

Electronic Music History

The Discovery of Music Theory (Antiquity-1700)

Since early times, different tuning systems were used and different theories behind the tunings and chordal systems were developed, which inherently lead to different musical instrument designs.

The Birth of a New Science: Acoustics (1700-1865)

During this time period, there were many studies in acoustics and sound. Big breakthroughs in this area were made, and concepts such as the outdoor concert arena shell were invented. The general attitude toward music innovation and sound design was becoming more open and creative.

The Age of Innovation (1865-1910)

In the late 1800s, there was a growing desire for composers to use emerging technologies for musical purposes. Most of the inventions were by engineers that discovered musical properties of technologies they were currently working with.



Musical Telegraph

Elisha Gray (1835-1901) would have been known to us as the inventor of the telephone if Alexander Graham Bell hadn't got to the patent office one hour before him. Instead, he went down in history as the creator of one of the first electronic musical instruments - a chance by-product of his telephone technology.



Carbon Arc Lamp

The predecessor to Thomas Edison's light bulb in the US was the Carbon Arc Lamp. This street lighting was widespread in Europe, yet had an annoying audible hum. William Duddell was appointed to solve the problem in London in 1899. During his experiments he found that by varying the voltage supplied to the lamps he could create controllable audible frequencies from a resonant circuit caused by the rate of pulsation of exposed electrical arcs. By attaching a keyboard to the arc lamps he created one of the first electronic instruments.

Telharmonium **

The most noteworthy electromechanical instrument was the Telharmonium, developed by Thaddeus Cahill in 1897. The Telharmonium was intended to be listened to using telephone receivers. The Mark II version weighed almost 200 tons and the main portion of it filled a room. In 1906 small number of performances in front of a live audience in NYC were given in addition to the telephone transmissions using large paper cones.



Thaddeus Cahill



the Telharmonium console.....and the rest of the Telharmonium!

The Origins of Electro-acoustic Music (1911-1958)

In the first half of the Twentieth Century, a number of writers advocated the use of electronic sound sources for composition. Many electronic instruments were developed through the 1920s and 1930s, and most of them were ephemeral - they came and went.

Theremin (1919) **

The first electronic instrument is often viewed to be the Theremin, invented by Professor Leon Theremin circa 1919–1920. It is unique in that it was the first musical instrument designed to be played without being touched. It consists of two radio frequency oscillators and two metal antennae. Clara Rockmore was a virtuoso on the theremin. She worked closely with Leon Theremin suggesting improvements to the instrument such as expanding the octave range and faster volume control. Bob Moog constructed his own theremin as early as 1949. Today, Moog Music is the leading manufacturer of theremins.



Leon Theremin (1896-1993)



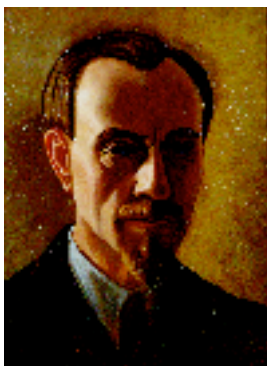
Clara Rockmore (1911-1998)



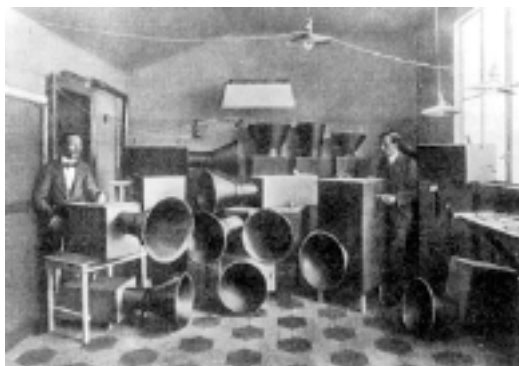
Moog Theremins

Luigi Russolo (1885-1947)

Luigi Russolo was an Italian painter and futurist. In his manifesto from 1913, Art of Noise, he proposed to break through the limiting canvas of “pure sounds”. He wanted to return to the creation of noise and the sense wonderment which it had evoked from earlier people. Russolo felt that the process which reduced music into clean harmonic timbres had also robbed sound of its ability to arouse the emotions.



