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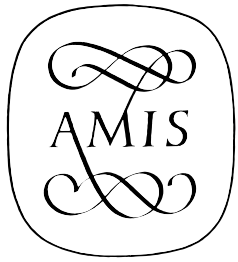

instrument types may lead them to presume that the music played on them is also old. Actually, most of the repertoire considered "traditional" today, in spite of some of it having roots in an early dynasty, came into being only after the instruments became popular among the "common people" during the Ming dynasty (1368–1644). In the case of *sizhu* in Shanghai and cities near it, the repertoire as played today developed even later than that—primarily from the mid-nineteenth through the early twentieth centuries. In fact, in contrast to Japan and to a considerable extent also to Korea, where older traditions continue to survive while new genres flourish in newly emerging social contexts, in China the music of one period has tended to supplant that of previous periods.

The two books reviewed here are valuable not only for readers interested in the world's musical instruments but also for those interested in the many facets of Asian culture. One hopes that more volumes focusing on musical instruments will soon be forthcoming in the "Images of Asia" series.

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Albert Glinsky. *Theremin: Ether Music and Espionage.* Foreword by Robert Moog. Urbana and Chicago: University of Illinois Press, 2000. xvi, 403 pp: 72 black-and-white photos, drawings, playbills, and cartoons. ISBN 0-252-02582-2. $34.95 (cloth).

Although the American Musical Instrument Society's stated purpose is "to promote the study of the history, design, and use of musical instruments in all cultures and from all periods," electronic musical instruments have been almost entirely absent from the society's consideration. The use of a complex technology to produce the sound, and the fact that much of today's electronic music indistinguishably blends recorded sounds and computer-generated rhythm with individual artistry, seems somehow to set this class of instruments apart.

Readers of Albert Glinsky's *Theremin: Ether Music and Espionage* may well obtain a quite different perspective on the manner in which electronic instruments fit into the musical picture. Some may have been under the impression that the theremin had a short life and was soon forgotten as a passing fancy. On the contrary, Glinsky's history shows that it was the first successful electronic musical instrument, attracting much attention from composers of rank and from prominent symphony

conductors. It was the direct ancestor of the many forms of synthesizers that are current today, both in the music industry and in the home. The instrument in essentially its original form still exists, as do a number of theremin enthusiasts.

The book treats concurrently two distinct histories. The first concerns the development of the instrument and its infusion into the music of the twentieth century; the second relates the strange life of its inventor, Leon Theremin. Born in an aristocratic Russian family, well educated and possessed of an inventive genius and creativity, Theremin became inextricably involved in the Bolshevik revolution and the darkest days of the Soviet empire. Both stories are treated in substantial detail, drawing on a great many sources and describing vividly the tumultuous historical events of the twentieth century that surrounded the life of the inventor and of his invention.

The instrument, originally called the "Etherophon" by its inventor, produced sound by using a "heterodyne" principle. This phenomenon is familiar to musicians as the production of beats. When two simple waves of different frequency are combined, a beat note is produced, having a frequency equal to the difference in the frequencies of the two tones. Musicians use these beats in tuning: when the two tones are adjusted to the same frequency, the beats disappear. In piano tuning, a specified beat frequency between harmonics is used in tempering the scale. In the theremin, the two original tones, far above the range of audibility, are produced by radio-frequency oscillators. One of these oscillators is fixed, the other is connected to an antenna in the form of a vertical rod atop the instrument. An object coming near this antenna will change the effective capacitance in the circuit, altering its frequency and producing a beat note in the audible range. The player need only approach the antenna with one hand to create notes varying in pitch as the distance to the rod is varied. A second variable oscillator, connected to a horizontal loop on the left of the instrument, causes the volume to change with left-hand distance. Thus the performer does not touch anything, but waves his or her hands as if conducting an orchestra, apparently drawing the music out of the air. In 1921, just a few months after commercial radio broadcasting began, this seemed like magic, greatly impressing early audiences.

Leon Theremin had been engaged for several years in the development of secret devices for the Bolshevik Physico-Technical Institute

when he invented the Etherophon, which was an outgrowth of his work on a proximity detector using radio waves. A personal demonstration of his instrument to Lenin, the father of the Communist revolution, resulted in the Party's decision to use the instrument as evidence of the Soviets' newly-growing technical prowess. Theremin was instructed to tour the Soviet Union, conducting "agit-prop" concerts and demonstrations, at the same time continuing his development of secret items for military applications. The highly successful tours were extended to Europe, Great Britain, and eventually to the United States, creating a sensation wherever he and his instrument appeared. All during this time Theremin was also gathering as much information as possible concerning technical developments in other countries, and transmitting the information back to the Soviet secret police.

