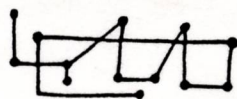


ELECTRONIC MUSIC
FOR
KATHINKA'S CHANT AS
LUCIFER'S REQUIEM



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SINCE THE BEGINNING of my composition of electronic music I have always been seeking for the technical means to produce phase-synchronized spectra with controlled phase-shifting of the individual partials. One learns ordinarily in the study of acoustics that the phase-alignment of the partials plays no audible role. However, that is true only to a very limited degree. Some results of phase-rotation which I achieved in an adventurously experimental manner in the Cologne studio were very encouraging toward making further investigation in this direction (for example, while simultaneously recording a spectrum on two parallel tape recorders, slowly pressing a finger down on the tape between the record and playback heads, and recording both outputs on a third tape recorder). By this means one can achieve wonderful spectral-“rotations,” in which all of the partials undergo phase-shifting among themselves.

The compositional availability of such phase-shifting in the Cologne Studio

for Electronic Music of WDR (Western German Broadcasting) in any case remained a permanent pipedream, like most of what I wanted to compose from 1952 (*Etude, musique concrète*, O.R.T.F., Paris) to 1976 (completion of the realization of *Sirius* at WDR), and could not realize because of technical limitations.

Since the opening of the studio for electronic music at IRCAM I have regularly been invited there for demonstrations of the equipment. From among the sound-examples of the demonstration tape made by Giuseppe Digiugno (the designer of the *synthétiseur 4X*), I was fascinated by an example of the slow phase-rotation of an overtone spectrum of “over 700 phase-synchronized generators,” as he proudly explained.

At the first opportunity to find out whether I could realize a large project in the IRCAM studio, I concentrated on processes of phase-rotation with the use of the *synthétiseur 4X*.

The 4X has six “plaques” (“boards”—memory storage), and each “plaque” can be programmed for a maximum of 64 oscillators, when these are used with a sampling rate of 32,000 Hz (at which rate frequencies above 16,000 Hz are no longer available).

There are therefore $6 \times 64 = 384$ programmable oscillators. Each “plaque” is divisible into $32 + 32$ oscillators. If one wants to produce a *continuous succession* of spectra, then these “plaques” must be divided into two halves (with 3×2 outputs each, therefore six potentiometers), so that during the running of the program of one-half, one can “load” the other half.

Depending on the complexity of the program, the “loading” sometimes takes rather a long time (in my program sometimes as much as six seconds). By doing this, the number of the simultaneously employable oscillators is automatically reduced by half—that is to say, by 192 (3×64 or 6×32). The twelve outputs of the six “plaques” (each is divided in two) can be separately regulated during the work by means of 2×6 volume-controls on a mixing-table, and—if necessary—filtered.

These were the technical conditions known to me when, in May of 1983, I wrote the version of

Kathinka's Chant

as

Lucifer's Requiem

for

Flute and Electronic Music.

The work had appeared at the beginning of 1983 in a first version for flute and six percussionists—as the second scene of the opera *Samstag aus Licht* (Saturday

from Light). This form was premiered in a quasi-concert version in October 1983 at the Donaueschinger Musiktage by Kathinka Pasveer (flute) and the Kolberg Percussion Ensemble. On the 25th of May 1984 the stage premiere followed, under the auspices of the Teatro alla Scala at the Palazzo dello Sport, Milan, with Kathinka Pasveer and the Slagwerkgroep Den Haag (Stage Director: Luca Ronconi; Stage Design and Costumes: Gae Aulenti; Sound Director: K. Stockhausen).

COMPOSITION AND REALIZATION

In May of 1983 I first wrote for the electronic music to *Kathinka's Chant a form scheme* with explanations of the symbols. It contains the information for the theoretical programming. This I discussed with Marc Battier, a musical/technical colleague from IRCAM (Paris), with whom I wanted to collaborate.

In December 1983 and August 1984 I realized the electronic music in 2×7 days at IRCAM. Battier, using a PDP-11 computer, programmed the 4X according to my score.

During the time spent in the studio there came about *working notes* containing the data for the particulars (chosen by ear) of the timbres and relative dynamics. Finally they were summarized in a four-page *synchronization scheme* with 2×6 tracks for copying from the 4X onto a 16-track tape. A *supplemented form scheme* with meter-level numbers is the result of the mix-down (August 21, 1984) in the auditorium "Espace de Projection" from the 16-track tape recorder to an eight-track tape recorder for the production of a performance master-copy. In this scheme I added the numbering (above each $\square$) of the K1 to K6 sounds.

The realization was concluded on the 22nd of August, 1984.

The automatically generated *tables for the sounds K1-K6* (*Tables d'ondes pour les K1-K6*) are dated the 20th of July 1983; all of the *tables for the sounds notated in ellipses in the form scheme* are dated the 14th of December 1983; the last version of the *explanation of terms in the score* (*Explication du nom des partitions*) and the *score of the whole composition* (*Partition*) are dated the 20th of August, 1984.

From the 9th to the 14th of May 1985 the world premiere and five further performances took place at IRCAM, with Kathinka Pasveer (flute) and a six-track projection of the electronic music.

The work lasts about 33 minutes.

The most essential aspect is the six-layered space-polyphony of controlled phase-rotations of harmonic spectra. A new orientation of musical logic in the realm of the *harmonic* stands out, which was not realizable with the technical means available up until now. Simultaneous phase-rotations of phase-

synchronous partial-groups of rich overtone-spectra (with completely determined fundamental tones and durations of each rotation, above all with very long durations and with certain intensity-relations of the partial-groups amongst themselves) can be of a beauty such as has never before been experienced. The changes of slow phase-rotations have such an intense temporal logic, that one can accurately follow quarter, third, and, above all, half-phases; and the coincidence of the maxima of all of the overtones (where a sharp explosion occurs at the point of phase synchronization) is perceived each time as a liberating new beginning.

I would like therefore to summarily describe the composition and the work of its realization.

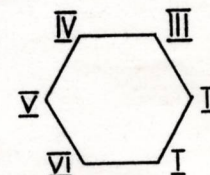
Comments on the significance of the *requiem*-character, of the 24 *stages*, etc., of *Kathinka's Chant* are in the general forward to the score and will not be repeated here. I will describe only the technical aspect.

DESCRIPTION OF THE FORM SCHEME (Example 1)

- 1) 24 *Grundton-Segmente* (Fundamental-tone segments) of the *Lucifer formula* are distributed over the 24 *stages* (1)–(24) (see *Grundtöne* and under them their *durations* [Dauern]).

Normal notes • signify periodic vibrations, slashed-through notes / noise-bands.

- 2) In *six layers*, overtone-groups are reproduced over six loudspeakers (see the comments beneath the *form scheme*).



- 3a) Where $\square$ appears, a **complete overtone-spectrum** of the first to the 212th overtone was placed, with levels of the overtones inversely proportional to the frequency-intervals (fundamental-tone level 1000.000000 = maximum; second overtone level 500.000000; third overtone-level 333.333344, etc.), graphically depicted in my working notes (Example 2) as 212 $\nwarrow$.

- b) Moreover, at each $\square$ there is an **electronically imitated instrumental sound** mixed in, phase-synchronous to the complete 212-overtone-spectrum. By this means six different sounds are employed, which I designate K1-K6.

They had already been recorded for other programs, so then they were