

Some Numerological Notes on Musical Tones

Music has always been employed to express and induce emotions. For example, to the Western ear a Minor Key is associated with sadness. Martial music has a characteristic rhythm. Bagpipes have been classified as a weapon of Psychological Warfare. Discordant tones and erratic rhythm can induce nausea and abnormal Bowel conditions in both musician and listener. In contrast there is the well known saying that “*Music soothes the savage breast.*”

If it did not always exist, it is not surprising that an association between music and the supernatural would develop over time. In one form this is evident in ecclesiastical music and chant. Naturally there would be those who would wish to determine whether specific sounds or tones created an effect which marked them out as particularly significant. It is said that the Solfeggio tones represent such a fundamental group and the frequencies, together with their significance, are reputedly defined within the Biblical Apocrypha.

The purpose attributed to each of the Solfeggio frequencies is as follows:

1. 396Hz - Returning to Spiritual Order.
2. 417Hz - Awakening Intuition.
3. 528Hz - Connectivity – Relationships.
4. 639Hz - Transforming – Miracles – (DNA repair)
5. 741Hz - Undoing Situations & Facilitating.
6. 852Hz - Liberating Guilt & Fear – Change.

Whether the Solfeggio tones actually have the influences attributed to them is a moot point. Nevertheless, they are used by healers within alternative medicine¹.

I encountered their use in the context of a debilitating spinal injury which I had suffered. I was advised to listen to one of the frequencies in particular, but was warned that unless the tone was buried within other music it was likely to prove to be a very tedious exercise. Accordingly audio editing software was employed to overdub the tone at about -20dB on music of my choosing. The overdubbed tracks were then played softly in a relaxing environment for about 40 minutes per day. I started the regime following a period of some six months during which the injury had worsened. After about two months, I observed that my sleeping patterns and general health had improved markedly.

This considerable benefit was obtained without recourse to drugs or intervention. Needless to say the risks associated with the alternative medicine approach pale into insignificance in comparison with mainstream medical practice. The only possible side effect has been a persistent high pitched tone in my head which is sometimes noticeable during quiet periods.

The frequency of the tone is constant and its intensity could scarcely be described as objectionable.

The regime I followed could hardly be classified as a scientific experiment. Perhaps relaxation was all that I required and my personal choice of music would have achieved the improvement I observed with or without the Solfeggio tone. In my case the explanation really didn't matter. I would be classified as a well educated person willing to try the idea being fully aware of the possibility of placebo effects.

However, it is not so easy to dismiss the evidence presented to me in respect of improvements in the condition of a young boy with little education and severe behavioural problems. Reportedly his mother regards her son's progress as nothing short of miraculous.

Out of interest I conducted a test to assess the frequency of the tone I hear in my head. Interestingly the tone appears to coincide with the 10th harmonic of the Solfeggio frequency which had been used.

This led me to consider physical explanations of the possible significance of the Solfeggio tone. For a first approximation I regarded the adult human head as a sphere with a diameter of approximately 15 centimetres. The composition of the human body was approximated by salt water. This produced the result that the fundamental mode pretty much coincided with the high pitched tone I hear. The fundamental mode has an antinode at the centre of the sphere which is approximately the location of the Cerebral Cortex. So it is at least possible that the tone produces a form of Acoustic Neural Massage which promotes psychological and physiological responses leading to the improvement in health which I and others have observed.

Current Medical Psychiatry is founded upon the principle of disrupting the interconnections in the brain which lead to internal conflict and behavioural extremes. It is a classic example of treating symptoms rather than resolving underlying causes, - an approach which the Medical Profession seems to favour. Obviously treating symptoms is an ongoing source of income for the Medical Profession and the Pharmaceutical companies. Curing illness is bad for business.

Historically, disruption of the interconnections has been achieved by intervention. The modern equivalent employs the use of pharmaceuticals with many known serious side effects and limited tangible advantages. The drugs reduce the patient to little more than a Zombie and erode the operation of their bodily functions.

