

The Theremin

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- *Introduction*
- *How the Theremin Works*
- *The Enigmatic Leon Theremin*
- *Clara Rockmore*
- *The Theremin Invades Hollywood*
- *The Moog Connection*
- *The Theremin's Obscurity*
- *The Theremin in the New Millennium*

Introduction

The theremin could be viewed as the great ancestor of electronic music: Virtually every electronic instrument traces its roots to the theremin's inventor, Russian physicist Leon Theremin (1896-1993), who produced his first instrument in 1918.



Furthermore, the theremin was the first electronic instrument with virtuoso performers playing solo and concert repertoire written specifically for it by major composers.

Theremin developed a complex timbre for his instrument quite similar to the sound of a bowed violin string. He possessed a keen understanding of acoustics and, working without the benefit of an oscilloscope, produced very complex and pleasing sounds.

How the Theremin Works

Perhaps the most intriguing characteristic of the theremin, apart from its mysterious sound, is the way it is played:

- There are no keyboards,
- no finger boards,
- no strings, valves, hammers or pipes.
- There is nothing to blow on, or into.

The performer literally “plays the air” around the instrument, making absolutely no physical contact with it.

The electronic components of the theremin set up low-power, high-frequency electromagnetic fields around the two antennas, one controlling pitch and the other volume. The player’s hands alter the fields by varying their distance to the antennas. The tone-producing portion of the circuitry is known as a beat-frequency oscillator.

The Enigmatic Leon Theremin

Theremin related in a 1989 interview with musicologist Olivia Mattis, “I wanted to invent ... an instrument that would not operate mechanically ... that would create sound without using any mechanical energy, like the conductor of an orchestra. The orchestra plays mechanically, using mechanical energy, [but] the conductor just moves his hands, and his movements have an effect on the music....”

Theremin discovered the phenomenon that was to become his magical new instrument quite by accident in 1917 at a technical institute in Russia, where he was a student. He was working on a device to measure the density of gasses under pressure. He discovered that the apparatus was very sensitive, interpreting even the slightest motion of his hands in the surrounding air. He attached a set of earphones to the device and could hear the fluctuations of the instrument as musical tones.



With encouragement, Theremin adapted his gas measuring apparatus as a musical instrument. The “Ætherphone,” as he originally called his instrument, was patented in 1921. When the Ætherphone was unveiled at an electronics exposition in Moscow in 1922, the mysterious instrument attracted the interest of Vladimir Il’yich Lenin, who summoned Theremin to his offices for a personal demonstration. Lenin showed keen interest in the instrument, and expressed great optimism that it would advance the cause of Communism by serving as a propaganda tool for national electrification.

Lenin sent Theremin across Russia to demonstrate the instrument; and in 1927 sent him abroad to show off the new Soviet regime’s latest technological and scientific advances. The public was amazed and intrigued by

Theremin's magical playing technique, which added a high degree of theatricality to the performances. When he played at the Paris Opera, police were called to keep order among the crowds that thronged to the performance.

Theremin arrived in America in 1928, wooing New York society with his enchanting instrument. While he engaged in creative work and selling his inventions, he also maintained a secret double-life as a Soviet spy: His mission was to gather information on U.S. innovations in military technology and to find out which side America would take in the event of world war.

Theremin's activities in America are clouded in secrecy and ambiguity, and the details of his rather sudden departure back to Russia are equally murky. According to various accounts, he returned voluntarily because he was anxious about the impending war, or else because he was forcibly removed from his studio by the KGB.

Theremin himself at different times recounted conflicting versions of his return to Russia, perhaps as a result of advanced age and failing memory - but perhaps also due to the degree of discretion he was allowed; he may have been deliberately vague. And it is also possible that the kidnapping theory arose because of language barriers between Theremin and his American associates.

Recent information has come to light that indicates the reason for his hasty departure was financial trouble: He had fallen into disfavor with close associates whose friendship and generosity in lending money to fund his work he exploited to the point where they finally had enough and closed the door on him. Facing lawsuits and other legal action, he left in haste for his homeland, accompanied by Soviet escorts who may have been mistaken for KGB agents.