Arriving in New York in 1927, accompanied by a great deal of publicity, Theremin not only gave many concerts, but also began to develop improvements and variations on the instrument, contracted with RCA to produce a commercial model, and established a studio to teach others the art of playing it. Reception of these efforts was mixed. Some music critics hailed the new device as the beginning of a revolution in music, allowing infinite gradations of pitch, timbres of sound never before attainable, and volumes capable of dominating symphony orchestras. Others complained of its lack of staccato and dismissed its sound as the mere squealing of a mis-tuned radio. The performance of Joseph Schillinger's *First Airphonic Suite* by the Cleveland Orchestra in New York's Carnegie Hall, with Leon Theremin as soloist, brought substantial recognition. Stokowski and the Philadelphia Orchestra commissioned some new and altered instruments from Theremin. A few radio stations scheduled regular programs of theremin music.

Aided by society matron Lucie Rosen, one of his pupils, who allowed him the use of one of the wealthy Rosens' town houses as a studio and laboratory, Theremin settled in to life in the United States. He tried to capitalize on his inventions by forming several small companies, producing a variety of products such as gun detectors and altimeters for aircraft. But the depression had begun, and in spite of vigorous nation-wide promotional efforts, RCA produced and sold only some five hundred instruments. Theremin's many attempts to capitalize on his inventions resulted only in his piling up of debts. In 1938 he suddenly departed for Russia, listed as a crewman on a Russian freighter, leaving behind with

no explanation the African-American wife, twenty years his junior, whom he had secretly married only a few months before.

On his return to his homeland, Theremin was almost immediately placed under arrest, accused, and convicted on the trumped-up charges common in Stalin's reign of terror, in which some three million Soviet citizens were arrested or disappeared. Glinsky draws on Solzhenitsyn's *The Gulag Archipelago*, as well as Theremin's own account, to describe the horrifying conditions in the Siberian gold mine camp to which he was sentenced. Few survived the cruelty of the guards, the extreme cold, and the exhausting labor for more than two years. Fortunately for Theremin, after nine months of laboring in the mines he was brought back to Moscow to join a group of scientists and engineers working on experimental aircraft—still prisoners confined to a fenced-in building, but treated with a modicum of respect and given tolerable living conditions. His work on aircraft and on radio technology persisted throughout the Second World War and into the Cold War. His most notable achievement of this period was an ingenious microwave listening device concealed in an ornamental plaque placed in the U.S. ambassador's office. It operated undetected for seven years, allowing the Soviet secret police to monitor every word spoken there.

After Theremin's furtive departure from the U.S., Clara Rockmore, his most talented pupil, and Lucie Rosen continued their efforts to bring the theremin to an acknowledged place in classical music, eliciting compositions from such composers as Bohuslav Martinů and Percy Grainger. Leopold Stokowski commissioned theremin concertos for the Philadelphia Orchestra. Clara Rockmore performed some seventy concerts on tours with Paul Robeson. The voice of the theremin began to be heard more and more often in special effects for motion picture scores and radio programs, prominently in Hitchcock's *Spellbound* and as the theme music for *The Green Hornet*. It was adopted by many of the popular music bands of the day.

In 1951 the theremin caught the attention of a fifteen-year-old boy, Robert Moog, who proceeded to build his own instrument and to devise more modern circuitry for other amateurs to copy. An avid interest in the possibilities of electronic music led him to devise what is now known as the synthesizer. This was an electronic instrument capable of variable attack, decay, timbre, and automatic rhythm—the prototype of the many varieties of machines that brought electronic music-making into the home and which today pervade the entire popular-music industry.

Leon Theremin was officially pardoned by the Soviets in 1957, but he continued to work for the KGB until 1964. Even then his reemergence from obscurity proceeded slowly, and the Western world still thought him long since deceased. Only gradually did recognition return to him, first in Russia, then in Europe. In 1991, at the age of ninety-five, he was brought back by some of his early friends to a triumphant concert in New York City, celebrating electronic and computer music.

Glinsky's thoroughly researched treatise covers in minute detail (perhaps too much in some areas) the history of the theremin, not omitting the many other electronic instruments that appeared—and disappeared—in this period. The treatment is authoritative, being replete with identified quotations from contemporary news sources, interviews, and communications from persons directly involved. Technical details of the mechanisms are sparse, though the descriptions are in most cases adequate for understanding the general ideas without any dependence on a knowledge of electronics. (Those who are familiar with electronics can get a more detailed picture from Theremin's U.S. patent 1,661,058, downloadable from Internet site www.uspto.gov.) Many photographs and illustrations of personalities, instruments, playbills, and news articles enliven the text. Robert Moog, the father of the synthesizer, which is basic to most electronic instruments today, tells in his foreword how Leon Theremin and his instrument influenced his own career.

Readers whose interests have been preoccupied with the study of more conventional historical instruments will be enlightened by this narration of the reception of the theremin in the musical world and its profound influence on much of what we hear today in film and television scores and modern popular music. They can hardly help being fascinated with the tale of the strange and intriguing life of its inventor.

The "classic" theremin is by no means dead. Instruments can still be purchased, recordings of virtuoso performances are available. One of them, *The Art of the Theremin* (Delos DE1014), contains performances by Clara Rockmore together with a twelve-page booklet that gives a quite complete description of the instrument, its history, and that of the artist. A small but enthusiastic group of admirers is still much engaged with the theremin, as can be seen by visiting the Internet site www.bigbriar.com.

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