This “*Living Death*” technique is certainly expedient for advancing the careers of Psychiatrists and for the purposes of Social Control, but it is astoundingly primitive and contains not a single shred of concern for the needs of the patient. I have good reason to suspect that some Medical Psychiatrists choose that career because it provides them with unfettered access to vulnerable people whom they can abuse with impunity.

Nevertheless, it is pretty much what might be expected as a natural development from the origins of modern medicine in Witchcraft, Butchery, Grave Robbing, and Murder. The principle is identical to the Doctor “*Burying his or her mistakes.*” A Zombie is scarcely likely to be regarded as credible if it sought to complain about the treatment to which its erstwhile personality and individuality was subjected.

Mainstream medical research has identified an association between different regions of the brain and particular aspects of human behaviour. Different acoustic modes give rise to antinodes at different locations within a sphere. Thus it could be expected that different frequencies would massage different regions of the brain.

The simplistic model of the human head as a sphere is clearly only a departure point. The actual dimensions of the head and the multitude of air spaces within it would lead to highly localised acoustic antinodes. These might very well coincide with regions which have been associated with human behaviour.

The structural complexity of the head renders the subject of Acoustic Neural Massage a tantalising avenue for research. The potential importance of the subject to Society, particularly as it relates to the behavioural sciences and psychiatry is enormous.

Having a background in Mathematics and Physics, Numerology has never appealed to me, and it was natural to consider the Solfeggio tones from a somewhat pragmatic standpoint.

Examination of Table 1 shows that the familiar chromatic scale proceeds in steps of approximately one eighth.

Concert Pitch is defined to be A = 440Hz Observe that with this reference, C = 264Hz. For Scientific purposes the reference is taken as C = 256Hz returning a value of A = 427Hz.

Natural Scale	C	D	E	F	G	A	B	C
Relative Frequency	24	27	30	32	36	40	45	48
True Scale Frequencies	264	297	330	352	396	440	495	528
True Scale Ratio Fraction	1	9/8	5/4	4/3	3/2	5/3	15/8	2
True Scale Ratio Decimal	1	1.125	1.25	1.333	1.5	1.667	1.875	2
Equal Tempered Frequencies	261.1	293.7	329.7	349.2	392	440	493.9	523.3
Equal Tempered Scale Ratio	1	1.122	1.2599	1.3348	1.4983	1.6818	1.8872	2

Table 1. The relationships between each of the notes of the Chromatic Scale.

Solfeggio Scale	1	2	3	4	5	6		
Solfeggio Scale Frequencies	396	417	528	639	741	852		
Solfeggio Scale Ratio	1	1.053	1.333	1.614	1.871	2.152		
Adjusted Solfeggio Frequencies	396	462	528	594	660	726	792	858
Adjusted Relative Frequency	6	7	8	9	10	11	12	13
Adjusted Scale Ratio	1	1.167	1.333	1.5	1.667	1.833	2	2.167

Table 2. Relationships between each of the Solfeggio frequencies and the adjusted values.

The differences are slight and I am certain that I would be unable to detect discord. However, some individuals known as “*Golden ears*” are able to distinguish between analogue and digital recordings of the highest studio quality. I have no doubt that there are those who could readily observe the difference between Concert pitch and the Scientific standard.

One of my friends had perfect pitch. He was a talented guitarist. However, he seemed to take more time tuning his guitar than playing it. Perhaps having perfect pitch is a curse.

Table 2 lists the Solfeggio frequencies and gives the relationships between them.

Note that to generate the numbers of the Solfeggio Frequencies, the first digit follows the pattern 3,4,5,6,7,8. The second digit follows 9,1,2,3,4,5. The third digit follows 6,7,8,9,1,2. From a mathematical perspective, zero would have been expected to be included in the sequences. Doing so generates 407 from 396. The two frequencies are very close together and the difference might not be noticeable. The method of generating the sequence of Solfeggio frequencies seems simplistic and may be an approximation to the ideal for the purpose of preserving the knowledge across generations and cultures as far as possible.