Whatever the circumstances were that entangled Theremin at that time, he did return to the USSR in 1938 and soon fell into disfavor there. His outspokenness landed him on the official "disapproval list." He was accused of anti-Soviet propaganda and sent to gulags and concentration camps. Rumors were spread that Theremin had been executed. However, the Soviets shrewdly recognized his talents, and eventually he was put to work on top-secret laboratory projects under close supervision.

Among other "various useful things," he developed the "Buran" ("Bug") for eavesdropping, for which he was awarded the most prestigious Soviet scientific award, the First-Class Stalin Prize, in 1947. He also exploited the motion-sensitive technology of the theremin to develop the first electronic alarm system triggered by disruptive movement into an electromagnetic field.

As biographer (and friend of Theremin) Bulat Galejev expressed it, "Theremin was a 'man of legend,' and all appearances seem to indicate that many episodes of his life will remain legends forever." The same writer also mused, "Our planet is probably not completely sane if the military industry can succeed in transforming an artist into a James Bond and a musical instrument into an alarm system. I ask the reader to make an allowance for Theremin, whose suffering outweighed his guilt. But while we might pity him, one could also envy Theremin for the happiness he attained in his fantastically impossible life."

Clara Rockmore

Clara Rockmore (1911-1998) was without a doubt the most gifted thereminist ever. She took the instrument to greater heights than any other person, and it was in large part at her behest that Professor Theremin made a number of significant improvements to the theremin. (Philanthropist, socialite, and thereminist Lucie Bigelow Rosen also contributed to the musical and technical enhancements of Theremin's instrument.)

Mrs. Rockmore elevated the theremin into the realm of serious music, pushing it beyond being merely a novelty or curiosity by turning it into a legitimate new musical instrument. She performed many concerts from the 1930s through the 1950s and appeared with many major symphony orchestras.

Mrs. Rockmore never played for any film scores; in fact, she was immensely offended by the idea of using the instrument for making “spooky noises” — which was what Hollywood composers usually called upon the instrument to create — she felt that such uses demeaned the integrity of the theremin which she viewed as a “serious classical instrument.” This opened the door for the highly (yet less) talented thereminist Dr. Samuel Hoffman to step in and “create musical goosebumps” for movies.



(It does bear noting that Clara Rockmore was approached by composer Miklós Rózsa to perform the theremin on his score for *Spellbound* (see next section) but she turned him down due to previously committed coast-to-coast performance engagements, a decision she apparently regretted in later years.)

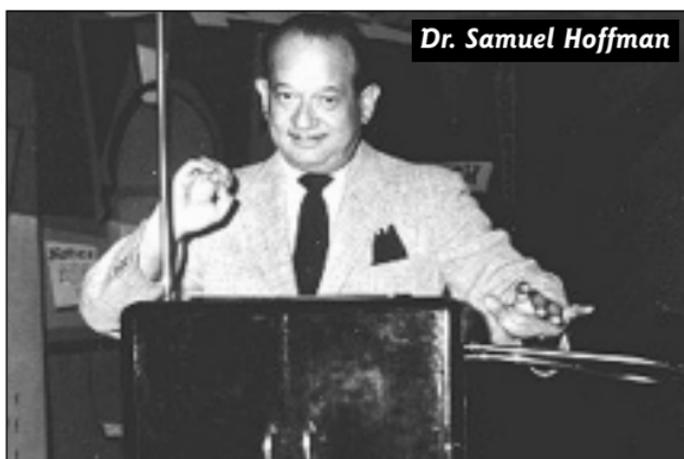
The Theremin Invades Hollywood

In the 1940s, Miklós Rózsa very effectively called upon the theremin for nervous and haunting tonalities in films dealing with psychosis (*Spellbound*) and alcoholism (*The Lost Weekend*). Rózsa won an Oscar for *Spellbound*. His score brought far more attention to the theremin than any other musical work up to that time.

