WAVE SONGS
for
female voice with pure wave oscillators

When Andrea Miller-Keller, Shelly Casto and James Rondeau of the Wadsworth Atheneum asked me to give a talk about wave phenomena, in conjunction with the exhibition of Lee Lozano's Wave Paintings in the Matrix Gallery, two works from the Sixties I might discuss immediately came to mind: David Behrman's WAVE TRAIN, in which a hand-swept oscillator carries piano sounds up and down in sweeping arcs and Michael Snow's film WAVELENGTH, in which the camera moves closer and closer into the corner of a room, providing the viewer with a continually changing point of focus. I also remembered a chapter in Italo Calvino's book, MR PALOMAR, where the hero, sitting on a beach, muses on the transient nature of ocean waves. There was something about the purity and neutrality of waves and their motions that attracted artists who wanted to make non-subjective and at the same time expressive works. Lee Lozano's eleven WAVE PAINTING S are prime examples of this blending of science and art. Reading through her writings one finds references to astronomy, physics and a love of math. Inspired by her work I suggested that instead of a lecture I be permitted to make a musical work that explored sound waves in the same spirit as her paintings explored light waves.

WAVE SONGS consists of eleven solos for female voice with two sine wave oscillators. (An oscillator is a simple electronic device that emits a steady sound for an indefinite period of time and can be tuned accurately.) I took the proportions of the paintings to compose my musical miniatures. Each painting is 96 inches high; each solo is 96 seconds long. In each painting the number of inches is divided by the size of the waves that are contained in it; in each solo the oscillators are tuned to the size of the waves. For example, in the *Two-Wave Painting*, each wave measures 48 inches (96 divided by 2 equals 48.) In the first solo the oscillators are tuned 48 cycles apart. Because of the purity of the electronic waves, audible beats--bumps of sound--are heard 48 times per second as the sound waves coincide. In each succeeding solo, the distance between the oscillator tones becomes narrower until, in *Solo XI*, corresponding to the *192-Wave Painting*, they are within a half a cycle of each other, producing a beat once every two seconds. So while the number of Lozano's waves increases as they become smaller the number of beats in the musical solos decrease as the tunings get closer. The reason for this contrariness is because, in order to imitate exactly the *Two-Wave Painting*, I would have had to tune the oscillators two cycles apart over a minute and a half time span (one beat every 48 seconds), a tempo much to slow to perceive in a musical performance.

In all the solos but one the singer sings long tones on the vowel "oo" (whose purity matches that of the oscillator tones), separated by silences. By singing closely against the stationary tones, the singer creates separate sets of beating patterns, one against the upper oscillator tone, another against the lower. In three solos she slides from one tone to the other, causing the beats simultaneously to slow down as she nears one tone and speed up as she moves away from the other. In *Solo IV* combination tones, low buzzing phantom sounds, are produced by the difference in frequency between two musical tones. They are actually beats rapid enough to form tones of recognizable pitch. In *Solo X*, I broke the pattern of wordless singing and took the liberty of inserting several sentences taken from Mz. Lozano's writings.

WAVE SONGS was written for singer and composer Joan La Barbara. I imagined the work as a mini opera with Joan taking the part of Lee Lozano, singing her paintings into existence or perhaps simply singing to herself as she worked on them.

Alvin Lucier
March 28, 1998

Wave Songs

Lozano Text

"The waves are really a reference to the electromagnetic spectrum. At the beginning they were more towards infrared, they were larger waves. There weren't as many oscillations. But I didn't do them in a sequence that would reflect the perfect order of the electromagnetic spectrum. I was trying to combine science and art and existence. It was a science idea transferred to an art idea."