## PERSISTENCE

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Persistence is a powerful word. It implies a sense of arduous effort – taken to go against the tide. To be insistent, to go on resolutely in spite of opposition. It is markedly different from the idea of perseverance, which implies a sense of focus and determination in one’s continuation but doesn’t really communicate the effort involved.

I used to consider myself perseverant, but only when I started writing this article did I realise that I was actually persistent. I don’t consider myself to be someone who has achieved a lot, especially not when it comes to musical output. But what I have managed, both musical and extra-musical, has taken a lot of effort. Going against the tide, and for so long, has been draining – so much so that it became normalised and embodied to the point of recovery. Much of this is personal and due to my history, but much of it is also musical and therefore inseparable from life itself.

One of these avenues of persistence is closely related to the subject of microtonality and tuning systems. Over the last couple of years I’ve been experimenting a lot and developing Comma, a microtonal tuning Max4Live patch designed by me and programmed in Max in two stages – first by Charles Matthews in London and then by John Eichenseer in California. It is the epitome of my musical persistence to date.

I spent the majority of my adolescent years listening to rock music and learning how to play guitar, bass, and drums by ear. I would record songs from the radio onto cassette tapes and sit next to the recording and figure out the melodies which had caused me so much trouble. I would spend hours checking they didn’t feel right. I was sure I had the right notes, but I was stuck at a wall again. I was frustrated that I couldn’t get the oud as the king of all instruments. I ended up dedicating the next seven years to studying it and being something between the unspoken spiritual philosophy of taqsim (Arab-Ottoman improvisations), the tunings of the maqamat (Arab-Ottoman modes), and the reverence of the taqsim in Music from Antiquity to the Avant-Garde by Joscelyn Godwin. The book soon arrived and I was captivated: tuning systems, mathematics, ratios, fractions, string lengths, monochords, the harmonic series, the zodiac, the planets, Pythagoras, the harmony of the spheres, the Greeks, the Arabs, the Enlightenment – it seemed endless. Wild and fantastical theories about sound, the universe, and music’s place in it, not merely as entertainment, but as an alchemical mirror reflecting the depths of ourselves (our »self«) and the entire cosmos (the universe as an embodiment of order and harmony).

At that moment, something clicked between the topic of tuning systems and music software, the hegemony it encourages, and the cultural asymmetries it can cultivate, ultimately advocating for a celebration of difference across cultures, ideas, methods, and sounds.

In the following years my interests grew. As I did more research, I rediscovered the oud and its high-revered position throughout the Middle East and North Africa as the instrument of choice for theorists, philosophers, musicians, and composers. In April 2004, I decided to start studying it and began weekly private classes with Iraqi oud maestro Ehsan Emam in London.

In June 2004 – thanks to the influence of Trey Spruance’s epic band the Secret Chiefs 3 and the Web of Mimicry’s online forum community – I placed an order for Harmonies of Heaven and Earth: Mysticism in Music from Antiquity to the Avant-Garde by Joscelyn Godwin. The book soon arrived and I was captivated: tuning systems, mathematics, ratios, fractions, string lengths, monochords, the harmonic series, the zodiac, the planets, Pythagoras, the harmony of the spheres, the Greeks, the Arabs, the Enlightenment – it seemed endless. Wild and fantastical theories about sound, the universe, and music’s place in it, not merely as entertainment, but as an alchemical mirror reflecting the depths of ourselves (our »self«) and the entire cosmos (the universe as an embodiment of order and harmony).

This time, I had to really persist; the oud is a fretless instrument and takes at least 6 months to a year of practice before it becomes even remotely enjoyable to play. But once I got the hang of it, I could finally sit next to the computer and play music (as now it was mp3s) with my mouse and oud in hand and start to try figuring out those evasive melodies which had caused me so much trouble.

I ended up dedicating the next seven years to studying the oud intensively. Fretlessness is a beautiful thing.

The topic of tuning systems is complex and confusing, partly because it is mathematical and goes back at least 2500 years, but mostly because the internet is full of unreliable and unsubstantiated information. It is essentially the mathematics of music and therefore highly theoretical, with lots of words and numbers and very few attempts to practically elucidate any theories or discussions.

Despite the sleek, seductive promises of modernisation, recent music-making tools are culpable for a number of often-overlooked shortcomings. Khyam Allami delves into his research on microtonality to reflect on the non-neutrality of music software, the hegemony it encourages, and the cultural asymmetries it can cultivate, ultimately advocating for a celebration of difference across cultures, ideas, methods, and sounds.

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A tuning system is a mathematically derived series of pitches used in composition and performance, i.e. just intonation. A temperament is the modification of a tuning system, i.e. quarter-comma meantone. An interval is the distance between two pitches of a tuning system, i.e. a perfect fifth. An octave is a distance between two pitches at a ratio of 2:1, whereby the second pitch is exactly a double of the first pitch’s frequency, i.e. the octave of 200hz is 400hz. The same applies, albeit mirrored, when thinking of an octave below, i.e. 200hz and 100hz.