A dozen or so other gothic or “noir” 1940s films whose scores utilized the theremin included *The Spiral Staircase*, *The Red House*, *Lady in the Dark*, *The Pretender*, *Road to Rio*, and *Devil Weed*.

And, of course, the theremin was used in numerous 1950s science fiction and flying-saucer movies, most eloquently by Bernard Hermann in his eerie, other-worldly score for *The Day the Earth Stood Still*. It was also featured in *Rocketship XM*, *The Thing*, *Five Thousand Fingers of Mr. T*, *Operation Moon*, *It Came From Outer Space*, and the Biblical epic *The Ten Commandments*.

Embarrassing lows for the theremin were plumbed in such films as the forgettable *Billy the Kid vs. Dracula*, and the instrument offered a touch of zany comedy at the hands of Jerry Lewis in *The Delicate Delinquent*.



The thereminist for all these films was Dr. Samuel Hoffman (1904-1968), Hollywood foot-doctor by day, thereminist by night. (See Dr. Hoffman’s comprehensive biography at www.137.com/hoffman.)

Thereafter, the theremin all but disappeared from films until 1994 when Howard Shore used the instrument to great (if tongue-in-cheek) effect in his score for *Ed Wood* (featuring Russian thereminist Lydia Kavina); and it was also used along with other electronic instruments for the 1996 film *Mars Attacks*.

(A number of film and TV scores used other electronic instruments such as the Electro-theremin and the Ondes Martenot, or highly processed soprano voices, which are often mistaken as the theremin.)

More recently, musician Dennis James composed a new score for the restored silent science-fiction film *Aelita, Queen of Mars* (1924, USSR - the restoration was premiered in the 1990s), which incorporates fragments of the original Soviet film score and utilizes the theremin, cristal bachel, piano, phonoviolin, cello and Ondes Martenot.

The Moog Connection

Robert Moog (1934-2005) started in electronic music by building theremins as a hobby when he was a teenager. That early work and research prepared him to develop the Moog Synthesizer in the early 1960s, with which he nearly single-handedly revolutionized Western popular music. The Moog Synthesizer also helped propel classical music into new and innovative realms through such works as Wendy Carlos’ groundbreaking *Switched on Bach*.

Now, more than 50 years after Moog put together his first theremin, one could say that he returned to where he started: making theremins (and other electronic instruments), but now for a new generation of musicians, performers and enthusiasts.



The Theremin's Obscurity

Although the theremin has been in existence for over 80 years, it has yet to find a significant place in mainstream music for a variety of reasons, but four significant ones:

1 - Extreme difficulty with playing the instrument well. Many serious challenges are presented to those who take up the theremin. With no physical reference for tones (a keyboard, etc.), the musician has to rely upon a highly refined sense of pitch to place notes.

Furthermore, the theremin responds differently according to the acoustics, the size, the temperature, and even the humidity of the room in which it is played. Thus, thereminists face the ongoing challenge of acquainting themselves anew with the instrument upon arriving at each new performance venue.

Thus, these difficulties inherent in playing the theremin have discouraged many people from serious study of it.

Unfortunately, these very same difficulties have also given rise to a number of undaunted theremin performers whose musicianship on the instrument often falls short of the level that would be expected from professional musicians on other instruments.

Indeed, very, very few thereminists have ever truly carried the instrument to a virtuoso level: Audiences of theremin performances frequently are subjected to mediocre, if well-intentioned, musicianship. Is it really any wonder the theremin has never achieved great popularity?

2 - Technique. There is no established theremin technique to teach new generations of theremin students. This is due not only to a lack of performers skilled enough to develop any such technique, but also equally due until very recently to a lack of sufficiently responsive instruments upon which to develop even adequate - let alone virtuoso - ability.

In the 1930s and into the 1940s, a handful of virtuoso thereminists were studying and performing initially with Leon

Theremin himself. Easily, the greatest and most dedicated students among them was Clara Rockmore. Others included Lucie Bigelow Rosen, Henry Solomonoff, (all of whom are also deceased), and perhaps a half-dozen others. However, interest in the theremin never really reached very far beyond this small group of performers.

