

A Century of the Theremin

I was setting up my instruments to play in a church once when the very engaged and musically trained vicar came over to investigate. He was intrigued by the theremin which I introduced to him with the tag line that it is the only instrument you play without touching it. He responded, "Good Lord, I thought that was the choir!" Of course there is much more to this 100-year-old instrument that bears the name of its Russian inventor Leon Theremin, than just the lack of contact while playing.

I got my theremin over 25 years ago. At the time I was living in a shared house with a very open front door that was home to an array of characters. I left it set up in the living room for people to play whenever it took their fancy. What became apparent was that everyone, not all musicians, developed their own signature sound; that I could tell who was playing the instrument without seeing them. The reason for this is that the instrument creates an analogue in sound of physical movement in 3D, and we all move differently. Our limbs are different lengths; we have differing degrees of tension, relaxation and control over our movement. Also we have different responses to sound so the instant feedback the theremin gives the player changes the behaviour of each of us differently.

Each theremin has 2 antennae: one vertical and one horizontal. As the player approaches the vertical antenna the pitch changes, and as the player approaches the horizontal antenna the volume changes. The antennae aren't radio aerials but function like plates in a capacitor, with your body creating the capacitance that generates the sound. The key is that to change pitch and volume you need to move freely in space with no references other than the sound you hear and the sensations in your own body. What you hear is the position of your hand relative to the antenna, but what you feel is the position of your hand only in relation to the rest of your body. No other instrument has ever functioned like this. With every other instrument you know where you are in space by making contact with the it: pressing a key, a string, holding it, putting it to your mouth, or hitting it. To play the theremin you need to be acutely aware of where you are in space from the soles of your feet and the crown of your head to your fingertips.

Leon Theremin was talented in both science and music; as a student he studied 'cello and Physics simultaneously.



Leon Theremin in 1924

His education was cut short in 1916 when he was called up for military service in both World War I and the Russian Civil War; during which he was briefly imprisoned, accused of taking part in a White Guard plot. This set a tone of subterfuge, which would play out later in life. His talent had been noticed, and in 1919 he was offered a leading role at the new Petrograd Institute of Physics and Technology where, in the process of developing a tool to measure the dielectric constant of gases he noticed that the same device also produced audible and controllably pitched sound. A witness is quoted as saying that "the next day he was playing Gluck on the voltmeter". The theremin was born. He patented his "Method of an Apparatus for the Generation of Sounds" first in Russia in 1921, then in Germany and, significantly, the USA in 1928.

He demonstrated the instrument for Lenin in 1921 and became a rising star of the new revolutionary spirit of modernity, a true Soviet success story proving to the world that science, technology and culture flourish within a socialist system. With patents now issued abroad it was time for Theremin, under the watchful eye and financial support of the Soviet Intelligence service, to bring his miraculous invention to the capitalist world. From 1926 he played to packed houses in Frankfurt, Berlin, Paris and London and then in 1927 moved to New York where he set up a studio to explore more advances in music technology. Here he worked with the likes of Albert Einstein, Leopold Stokowski among other intellectuals and performers invited to the studio. Theremins were being mass-produced by RCA and new instruments were patented: the Terpistone, a version of the theremin to be played by dancer using their whole body, doubtless inspired by his first wife African-American dancer Lavinia Williams; and the Rhythmicon, the world's first rhythm machine.

How much communication he had with the authorities back in Moscow during this period is unknown but the intense intellectual and cultural cross-pollination came to an abrupt end in 1938 when he quite simply disappeared. Even Lavinia had no idea what had happened. The Theremin story seemed to be over. Despite the sensation his instruments had created, very few if any composers had written for the theremin and RCA halted production.

Theremin was a highly skilled musician but he was not a composer and this hampered the theremin in its early years. Although it was seen as a technological innovation it was never understood as an expressive or artistic breakthrough. The music selected to demonstrate the instrument was composed for instruments that functioned in an entirely different way with totally different properties. This continues to this day with Lydia Kavina, Theremin's niece and renowned theremin virtuoso performing adaptations of pieces written for piano, violin or voice by 19th century classical composers. What makes European music of the last 300 years tick is the strict use of equal temperament as promoted by J. S. Bach all the way back in 1722. Pitches are fixed into a rigid framework of 12 semitones to an octave. This allows for elaborate harmony and melody; and accurate notation and transposition even between instruments, but not for

the dramatic shapes, forms and completely liberated tonal world that Theremin unleashed 200 years later. Theremin



