale. The Mercy seventh is left off, reflecting the old practice. The solfeggio syllables are beneath what they are claiming make up what we would recognize as the first six pitches of the Major scale.

frequency	174	285	396	417	528	639	741	852	963
“solfege”			Do	Re	Mi	Fa	Sol	La	

“Solfeggio Scale” - the original solfeggio scale was a series of whole steps and half steps within an octave (a Pythagorean 2:1 ratio). So, if we take “Do,” and multiply the frequency by 2, we will get the frequency for the next “Do” one octave above the original. In this case, “Do” is 396 Hz. Multiplied by 2, that makes the next “Do,” 792 Hz. This automatically creates a problem because their supposed ancient solfeggio scale is not fitting within Pythagorean ratios, and is spanning more than an octave.

Chart 5: The solfeggio scale using Pythagorean tuning, compared with the “ancient Solfeggio scale” frequencies

Solfeggio	Ratio	Calculated Frequency	Ancient solf.	Diff. in cents	Diff in half steps	~Diff in interval*
Do	1:1	396	396	0	0	Unison
Re	9:8	445.5	417	-114.45	-1.144	Flat m2v**
Mi	81:64	501.19	528	90.21636	0.902	Flat M2^
Fa	4:3	528	639	330.3336	3.3033	Sharp m3^
Sol	3:2	594	741	382.81	3.828	sharp m3^
La	27:16	668.25	852	420.5586	4.2056	Sharp M3^

*From calculated frequency

** v designates an interval going down. ^ designates an interval going up.

Chart 6: The solfege scale using Just Intonation, compared with the “ancient Solfeggio scale” frequencies. This is the tuning system Horowitz and Puleo claim to use with their frequencies, but the math proves otherwise.

Solfege	Ratio	Calculated Frequency	Ancient sol	Diff in cent	Diff in half steps	~Diff in interval*
Do	1:1	396	396	0	0	Unison
Re	9:8	445.5	417	-114.45	-1.144	Flat m2v**
Mi	5:4	495	528	111.73	1.12	Sharpm2^
Fa	4:3	528	639	330.3336	3.3033	Sharpm3^
Sol	3:2	594	741	382.81	3.828	sharp m3^
La	5:3	660	852	442.065	4.42	Sharp M3^

*From Calculated Frequency

** v designates an interval going down. ^ designates an interval going up.

In order for the ancient Solfeggio frequencies to be plausible, they need to be within +/- 1/2 Hz of frequencies calculated from the Just Intonation ratios. As the graph shows, not only is this not the case, but the frequencies are so far beyond the tuning system to be dysfunctional.

Calculating Frequencies with Ratios

Finding frequencies in the equal-tempered chart online is easy because no math is involved. While the equations for the frequency logarithm can be intimidating, calculating frequencies from the ratios is fairly simple.

For example, say one would like to calculate Just Intonation intervals for the G Major scale, starting on G4=392 Hz. All that is needed is to multiply the starting frequency by the ratio. Most phones have a calculator that will process the equation:

$$392(9/8)=441$$

$$392(5/4)=490$$

$$392(4/3)=522.67$$

$$392(3/2)=588$$

$$392(5/3)=653.34$$

$$392(15/8)=735$$

One could then compare these frequencies to a healing frequency system supposedly using 392 Hz as a standard tuning frequency using Just Intonation, and see if that is actually what they are using.

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