Thus, with no students, and no prospects for any, Clara Rockmore felt no need to devise written teaching materials other than a very casually prepared pamphlet containing a short series of exercises and some rather vague indications about the unique “aerial fingering” technique which she had devised for virtuoso theremin playing.

3 - Repertoire. As Leon Theremin himself noted in a 1992 interview with musicologist Olivia Mattis, “... [T]here are so far no well-written compositions for the thereminvox.” A few established - if somewhat obscure - composers (including Paschencko, Martinu, Varèse, Schillinger, Grainger, Fuleihan, and a few others of even greater obscurity) have written for the theremin but again, none of these works have managed to truly captivate the music-listening public. (Let alone many diehard enthusiasts of more esoteric musical experiences.)

Thus, what one most often hears played on the theremin are transcriptions of music for more traditional solo instruments. While such pieces do not fully exploit the instrument, they generally are more “comfortable” for mainstream audiences than much of the original music for the theremin - typically cutting-edge avant-garde and often incomprehensible to non-avant-garde ears. (And, in many cases, even to avant-garde ears.)

The highly visionary nature (and, sometimes, mediocre quality) of most original music for the theremin has kept it out of reach of all but its most ardent proponents. With very little interesting or inspiring repertoire for the instrument, it was doomed to fade into obscurity as indeed it did.

4 - Lack of Instruments. Leon Theremin licensed his instrument to the RCA Corporation in the late 1920s. They made about 500 instruments, and then the RCA theremin met a grim fate brought on by the Great Depression. The expensive instrument represented an unjustifiably frivolous expense to the average person. (Also, the incredibly high skill required to play the theremin with any degree of proficiency certainly added to its quick demise.)

Until very recently, there have been few theremins responsive enough, or with sufficiently refined tone quality, to handle virtuoso repertoire. Leon Theremin's earliest instruments - and those (of his design) manufactured by RCA - were not capable of subtle nuance or expression, had fairly unpleasant tone quality, and offered a fairly limited range of pitches.

In the early 1930s, at the behest of Clara Rockmore, Theremin greatly improved his circuitry and developed an instrument that met her high standards and artistic demands. However, he only made a few of these custom instruments, and none were available for new students' practice and study. (Clara Rockmore often lamented that many had come to her over the years to take lessons, but she had to turn them away because they did not have - and could not get - suitable instruments of their own.)

Today, however, excellent theremins are readily available thanks in largest part to the research and work of Robert Moog (whose legacy lives on in the company he founded, Moog Music). Modern instruments incorporate new technologies - analog, digital, even infrared, with some instruments MIDI capable; and, yes, some "purist" theremins still utilize vacuum tubes!

The Theremin in the New Millennium

A fascinating film-documentary about the life and times of Leon Theremin, entitled *Theremin: An Electronic Odyssey*, was produced in 1995 by filmmaker Steven M. Martin. The compelling, award-winning documentary enjoyed great critical success. Worldwide distribution of the film thrust the theremin into the forefront of pop-culture fixation, and triggered a worldwide renaissance of interest in the theremin.

Also, a detailed, written biography of Leon Theremin by noted scholar and musician Albert Glinsky has since been published by the Indiana University Press, and is widely available on the Internet.

The theremin's most ardent enthusiasts, many of them connected solely by the Internet, have maintained a continuing interest in the instrument's past and its future. And a small but devoted band of performers, builders, and enthusiasts are working together to ensure the instrument a more noble and more deserving place in music. Indeed (and perhaps ironically), there are more people building, playing, researching, and discussing theremins now than at any other time in the instrument's history.

About the Writer

Charles Richard Lester's interest in the theremin began in 1995, upon seeing the documentary about the instrument. Since then, he has played many concerts, recitals and



Charles Richard Lester

demonstrations across the United States; has worked on film and television scores including the Spielberg animated film *Monster House*; has appeared on live television including *Good Morning America*; and has performed with the Los Angeles Philharmonic Orchestra.

CHARLES RICHARD LESTER
www.137.com/theremin • crl@137.com