A cent is the logarithmic unit of measurement used for musical intervals. It was invented in 1875 by the English Mathematician Alexander J. Ellis and defines the octave as a distance of 1200 cents and an equal-tempered semitone as 100 cents. Microtonality refers to the use of intervals of less than an equal-tempered semitone, i.e. a quarter-tone (50 cents).

A mode is a series of pitches selected from a given tuning system, i.e. C Major. A degree is one of the selected pitches in the scale or mode, i.e. the sixth.

The majority of tuning systems throughout history have recognized the division of the octave into a defined number of parts. These are referred to as octave-repeating tuning systems. Some modern tuning systems disregard the octave altogether (i.e. Bohlen-Pierce scale).

The foundations of most tuning systems were discovered by Greek philosophers and mathematician Pythagoras in the 6th century BC. The Pythagorean tuning system uses mathematical ratios, more specifically, ratios that can be obtained from the musical scale. The ratios are related by string lengths and intervals: 2:1 to the octave; 3:2 to the fifth, and 4:3 to the fourth.

Almost all tuning systems since Pythagoras use the mathematics of ratios. It is generally considered that the larger their numbers, the less pure the resulting sound, hence the reverence of the ratios 2:1 (octave); 3:2 (fifth) and 4:3 (fourth) as pure, universal, and in harmony with nature.

Today, 2000+ years later, the most pervasive tuning system in the world is used is derived from equal temperament (ET), also known as twelve-tone equal temperament (12-TET), or twelve equal divisions of the octave (12-EDO). It is named as such because it equally divides the octave into equal parts, preceding historical tuning systems such as the Pythagorean or just intonation (another tuning system based on simple ratios). None of its intervals are simple ratios.

Although considered a ‘Western’ tuning system, the earliest historical mention of it is found in China in the 5th century. In Islamic China, the first mathematical description of a 12-tone chromatic scale is found in a treatise by the 9th century Arab philosopher, mathematician, and musician Ishaq Al-Kindi (d. Baghdad c. 873).

Before ET, all the notes on keyboard, wind, fretted, or hammered acoustic instruments had to be tuned to a specific tuning system in a chosen key. Wind instruments were another ballgame. Fretless instruments, such as the violin or the oud, did not face the same problem because the musician can adjust their intonation accordingly.

ET was assimilated into Anglo-European music in the 18th century for the specific purposes of enabling compositional modulations into distant key signatures without sounding ‘out of tune,’ and to allow the transposition of any composition into any key without having to re-tune the instrument every time.

Contrary to popular misconception, ET was not favoured amongst all musicians and composers at the time. It was in fact a niche tuning system, necessary for specific types of compositions that were »connected.« *6) Where the Sequential Prophet 600 and Roland JP6 and presented at the Los Angeles NAMM show, and many conferences and meetings between leading American and Japanese synth manufacturers. By January 1983, this new proposed system was born and marketed at the Los Angeles NAMM show, where the Sequential Prophet 600 and Roland JP6 were »connected.« *6)

Ten years later, in January 1992, the MIDI Tuning Standard (MTS) – a ultra-high-resolution specification for microtuning – was ratified by the MIDI Manufacturers Association (MMA) and included as an integral part of the MIDI spec itself. Developed together with composers Robert Rich and Carter Scholz, MTS allows the use of both octave-repeating and non-octave-repeating tunings to a resolution of 0.0001 of a cent, which essentially divides the octave into 196,608 equal parts. It also allows the choosing of one or more notes in real-time, and even gives the user the choice of changing all currently sounding notes, or only the new notes that follow the tuning change message. *7) This is a phenomenal level of detail that covers all the melodic needs
of all musics from across the world, past, present, and future.

But...

The support of MTS within the implementation of MIDI by software and hardware manufacturers is optional. There is in fact a long list of developers and manufacturers that provide tuning capabilities in their products: Dave Smith Instruments, Korg, Native Instruments, Steinberg, Yamaha, Roland, u-he, Ensoniq, and Xfer Records are just the tip of the iceberg. In these cases, however, the issue is not whether they support it or not – it’s how.

Secondly, MTS messages are part of a MIDI data group called SysEx messages (System Exclusive). The same applies for the majority of group called SysEx messages (System Exclusive). Secondly, MTS messages are part of a MIDI data

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As I mentioned earlier, many software and hardware manufacturers have made provisions to include microtonal capabilities in their products. The majority of these are pre-loaded tuning files are often generous and include many historical, modern, and non-Western tunings. Unfortunately, though, when any such tuning is loaded up, it is impossible to know how it is supposed to be used. There is often no documentation on what these tunings are, what their values are, which note on the keyboard they start on... nothing. The maximum we can find is a little bit of a blurb about each tuning in the manuals, but even this is usually trivial.

Secondly, the tunings are loaded up and spread across the 12-tone piano keyboard/piano roll regardless of the number of divisions and regardless of the way these tunings are supposed to be used (which, as I described above, involves choosing only certain values for certain notes to create specific modes or scales).

