Art, memory, and place. Pioneering research and technology innovation to support creation (when resources are scarce)

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Abstract

The development of electroacoustic music during the second half of the 20th century represents a significant achievement in a renewal and long convergence process between art, science and modern technologies. New aesthetic values and models, scientific theories, technologies and techniques gradually met, allowing a new approach to listening, understanding and creating music. In Latin America, technology innovators were pioneering the development of instruments and devices that allowed the creation of new media art, including electroacoustic music. Juan Blanco from Cuba, José Vicente Asuar from Chile, Raúl Pavón from Mexico, César Bolaños from Peru, and Fernando von Reichenbach from Argentina were among those innovative creators and engineers.

Keywords

Latin America; electroacoustic music; art-science-technology convergence; R+D; technology innovation.

Introduction

The development of electroacoustic music during the second half of the 20th century represents a significant achievement in a renewal and long convergence process between art, science and modern technologies. Before, the early decades of the 20th century were a turning point for a large part of the world, encompassing the arts -as they were understood- in the Western hemisphere. New aesthetic values and models, scientific theories, technologies and techniques gradually met, allowing a new approach to listening, understanding and creating music and beyond.

For a long time, electroacoustic music creation in Latin America had no favorable or easy conditions in almost no countries of the region. Unlike today, access to highly flexible and powerful recording technologies and professional systems for the electronic generation and processing of audio signals was extremely limited or nonexistent in most places.

Many composers worked with tape techniques using home tape recorders, recording acoustic sounds to edit those samples later, applying the usual techniques: cut and splice, speed change, tape direction, loops, and remixing. Electronic generating and modifying equipment were very rare. It was usually available only in electronic music studios, where composers shared those resources, or in radio stations or scientific research labs. However, there were exceptional cases worth considering. Difficulties sometimes help us sharpen our wits, develop unexpected ways of solving problems, and create new opportunities.

Latin America: A fertile place for innovation

In 1942, Juan Blanco (born in Mariel, 1919; died in Havana, 2008) registered the description and design of a new musical instrument at the Patent and Trademark Office in Cuba. He called his device the Multiórgano (Multiorgan).

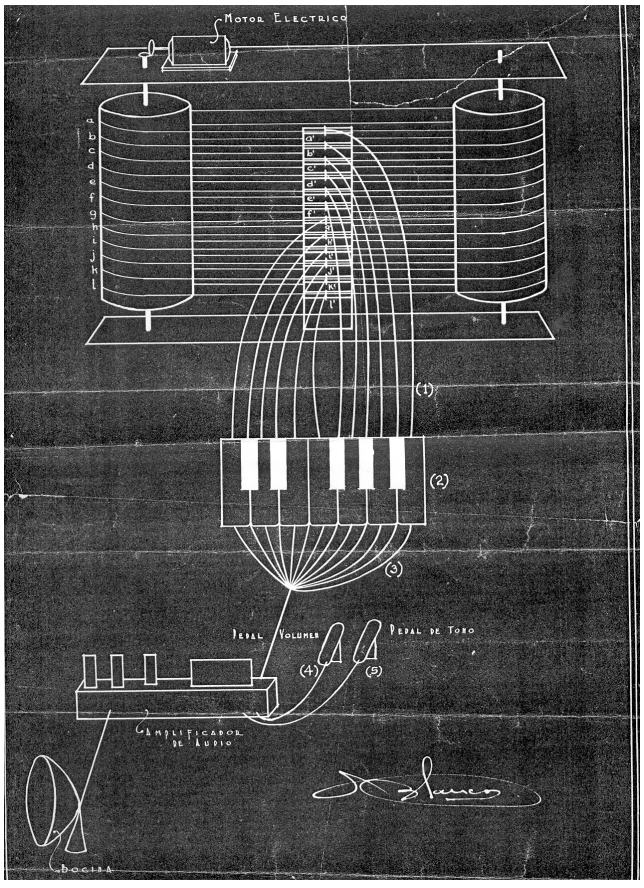

Figure 1. With a similar concept to the Chamberlin and the Mellotron, the Multiorgan, conceived by Cuban composer Juan Blanco in 1942, predated those instruments by several years.

The Multiorgan was based on 12 magnetophonic wire loops running through a playback head (recording on magnetic tape was used in Germany then, but not in America yet.) Conceived as a polyphonic instrument, the Multiorgan could be loaded with 12 chromatically recorded voices, musical instruments or other sounds, including any multitimbral combinations and limited only by the allowed number of loops. Each sound signal would be controlled by a keyboard, switching its flow to the amplifier. One pedal could change the sound amplitude, while another modified its frequency/duration, varying loop speeds. The Multiorgan concept predated the Mellotron by several years, but the original instrument, invented by Blanco, was never built. In 1991, Blanco presented a blueprint of his original design during the Musical Inventions and Creations: Denial of Utopia symposium held in Bourges, France.

