Pioneers of Electronic Music/ World Centers continued

Milan, Italy

United States

Milan, Italy
Radio Audizioni Italiane – RAI

- Established in 1955
- Artistic Directors - Luciano Berio and Bruno Maderna
- Other composers involved in the fifties included Luigi Nono and John Cage

Basic Aesthetics at RAI

- Music used ideas and techniques from both Musique Concrète and Electronische Musik. (distinct lack of dogma)
- Primary concern with texture and sonority.
- Special interest in manipulation of speech.

Equipment used in Milan Studio

sine-wave generators
white noise generator
modified Ondes Martenot
oscilloscope - used to display synthesized sounds
Mono, stereo and four-track tape recorders
ring modulator
amplitude modulator
reverberation chamber
tape-head echo unit
high-pass, low-pass, and band-pass filters - used to attenuated sounds within determined frequency ranges

Important Works from Milan

Thema - Omaggio a Joyce (Theme in homage of Joyce) - 1958 by Berio

This work manipulates a short text taken from James Joyce's *Ulysses*. Techniques involved in text manipulation include fragmentation, overlaying, and changing the vocal timbre via filtering.

Fontana Mix - 1958-59 by John Cage

Graphic design determines indeterminacy of sonic events in this piece which uses both speech sounds and electronically produced sounds.

Early Pioneers in the United States

I. New York City

"Music for Magnetic Tape"

II. Columbia University

"Tape Music"

III. Edgar Varèse

NYC – "Music for Magnetic Tape"

1948 Louis and Bebe Barron, two recording engineers in New York began to work with magnetic tape, experimenting with splicing, tape speed, and tape direction. Work was carried out in their personal studio.

1951 Experimental composer John Cage became interested in the Barrons' studio and gathered together a group of musicians on a joint venture called "Music for Magnetic Tape"

Group included: The Barrons, John Cage, Earle Brown, Morton Feldman, David Tudor, and Christian Wolff

1953 Project ends and composers go their separate ways.

Techniques: manipulation of sounds using tape speed, tape direction, and splicing, also some electronically generated sounds using electronic circuits

Aesthetics: Explored techniques common to both Musique Concrète and Elektronische Musik but with a more free and experimental bent. Cage's influence added the exploration of indeterminacy used in composition.

Works: *Williams Mix* by John Cage in 1952 - Created with the use of chance operations (I-Ching) to determine elaborate splicing and looping routines. Juxtaposed hundreds of samples catalogued in categories of city sounds, country sounds, electronic sounds, manually produced sounds (included musical instruments), wind-produced sounds (included voice), and small sounds requiring amplification

Forbidden Planet Soundtrack by Louis and Bebe Barron in 1956 - Created Electronically generated sounds using electronic curcuits. This soundtrack was the first completely electronic score for a major feature film.

Forbidden Planet

Columbia University – "Tape Music"

1951 Columbia University's Music Department acquires a tape recorder. Professor Vladimir Ussachevsky begins a set of studies using recorded piano sounds with tape speed manipulation and tape-head echo.

1952 Ussachevsky presents these studies on a Composers' forum at Columbia. Otto Luening attends forum and invites Ussachevsky to present the experiments at Bennington College. At Bennington, Luening becomes involved in further experiments with Ussachevsky, and they prepare a concert of short compositions for public performance in New York later that year.

Techniques: tape-head echo, extreme changes of playback speed, and splicing

Aesthetics: Luening and Ussachevsky saw the tape recorder as a means of extending traditional ideas of tonality and instrumentation, rather than as a tool for creating a totally new sound world. This conservatism can be heard in the tape music which employs blatant use of chords, scales, and arpeggios. After initial experiments in tape music, they composed music for live instruments and tape.

Early works from 1952:

Low Speed and *Fantasy in Space* by Luening

Sonic Contours by Ussachevsky

Collaborative pieces for orchestra and tape

by Luening and Ussachevsky:

1953 - *Rhapsodic Variations for tape recorder and orchestra*

1954 - *Poem in Cycles and Bells*

Founding the Columbia Studio

1955: Luening and Ussachevsky receive grant from the Rockefeller Foundation to investigate studio facilities at home and abroad. They visit Paris, Cologne, Milan, and Ottawa University in Canada.

- After this investigation, they conclude that the U.S. is making limited progress and that money needs to be set aside to promote studios within universities.
- Columbia sets up a small electronic music studio for their research.

1957: Columbia Studio is expanded.

1959: Princeton University and Columbia University receive $175,000 to establish a joint electronic music studio. Under the influence of Milton Babbitt, a music professor at Princeton, they purchase the RCA Mark II synthesizer, and their focus shifts to synthesis.

