

CRI SD 310

Computer Music: Hiller/Baker/Melby

Lejaren Hiller and Robert Baker

Computer Cantata (1963) (24:00)

University of Illinois Contemporary Chamber Players

Helen Hamm, soprano; Jack McKenzie, conductor

John Melby

91 Plus 5 for Brass Quintet and Computer (1971) (20:00)

Contemporary Brass Quintet:

Elin Frazier, Daniel Orlock, Edward Curenton,

Robert Moore, Jonathan Dornblum

Roman Pawlowski, conductor

The two pieces on this record represent the two major ways in which computers are used to create music. The first, *Computer Cantata*, is one of the earliest attempts to use it to create a composition. The second, *91 Plus 5*, is a recent example of its use to turn a composition that exists on paper into audible sound.

Lejaren Hiller (b New York, 1924) studied piano with Harvey Brown, oboe with Joseph Marx, and composition with Harvey Officer, Milton Babbitt, Roger Sessions, and Hubert Kessler. He attended Princeton University, B.A. (1944), M.A. (1946), Ph.D. (1947) majoring in chemistry, and minoring in music. He also obtained a Master of Music degree from the University of Illinois (1958). Hiller worked for E. I. duPont de Nemours as a research chemist in synthetic fibers and polymers (1947-1952) and in the Chemistry Department of the University of Illinois (1952-1958).

All the while, he composed music in many media. In 1956, he organized the Experimental Music Studio of the University of Illinois. From 1958 to 1968, he was professor of music, director of the Experimental Music Studio, and co-director of the University of Illinois Contemporary Chamber Players.

In 1968, he became the first permanent Frederick B. Slee Professor of Music at the State University of New York at Buffalo with an adjunct appointment as professor of computer science. At Buffalo, he is also co-director, with Lukas Foss, of the Center of the Creative and Performing Arts, widely known for its "Evenings for New Music."

Hiller started experimenting with the ILLIAC computer at the University of Illinois in 1957 and, with the help of it and Leonard Isaacson, created a composition for string quartet called the *ILLIAC Suite*. The discoveries made then led to further work with computers, and another work called *Computer Cantata*. Both of these were originally released on the Heliodor label. The composer writes:

"In 1962, Robert Baker and I started MUSICOMP and the *Computer Cantata*. MUSICOMP was an expandable set of programs for composition that was written in SCATRE (an IBM-7094 assembly language) and to a lesser extent in FORTRAN. It consisted of three basic groups of routines: (a) system regulatory routines that set up format, data input and output, a choice order code, instrument ranges and playing limitations, and other bookkeeping chores; (b) compositional sub-routines, of which some fifty to sixty eventually became operational, and (c) special output routines that provided data for sound synthesis.

“Obviously, the compositional subroutines were the heart of the matter because they provided the composer with statements that control the successive selections of notes, rhythms, phrases, and so forth. A few of the subroutines included procedures such as generating tone rows, generating chords, generating rhythmic groups, choice of rest or play, and matching like rhythms. These and the other subroutines were derived from both traditional and speculative compositional techniques and can be exploited in both deterministic or probabilistic contexts depending on their user's preferences.

“We wrote the *Computer Cantata* in 1963 to illustrate what we could do with the relatively few subroutines we had at that time.

“The five main strophes are stochastic settings of five successive approximations of spoken English. These texts were generated by Professors Hultzén, Allen, and Miron of the University of Illinois as an experiment in speech research. The music is correlated to these texts and goes from a state of great disorder in Strophe I to some degree of order by Strophe V. The Prologs and Epilogs, in contrast to the Strophes themselves, are concerned with rhythmic organization for percussion, total serialism and scales of 9 to 15 tones per octave realized by a simple sound synthesis scheme devised for the CSX-1 computer. We deliberately left this synthetic sound crude.

“Much nonsense has been written about computers ‘thinking’ and ‘creating.’ After all, a computer is really nothing more than a complex array of hardware. It can be tremendously useful hardware, however, but only if you know the limitations of programming logic and how to ask sensible and precisely formulated questions.