Leon Theremin playing Theremin photo by: Paul Grace

had created an instrument that functioned outside of prevailing musical structure and method, yet in application it was being shoehorned back in to that system, and you can hear the mismatch. The theremin is the ultimate analogue instrument. There are no steps of any kind. No tones, semitones or

even quartertones. No forte, fortissimo or pianissimo. Instead there is a continuum of constantly changing values in space producing infinitely variable sound from the control of just 2 parameters. That's a lot to take in. To make real use of it involves turning away from so many previously held ideas of musical structure that it's a challenge to put the instrument in a context which best makes use of its strengths.

I like to think of the history of the theremin in parallel to the saxophone. The saxophone was invented in 1846 and functioned as a rather muddy extra flavour somewhere in the mid-range of the increasingly huge and unwieldy symphony orchestra of the day. After some initial interest it became seen as a novelty and by 1900 was almost entirely overlooked except by the American military. Following the military lead, civilian marching bands in the US made use of the instrument: the very same marching bands that became the cornerstone of the development of Jazz in New Orleans. Another population with another aesthetic was playing the instrument and by the 1950s the expressive potential of the saxophone was finally realised in the hands John Coltrane, Sonny Rollins and Stan Getz. The theremin is still awaiting that moment.

In the 1950s the theremin began to reappear in movie soundtracks, linked to sci-fi and horror themes. It captured the imagination of a bright young high school student called Robert Moog. He began to build his own theremins and sell them in kit form, launching a career that led to the development of the modern synthesizer. Moog never lost sight of the theremin and was aware of the profound nature of the instrument, introducing new designs throughout his career until his death in 2005. He brought the theremin to a new wave of musicians from The Beach Boys to Led Zeppelin, but again the context was seated in the equal temperament system of Bach, albeit electrically amplified and playing the blues. Still the instrument was out on a limb, and now it carried the extra reference of 50's B movie soundtracks, something it is yet to shake off.

News began to appear that Leon Theremin was still alive and teaching in Moscow. With the end of the cold war he was allowed to travel, even returning to New York in 1991, and the bizarre story of the missing years finally came to light. Back