In Chile, in 1957, Juan Vicente Asuar (born in Santiago, 1933; died in the same city in 2008) proposed to write his civil engineering thesis on Generación Mecánica y Electrónica del Sonido Musical (Mechanic and Electronic Generation of Musical Sounds). Then, in 1958, he started building the first Electronic Music Studio in Chile at the Catholic University, which was ready in 1959. Asuar helped to develop several electronic music studios in different countries during the 60s, including Germany and Venezuela. Since 1969, he became interested in the possibilities of using computers in music and created some works using an IBM System/360 in 1970 and again in 1972. In 1978, Asuar started his personal computer music studio based on a system he named COMDASUAR or Computador Musical Digital Analógico Asuar (Asuar Digital Analog Music Computer). The COMDASUAR used a microcomputer to generate square waves in real time that were later processed by analog means. The system was able to produce six voices simultaneously. The software he wrote for the system could generate basic control signals, allowing the composer to produce his scores and use, from data interpolation and pitch transposition to more complex operations such as pitch and duration transmutation, canon, retrograde, and probability, among other functions.

An engineer interested both in electronics and music, Raúl Pavón Sarrelangue (born in Mexico City in 1930; died in 2008) began to promote the use of electronic musical instruments in Mexico years before the first studio was built in the capital of the country in 1970. In 1958, he built the prototype of a loop-based musical instrument using magnetic tape recordings without knowing this principle was already in use. Then, in 1960, he built a small electronic musical instrument that featured an oscillator with multiple waveform outputs, various types of filters, an envelope generator, a white noise generator and a keyboard, among other modules. Pavón named the instrument the Omnifón, and it was among the first electronic sound synthesizers created. Years later, he wrote one of the first books in Spanish about electronic music: La Electrónica en la Música … y en el Arte (Electronics in Music…and the Arts), which was published in 1981 by Centro Nacional de Investigación, Documentación e Información Musical Carlos Chávez (Carlos Chávez National Centre for Musical Research, Documentation and Information) or CENIDIM. In that book, Pavón wrote about acoustics, the history, technology and techniques of electroacoustic music, and new media arts. Pavón also developed the Icofón, an oscilloscope-based system that projected Lissajous figures from the original sounds analyzed. He used the Icofón to create new media works.

A Media Lab in the 60s: The ITDT

In Argentina, Fernando von Reichenbach (born in Buenos Aires, 1931; died in the same city, 2005) played a crucial role in the development of technological tools for the arts during the days of the Centro Latinoamericano de Altos Estudios Musicales (Latin American Center for High Musical Studies) or CLAEM, at the Torcuato Di Tella Institute, or ITDT, in Argentina, in the mid-60s.

He invented the Convertidor Gráfico Analógico (Analog Graphic Converter), also known as Catalina, used to convert graphic scores from a paper roll into electronic control signals adapted for musical uses with analog instruments, capturing the original drawing images with a camera.

In an interview with the author, Uruguayan composer Ariel Martinez (born in San José de Mayo, 1940) mentioned: “Reichenbach had built Catalina, the Analog Graphic Converter, that was a paper band in which it was drawn, a TV camera that read the paper band, and a generator of the voltages that were controlling a Moog oscillator, which was the audio generator, controlled by the voltage that was as well controlled by Reichenbach’s apparatus.” [free translation by the author].

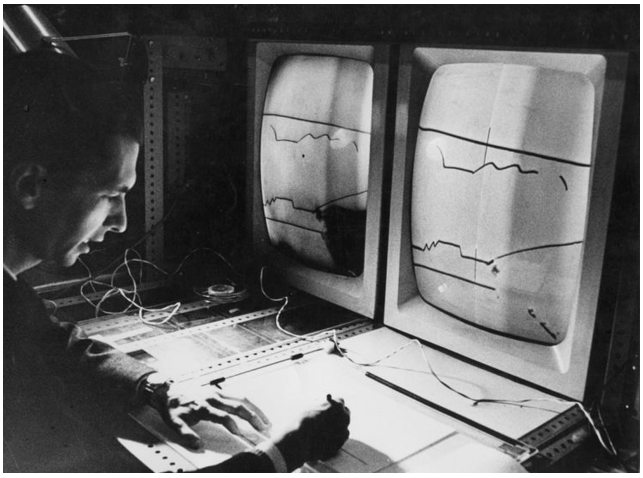

Figure 2. The Analog Graphic Converter developed by Fernando von Reichenbach in Argentina during the 60s.