Now consider the Solfeggio Frequency Prime factors:

$$\begin{aligned} 396 &= 2.2.3.3.11 \\ 417 &= 3.139 \\ 528 &= 2.2.2.2.3.11 \\ 639 &= 7.7.11 \\ 741 &= 3.13.19 \\ 852 &= 2.2.3.71 \end{aligned}$$

The Solfeggio frequencies have no common divisor greater than 1, meaning that their relative relationships are the frequencies themselves.

From Table 1 it is seen that in the Chromatic scale, the relative relationship between the frequencies consists of numbers much smaller than the frequencies themselves. This reflects a common factor between the frequencies. The Chromatic scale is in part a convenience but also contains the essence of harmonics. One octave represents a frequency doubling which means that even harmonics are available.

If it is permitted that the simplistic method of generating the Solfeggio frequencies was an approximation, for reasons such as those suggested, then by making certain changes to the sequence, the common factors of 2,3, and 11 = 66, can be extracted from the sequence, providing the following set of frequencies.

Interestingly the first frequency of 396Hz is 6x66 which is at least reminiscent of The Number of the Beast. Perhaps it’s a diabolical scale!

6		396 = 2.3.(2.3.11)
7	(417)	462 = 7.(2.3.11)
8		528 = 2.2.2.(2.3.11)
9	(639)	594 = 3.3.(2.3.11)
10	(639)	660 = 2.5.(2.3.11)
11	(741)	726 = 11.(2.3.11)
12		792 = 2.2.3.(2.3.11)
13	(852)	858 = 13.(2.3.11)

In the altered sequence, one significant discrepancy occurs at 639Hz. Although the difference between 417 and 462Hz, would be noticeable, 417 does seem to be rather too close to 396 in the first place. The difference between 726Hz and 741Hz may be noticeable, but the difference between 852Hz and 858Hz is extremely small.

It is worth considering the possibility that a mix of 594Hz and 660Hz may produce an effect which is approximated by the single tone of 639Hz. If so, this would remove an objection to adoption of the adjusted scale.

An interesting point is that by following the sequence of Natural Numbers in the frequency relationships, two additional frequencies suggest themselves, thereby transforming the Solfeggio “*Hexave*” into an “*Octave*”. Furthermore, the factor of 2 in the frequency relationships appears at the seventh tone while the ratios between the adjusted frequencies reflect the simplicity of the progression of the Natural Numbers.

One obvious development of this line of thought is to regard the Solfeggio Scale neither as a Hexave nor an Octave but rather as a “*Heptave*”. This approach allows for a progression of Heptaves which preserve the harmonic properties of the basic Heptave. That in turn would simplify the production of musical instruments which might allow the Solfeggio scale to achieve general acceptance.

One attraction of the Heptave is that the progression of frequencies possesses a symmetry which is absent from the Chromatic Scale. Notice that G is the “*Middle*” note in the Chromatic Scale and that there are three divisions below it: D, E, and F while there are only two notes between G and the next higher C.

The addition of the four sharp and flat notes in the Chromatic scale may have reflected a desire to equalise the scale. Mathematically the Chromatic scale is a “*Dodecave*” and not an Octave at all.

Arguably the sharps and flats provide increased flexibility to the musician, but it is at least possible that

such a view is making a virtue out of a vice. Musicians will make music using whatever is to hand...

I recall Roger Waters at Knebworth Park in 1976 announcing that the Hammond Organ was out of key with the rest of the band. The Hammond took its reference from the generator which was being given rather a hard time by Pink Floyd's light show. With a wild gesture of his arm Roger Waters declared "*Fuck the Hammond*" and carried on the concert without it. From the moment the Spitfire flew across the audience until the final echoes faded, the concert was outstanding, undiminished by the technical restrictions imposed nor its memory dimmed by the passage of the years.

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Ref:

1. Dr Mary Helen Hensley - "*The Land Beyond the River*"
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