Features of the RCA Mark II

- 4 channels
- 12 oscillators tuned to diatonic pitches
- 2 sets of 12 variable pitch oscillators with octaver for transposition by octave
- frequency glider
- envelope and volume control systems
- Lowspeed Amplitude modulator - used for tremelo
- 2 sets of resonators - used to amplify sounds at determined resonant frequencies
- filters - high and low pass
- Punch cards for recall of sequences of notes

The RCA Mark II

Milton Babbett and the RCA
Electronic Music Synthesizer
Mark II

Edgar Varèse

1950 At the age of 67, Varèse begins work on *Déserts* for orchestra and tape in modest home studio in Greenwich, NY. This piece combines live instruments with factory noises recorded in Philadelphia.

1954 Schaeffer invites Varèse to Paris, where he completes work on *Déserts* at RTF studio. It is performed in both Paris and New York. In Paris, the performance is booed, but in New York City, it is received favorably.

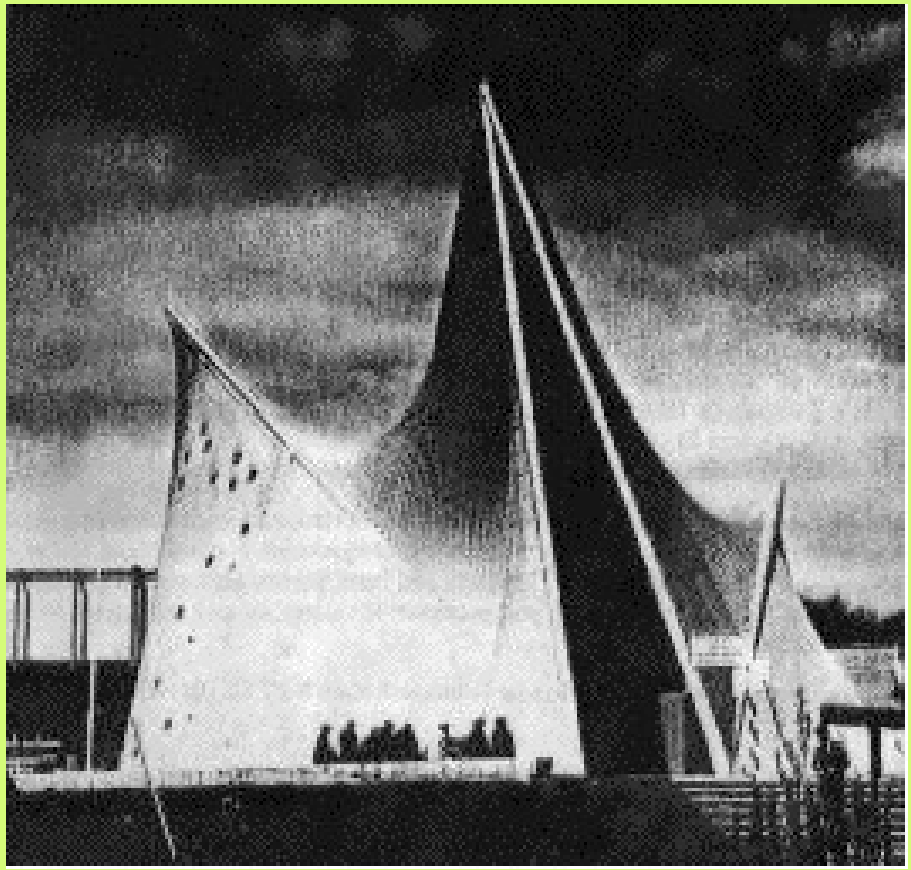
Poème Électronique

1956-58

- Varèse composes *Poème Électronique* for the Brussels World Fair in 1958. This music is specially designed for performance in Le Corbusier's pavilion over an array of 425 speakers. Both the structure and music were commissioned by the Phillips electronics firm in Holland. A special studio at the Phillips Laboratories was provided for Varèse to work.
- Source material for the piece includes machine noises, aircraft, bells, singers, piano and organ, and electronically generated sounds. Techniques used include pitch transformation, filtering, and modification of attack and decay. A three channel tape was fed to the array of speakers dispersed throughout the pavilion.

Note: Also involved was composer Iannis Xenakis, whose piece *Concret P.H.* was likewise projected through the pavilion which. Xenakis was also an architect and helped to design the pavilion itself.

The Phillips Pavilion at the 1958 World Fair in Brussels



Varèse's Sketch of *Poème Électronique*