Luigi Russolo



Intonarumori (noise-making instruments)

Intonarumori (1921)

Luigi Russolo gave a concert in Paris in 1921 with the intonarumori (noise makers in boxes with a crank to produce the sound) and caught the attention of Ravel and Stravinsky.



The Ondes Martinot (1928)

The most successful instrument developed during this period was the Ondes Martinot (pronounced "owned Martin O"), developed by Maurice Martenot (1898-1980). It sounded a lot like a theremin and used similar technology. It was performed by inserting a finger in a ring and pulling a ribbon left or right while left hand varied loudness and timbres by manipulating various controls. Later he added a keyboard, which greatly helped its success.

Musique Concrete, Electronic Music, Tape Music (1950s-1960s)

The tape recorder was invented in Germany during World War II. It wasn't long before composers used the tape recorder to develop a new technique for composition called **Musique Concrète**. This technique involved editing together recorded fragments of natural and industrial sounds on tape. Traditionally, classical music begins as an abstraction, as musical notation on paper, which is then produced into audible music. Musique concrète is the other way around, starting with "concrete" sounds which are then abstracted into musical compositions.



Pierre Schaeffer (Father of Musique Concrete, 1910-1995) **

The first pieces of musique concrète were written by Pierre Schaeffer, who first performed with it live in 1950. While an engineer at a TV station in France, Pierre Schaeffer experimented with sounds using their equipment (mainly turntables), playing sounds backwards, slowing them down, speeding them up and juxtaposing them with other sounds. These techniques were virtually unheard of at the time. After gaining recognition, he acquired a tape recorder in 1951 and began composing musique concrete.



Louis (1920-1989) and Bebe Barron (1927-2008) **

The first electronic music for magnetic tape composed in America was completed by Louis and Bebe Barron in 1950. Theirs differed in that instead of using "real world" concrete sounds, they developed electronic devices which produced sounds by calculating mathematical equations, and recorded these electronic sounds onto tape. They wrote the soundtrack and theme song for Forbidden Planet which set the standard for other science fiction movies of the time.

The Golden Age of Electroacoustic & Computer Music (1958-66)

By the mid-1950s, the eventual commercial potential of electronic musical instruments was becoming clear and many companies entered the field. Two new electronic instruments made their debut in 1957. Unlike the earlier Theremin and Ondes Martenot, these instruments were hard to use, required extensive programming, and neither could be played in real time.

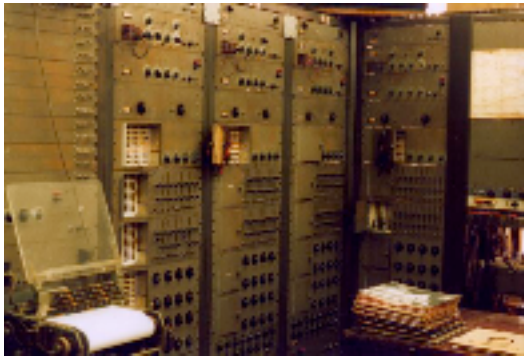


Max Mathews (Father of Computer Music, born in 1926) **

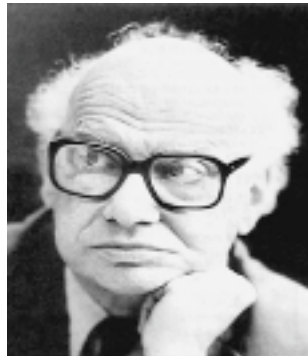
The first of these electronic instruments was the computer when Max Mathews wrote a program called Music 1, after hours at Bell Laboratories. Later users of Music 1 were Edgard Varèse and Iannis Xenakis.

RCA Mark II Sound Synthesizer

The other electronic instrument that appeared that year was the **first electronic synthesizer**, designed by RCA. Called the **RCA Mark II Sound Synthesizer**, it used vacuum tube oscillators and incorporated the first electronic music sequencer.



RCA Mark II Sound Synthesizer



Milton Babbitt

Milton Babbitt (Born in 1916)

In 1959 Milton Babbitt established the Columbia-Princeton Electronic Music Center and purchased the Mark II. Although it was difficult to operate, Milton Babbitt describes the allure as, “having complete control over one’s composition.. being complete master of all you survey.”