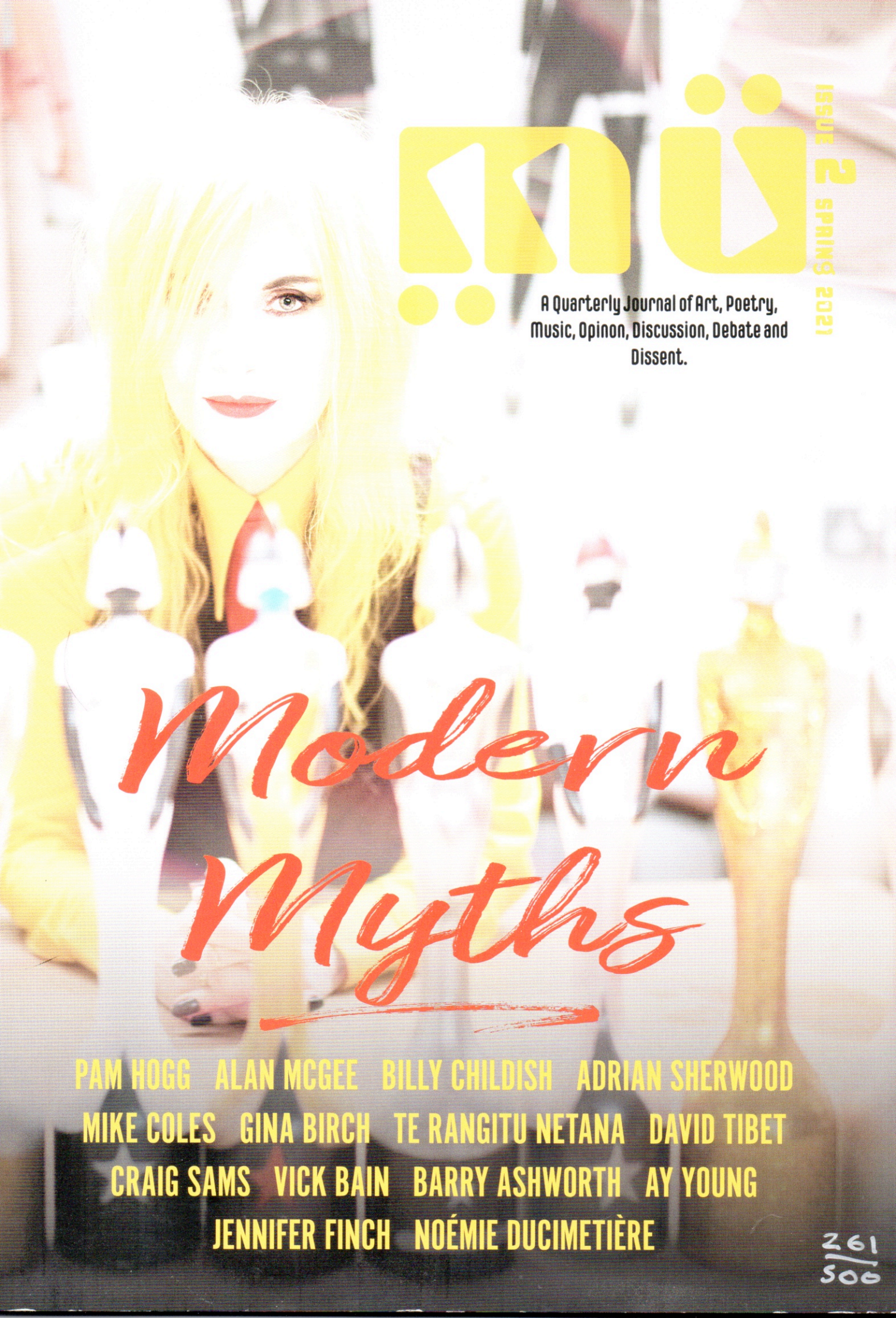
in 1938 he'd been spirited away in the middle of the night by Russian agents and secretly smuggled back to Russia along with 1000 kg of electrical equipment. The official Russian line is that he had been "rescued" from creditors and the US immigration service, but whatever the reason, shortly after arriving back in Russia he was convicted of counter-revolutionary activities and was condemned to eight years of hard labour in the Gulag. After surviving a year in Siberia he was moved to Sharaga, a specialist prison for scientists where he was put to work for the NKVD - the forerunner of the KGB. Unsurprisingly he excelled in his new career and developed the Buran eavesdropping system that earned him First Stalin Prize and his release from prison in 1947. He continued to work for the NKVD, going on to invent a spectacularly successful bugging device known as The Thing that was audaciously concealed in a wooden copy of the Great Seal of the United States that hung in the US ambassador's office in Moscow for seven years before it was accidentally discovered. He retired from service in 1964, taking up an unpaid acoustic research position at the Moscow State Conservatory where he was finally rediscovered by the West.

Leon Theremin died in Moscow in 1993 at the age of 97. Perhaps it took a character like his to create an instrument that, a century later, is still waiting to fulfil its potential. There are some wonderful and innovative thereminists who are still developing new techniques and approaches to the instrument: Beatrix Ward-Fernandez and Robert Wheeler foremost. Sadly there are also those who continue to use the theremin as a novelty, deliberately placing the instrument in incongruous contexts to play on the sci-fi kitsch of the 50s, or make comedy versions of familiar tunes. This has been exacerbated, ironically, by the Robert Moog's company, who after his death, produced the "Theremini", a cheap digital theremin that retunes the sound to equal temperament. This toy completely undermines the essential value of the instrument but has become worryingly popular.

Ideas that are the quality of the theremin have a tendency to persist. Despite all the advances with 3D mapping and audio that have been made in the digital domain over recent years, there is still nothing of the fluency or accessibility of the theremin or that has such an impact on the performer's physical control and internal sensitivity. After 25 years and in different contexts all over the world, I am still learning about movement, stillness, tensions and balances within my own body from the playing the theremin. These are all externalised as music for the listener. For a composer the theremin provides such an intuitive interface that it produces a much more direct and emotional approach to material, even if the resulting patterns are then transferred to different instruments.

There is another link between the saxophone and the theremin: a resonance with the human voice. The tenor sax in the hands of a master can carry all the nuances of the sound of speech, and the theremin can soar like a soprano. If you feel the inner voice of your body should sing, look no further than the theremin.

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