The result is that almost any tuning loaded immediately feels unusable in any sense other than weird, exotic, or «other.» This applies just as much to historical and modern Western tunings as it does to those from across the globe.

That the inclusion of such capabilities is so tokenistic and counter-intuitive is really a shame. Rather than allowing users to discover such wonderful worlds and experiment with them, tunings are
treated like stocking-fillers, used to make the main gift bigger and more exciting, knowing they will be thrown aside within minutes of opening. More importantly, this «othering,» whether inco-
centional, is detrimental on many levels.

THE PERVERSIVENESS OF ET AND CULTURAL HEGEMONY THROUGH TECHNOLOGY

The persistence of ET has been astounding. It has homogenised and tainted music from across the world. Whilst all music makers are pushing to be as original and inventive as possible, they are all subscribing to the rigid whitewashing of equal temperament without questioning it.

The truth is, for the majority of music being made today, the reality is not as exciting, or diverse, as one would like to believe. The technology supports a homogenization of sound that is not always desirable. This is a result of the continued tokenistic incorporation of other cultures, with a focus on mainstream music and the “Western” tradition.

The technology and the practices of ET have led to a homogenization of sound. This is not to say that all music made with ET is bad, but it is a concern that it is becoming the norm rather than the exception.

When looking at non-Western music, the disas-
ter of ET is even more painful. Not only have microtonal tuning systems been bastardised, but listeners and musicologists have also been corrupted. In the world today, there is a lack of understanding of the different tuning systems and the pitch relationships that exist within them.

The Arab world is suffering even more because of the misconception that the Arabic musical system is »exotic,« i.e. an octave divided into 24 equal parts. This is a grave misunderstanding and has led to the norm of musicians using electronic instruments to tune their »quarter tones« to -50 cents, which is not only incorrect but also sounds horrendous.

COMMA: AN ATTEMPT AT A WORKAROUND

After years of research and study, I took things into my own hands and started developing Comma, the MaxLive device at the heart of my current work – fully aware that it itself is a workaround.

Kawales: Part II, the microtonal virtual/acoustic piano project that I will present at CTM this year, is being tempered. The paradox is that major tunings are almost completely disregarded.

The persistence of ET has been astounding. It has invaded our very core to the point where, as Alain Perspectives of New Music notes, “it must be stated that the treatment and rendition of the subject is also overtly, if not exclusively, male-dominated. As ionising composers Elaine Walker, Jacky Ligon, and Ellen Arkbro, in all of my research on this topic I have come across very few female contributors to related theoretical or creative output.”

Modern technology, as much as it seems neutral and empowering, is heavily laden with cultural and political asymmetries that often go unnoticed and unchallenged. In the field of music, its hegemonic reality is destructive, though wrapped in bows of promised modernisation and advancement. As we are learning to become warier of gender and racial inequalities, we need also to attune our anten
tennas to cultural inequality. A default »zero« for one culture does not necessarily mean the same for another.

And so we continue to persist, and to persevere in our persistence, towards the reverence of differ
cence, of individuality, of fleshtones, and the ac
cception that »we« should mean all – not some, and definitely not most.

If MTS was fully accommodated and properly supported as its inventors Robert Rich and Curt-
er Scholz had envisioned, I am certain that there would be a marked difference in the amount of non-\nWestern musical activity today. I am also certain that the progress and development of non-
Western music would have been far less inhibited.

Tuning is a subject that is about the cele-
bration of difference – of cultures, ideas, man-
nerisms and tastes. It should also be about the celebration of the choice of individuals to sound however they please.

As令 we have seen, the subject of tunings goes back de-
millenia and includes very detailed and specific contributions from revered philosophers, theorists, physicists, mathematicians, scholars, engineers, composers, and musicians from Greece, China, Iraq, Egypt, Germany, France, The Netherlands, Eng-
land, America, and many more. In the 20th and 21st centuries it has been developed and studied in great depth, but sadly still remains elusive and shrouded in unnecessary mystery.

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dering of the subject is also overtly, if not exclu-
sively, male-dominated. As ionising composers Elaine Walker, Jacky Ligon, and Ellen Arkbro, in all of my research on this topic I have come across very few female contributors to related theoretical or creative output.

Conclusio

Scan this QR code to stream Khyam's curated playlist of microtonal music to accompany this article.

KHYAM ALLAMI is a multi-instrumentalist musician and composer. He is currently undertaking an AHRC MSC-
ology funded PhD in composition at the Royal Birmingham Conservatoire, UK. More on his work can be found at:

www.khyamallami.com

*3) www.midi.org/articles-old/new-mma-members-and-new-mma-specs

*4) www.midi.org/articles/midi-history-chapter-6-midi-is-born-1980–83

*5) www.midi.org/articles-advanced-tuning-and-alternative-intonation-systems

*6) www.midi.org/articles-midi-pitch-bend-expression-and-mpe

*7) Ibid.

*8) www.music mathematics.com

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