The only VCO available at CLAEM to be controlled by the Analog Graphic Converter was a Moog module borrowed from composer Nelly Moretto. It was a multi-waveform monophonic oscillator. Therefore, any polyphonic texture needed to be realized by mixing and remixing each line or voice on analog (usually stereo) tape recorders.

In an interview with the author, when asked about the Analog Graphic Converter, von Reichenbach said: “Having no computers, it was necessary to find some way to draw the pitch or the intensity or both at the same time; we had two channels for drawing […] With drawings, it was possible to control […] the oscillator, the modulator, and the filter.”

The first tape piece created using the Converter was Analogías Paraboloides by Pedro Caryevschi, composed in 1970. José Ramón Maranzano and Eduardo Kusnir also composed tape pieces with the Converter that same year.

Ariel Martinez, on the piece of Caryevschi, said: “He proposed to realize a rational piece, that was the accomplishment of a paraboloid module, that is to say, following Xenakis’ style, lines which in the parabolic form are generating a module that gradually opens and then it closes.” This key part of Carievschi’s work was done with 48 sine waves recorded individually, using the Analog Graphic Converter and assembled (remixed) on tape.”

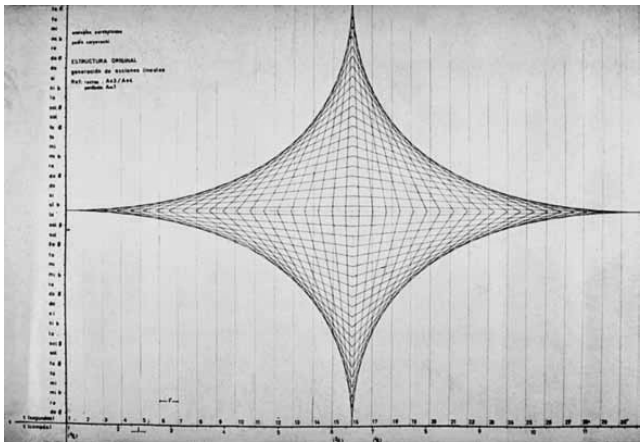

Figure 3. Part of the plan for Analogías Paraboloides by Pedro Caryevschi, a 1970 tape piece created using the Analog Graphic Converter developed by von Reichenbach (excerpt.)

During those years, von Reichenbach also created devices such as the keyboard-controlled polyphonic third/octave and octave filter and a special patch-bay that helped solve the complex needs of composers at the lab. Usually using low-tech, he worked behind the scenes to solve the technical needs of composers experimenting at the Di Tella Institute. An example is the switch pedal board he developed for Interpolaciones, a 1966 piece for guitar and tape by Peruvian composer César Bolaños, to allow the performer a live control of sound distribution around the audience. Fernando von Reichenbach was also involved with the technical development of several multimedia shows in Buenos Aires. Around 1960, before CLAEM started its activities, he was working to put on one of the first large multimedia shows in Argentina, the Shell Pavilion.

In 1964, Bolaños composed the first electroacoustic work in the original laboratory at the Instituto Di Tella. This studio underwent a radical transformation with the arrival of von Reichenbach at the ITDT, who turned it into a space for creative work with electronic media at the highest international level.

It is worth mentioning the experiences of César Bolaños (born in Lima, 1931; died in the same city, 2012) with the mathematician Mauricio Milchberg in Buenos Aires during the early 70s when they were experimenting with computers (supported by Honeywell Bull and later by Olivetti Argentina) to organize compositional materials. Their work led to the creation of two pieces: Sialoecibi, also known as ESEPCO I (Estructura Sonoro-Expresiva Por Computación or Sound-Expressive Structure By Computing) for piano and one reciter-mime-actor, and Canción sin palabras (Song without words) or ESEPCO II, for piano with two performers and tape, both from 1970.

In an email from 2005 to the author, Milchberg wrote: "It was clear that I was only trying to be a complement of the composer, who was really taking the decisions. Working with calculus techniques from what used to be called, very overestimated, artificial intelligence. We were not using the computers to generate sounds but structures - the idea was to write 'scores' […] and complements, as the generation of some texts read during the pieces". [author's free translation].