The First “Playable” Synthesizers (mid 1960s)

Musique Concrete was clumsy, as were room-filled synthesizers such as the RCA Mark II Synthesizer, and Max Mathew’s Music V computer program. This led to some simultaneous independent teams to develop the world’s first “playable” electronic synthesizers. These “modular synthesizers” were *relatively* easy to program using patch cables, but still not... easy.



Morton Subotnick



Buchla (Modular) Synthesizers

Morton Subotnick (born in 1933)

Morton Subotnick founded the San Francisco Tape Music Center in 1961 which was one of the liveliest centers of new music activity, producing tape music of all sorts.

Buchla Synthesizer

At the Tape Music Center, Morton Subotnick worked with Donald Buchla to develop one of the first voltage controlled modular electronic synthesizers (1963), the Buchla 100 series. He composed “Silver Apples of the Moon” on a Buchla 100. New models were later developed. Now in his mid-70s he still performs and educates.

Bob Moog (Father of Synthesis, 1934-2005) **

Bob Moog was producing his own brand of Theremins in the 1950s when he met a musician who prompted him to make other electronic music devices. This led to Bob Moog developing some of the first modular electronic synthesizers, which became commercially successful. He used the word Synthesizer for the first time in 1967.

By 1969 Moog was enjoying success with mainstream artists using his modules. He continued to develop a full line of synthesizers which are still popular to this day, including the Mini-Moog and Little Phatty.



Bob Moog

Moog Synthesizers

The First Digital MIDI Synthesizers (mid 1980s)

John Chowning (born in 1934)

John Chowning is known for having discovered the FM synthesis (Frequency Modulation) algorithm in 1967. He developed the most famous synthesizer of the 1980s, the DX7, produced by Yamaha. Its electric piano became a standard sound in ballads, its bass was the standard bass sound, typically played in bouncy octaves. Its crystalline timbres were such a departure from the world of analog.



John Chowning



Dx7 Synthesizer (first FM synth, 1983)

ROM-based synthesizers that competed with the Yamaha DX7



Roland D50 (1987)

The Roland D-50 was marketed as the antidote to the Yamaha DX7's unfriendly interface and non-intuitive synthesis architecture. Its main selling point was the short, ROM-sampled attack transients that were grafted onto voices generated by a software simulation of a conventional analog synthesizer, in the name of realism.



Korg M1 (1988)

The Korg M1 also used PCM samples to create sounds that were clear, vibrant and very acoustic sounding. The M1 is also a workstation with eight-part multi-timbral capacity, a generous amount of polyphony (16 voices), plenty of ready-to-go sounds and drum kits, onboard multi effects and a powerful sequencer.

Electronic Music Composers:



Edgard Varèse (Father of Electronic Music)

Edgard Varèse was the inventor of the term "organized sound", a phrase meaning that certain timbres and rhythms can be grouped together, sublimating into a whole new definition of sound. Although his complete surviving works only last about three hours, he has been recognised as an influence by several major composers of the late 20th century. His use of new instruments and electronic resources led to his being known as the "Father of Electronic Music"



John Cage (1912-1992)

John Cage was an American composer. He was a pioneer of chance music, non-standard use of musical instruments, and electronic music. He is perhaps best known for his 1952 composition 4'33", whose three movements are performed without a single note being played. Though he remains a controversial figure, he is generally regarded as one of the most important composers of his era.



Wendy Carlos (born in 1939)

Wendy Carlos has done groundbreaking work in electro acoustic music since the 1960s. Carlos worked as a recording engineer and befriended Robert Moog. Her 1968 recording Switched-On Bach hit platinum sales, which propelled the Moog synthesizer into the public consciousness. She introduced the use of vocoders for synthesized singing in her score for Stanley Kubrick's film, A Clockwork Orange. Carlos wrote horror music for Kubrick's The Shining, and composed the score for the 1982 Disney film Tron. In 1986, Carlos turned to a lifelong interest in alternate scales and musical tunings.