“Should a person listen to this piece as he might ‘ordinary music’? Yes, I think, but with this important qualification: It is much more didactic than expressive compared to most music. This piece is truly experimental because it is concerned with revealing process as well as being final product. It is an embodiment of objective research results. It is a laboratory notebook. Sometimes the results surprise us because a compositional routine seemed less effective than expected, sometimes more so. If I had deleted everything that disturbed me esthetically, I would have falsified the research record. So, at that time, my objective in composing music by means of computer programming was not the immediate realization of an esthetic unity, but the providing and evaluation of techniques whereby this goal could eventually be realized.”

Since composing the *Computer Cantata* in 1963, Hiller has continued to write other compositions with computers as well as by other more traditional means. More recent computer works include *Algorithms I for 9 Instruments and Tape* (1968), *HPSCHD* (1968), composed in collaboration with John Cage; and *Algorithms II for 9 Instruments and Tape* (1972), composed in collaboration with Ravi Kumra.

John Melby was born in 1941 in Whitehall, Wisconsin. He received his diploma and bachelor of music degree from the Curtis Institute of Music, M.A. in composition from the University of Pennsylvania, and M.F.A. and Ph.D. in composition from Princeton University. His composition teachers have been Henry Weinberg, George Crumb, Milton Babbitt, Peter Westergaard, and J.K. Randall. He has done extensive work in the area of computer-performed music; his *Forander: Seven Variations for Digital Computer* (1969-70) was performed on the Tenth Anniversary Concerts of the Columbia-Princeton Electronic Music Center in New York in 1970.

The composer writes about his music:

“*91 Plus 5* (the title refers to nothing more than the fact that the piece is scored for an electronic tape realized on an IBM 360/91 digital computer and five brass instruments) is a composition in nine sections which combine to form one continuous movement. The first through eighth sections form a large arch-form, with the first related to the eighth, the second to the seventh, etc. The ninth section serves as a ‘coda.’ Each pair of related sections emphasizes a different aspect of the basic rhythmic/pitch materials. In addition, the related sections correspond in terms of tempo relationships, ‘timbral’ considerations, etc.

“Composers who make use of digital computers in their pieces can be divided into two general categories: 1) those who use the computer as an aid to composition and 2) those for whom the computer serves as an incredibly flexible performing medium. My use of the computer falls into the latter class. In *91 Plus 5* (and in all my other works for digital computer, either in combination with live performers or alone), the computer is programmed to produce a digital tape that contains a series of numbers which, when changed through the digital-to-analog conversion process, produce fluctuating voltages. These voltages, when recorded on an ordinary magnetic tape and amplified, produce musical sounds. Thus, while the computer is actively involved in the performance of the work, it is not involved in the compositional process. The great precision inherent in computer performance makes it possible to produce effects (such as accurate rendering of passages in simultaneous different tempi) which are impossible, or at best very difficult to achieve, with live instrumentalists. In addition, the unlimited ‘timbral’ possibilities offer much room for experimentation. In the case of *91 Plus 5*, I have purposely limited myself to relatively simple sounds in the computer part; this is due to a desire to obtain sounds which contrast with the ‘richness’ of the harmonic spectra of the brasses.

“*91 Plus 5* was composed in late 1970 and early 1971. The computer tape was realized, using the MUSIC360 sound synthesis program written by Barry Vercoe, at the Princeton University Computer Center, with digital-to-analog conversion at Bell Laboratories, Murray Hill, New Jersey. The composition was first performed in April of 1972, by the performers on this record, at the National Conference of the American Society of University Composers in Baltimore, Maryland.”

Roman Pawlowski is both a conductor and a composer. At age twenty-nine, he has been gaining a reputation in the Philadelphia area as a rather versatile conductor, thoroughly at home with the standard choral and orchestral literature; he is also a specialist in the avant-garde. Currently he is the chairman of the music department of a private school in the Philadelphia area.

The **Contemporary Brass Quintet** was originally formed in 1965. Since that time, the group has performed numerous Young Audience concerts and adult community concerts throughout the East Coast area. The members are all graduates of various well-known music schools. They have all performed in symphony orchestras and ballet and opera orchestras and are also free-lance recording artists.

Computer Cantata was originally released on the Heliodor label. It is re-released under CRI's ongoing policy of making available music of historic interest, with the assistance of the Alice M. Ditson Fund of Columbia University.

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