In 1958 the Instituto Torcuato Di Tella (ITDT) was founded in Argentina. The Institute was conceived to promote high-level study and research to update artistic and cultural production without losing the perspective of the Latin American context. In 1963, the Centro de Artes Visuales or CAV (Center for Visual Arts), the Centro de Experimentación Audiovisual or CEA (Center for Audiovisual Experimentation), and the Departamento de Diseño (Department of Design) were opened. The Centro Latinoamericano de Altos Estudios Musicales, or CLAEM, had its first activities in Buenos Aires the year before, in 1962. These Centres, all part of the ITDT, were a magnet for innovators, artists, composers, musicians and conductors, both local (e.g., Oscar Bazán, alcides lanza, Mariano Etkin, Pedro Caryevschi, José Maranzano, Luis Arias, and Graciela Paraskevaídis from Argentina) and from all Latin America (e.g., Edgar Valcárcel and Alejandro Núñez Allauca from Peru; Alberto Villalpando, Florencio Pozadas, and Atiliano Auza from Bolivia; Mesías Maiguashca from Ecuador; Blas Emilio Atehortúa and Jacqueline Nova from Colombia; José Rafael Aponte Ledée from Puerto Rico; Jorge Antunes and Marlene Migliari Fernandes from Brazil; Gabriel Brnčić and Iris Sangüesa from Chile; Jorge Sarmientos and Joaquín Orellana from Guatemala; Coriún Aharonián, Antonio Mastrogiovanni, and Ariel Martinez from Uruguay; Federico Ibarra Groth from Mexico; Alfredo del Mónaco from Venezuela) who travelled to Argentina as scholarship holders. Also, it was an attractive place for renowned artists worldwide, mainly from Europe and the Americas (e.g., Gilbert Amy, Earle Brown, Aaron Copland, Luis de Pablo, Luigi Dallapiccola, Mario Davidovsky, Umberto Eco, Cristóbal Halffter, Roman Haubenstock-Ramati, Maurice Leroux, Bruno Maderna, Ricardo Malipiero, Oliver Messiaen, Luigi Nono, Eric Salzman, Roger Sessions, Hans Heinz Stuckenschmidt, Vladimir Ussachevsky, Iannis

Xenakis), who went to Buenos Aires to lecture or teach seminars, together with the Argentinean professors who regularly taught at CLAEM (e.g., Alberto Ginastera, Gerardo Gandini, Enrique Belloc, Raquel Cassinelli de Arias, Francisco Kröpfl, Amalia -Pola- Suárez Urtubey, Horacio Raúl Bozzarello, and Fernando von Reichenbach.)

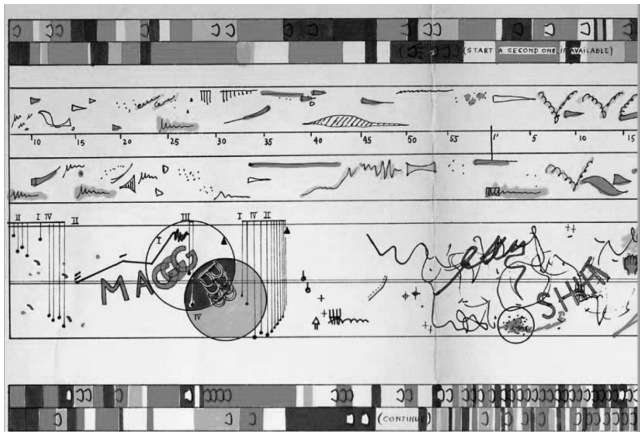

Figure 4. Score of Strobo I, for double bass, miscellaneous percussion instruments and tape (with synchronized slides, colour lights display, strobe lights or rotating lights from a police patrol car, etc.) by alcides lanza, performed at CLAEM/ITDT in 1968.

The ITDT impact on the cultural life of many countries from the 1960s onwards made it a reference in the artistic history of the media arts.

Conclusions

Hopefully, this text will invite you to explore the rich and hardly known world of electroacoustic music, sound art, and new media works created by hundreds of Latin American artists over the past several decades.

This document has been compiled from bibliographic information and, above all, from communication in person, by e-mail and by telephone with the pioneering creators and innovators over many years. These results are part of the material that today appears in various publications, such as the Latin American Electroacoustic Music Collection hosted by the Daniel Langlois Foundation in Montreal and the article Part of Computer Music History... (Trust Me, Latin America Has Always Been There!) published by The MIT Press, among others. There is no direct correlation between the number of lines written and the quality or relevance of the achievements of the people named here. Compiling the original data was difficult in most cases, but as Lao-Tse said, "A journey of a thousand miles must begin with a single step." This is a project that continuously unfolds and uncovers amazing productions made with scarce resources and in places that until recently were not even considered part of the history of new media arts.

Acknowledgements

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