

Tod Machover

(b. 1953)

- 1** **Flora** (1989) (4:14)
for computer-generated tape
based on the voice of Karol Bennett

- 2** **Towards the Center** (1988-89) (19:49)
for 6 instruments and live computer electronics
The New York New Music Ensemble
Jayn Rosenfeld, flute; Jean Kopperud, clarinet;
Linda Quan, violin; Chris Finckel, cello;
Elizabeth DiFelice, electronic keyboard;
Daniel Druckman, electronic percussion;
Robert Black, conductor

- 3** **Famine** (1985-86) (13:35)
for 4 amplified voices and computer-generated tape
Text by Rose Moss
Electric Phoenix
Judith Rees, soprano; Mary King, mezzo-soprano;
Daryl Runswick, tenor; Terry Edwards, bass;
John Whiting, sound engineer

- 4** **Bug-Mudra** (1989-90) (15:14)
for 2 guitars, percussion and live computer electronics
(live performance, February 4, 1990, Tokyo)
David Starobin, acoustic guitar, Oren Fader, electric guitar;
Daniel Kennedy, acoustic and electronic percussion;
Tod Machover, conductor, data-glove.

Total Time: 54:14

Notes by Tod Machover

Although the four works on this recording are quite diverse in feeling, instrumentation, and musical materials, they are in fact closely related. As a group, and along with my opera *Valis* and orchestral work *Desires*, they represent a distinct period in my musical thought. The listener will notice many common harmonic, rhythmic, timbral and developmental procedures that occur in all the pieces. There are also similarities in musical form and shape. Both *Towards the Center* and *Famine* are organized into movements, but also project a sense of continuous change, development and musical discovery. *Flora* and *Bug-Mudra* have almost opposite forms: the first piece develops as a sort of upside-down V-shape, starting from gentle stillness, building in a single arch to a rich climax, and then quieting down to end almost as it began; the latter forms a regular V, starting with a bang, moving towards a moment of agitated stillness at its center, and then building up gradually to first recapitulate its opening, and then to intensify, ending with an even greater bang. All

four pieces combine extremely diverse musical materials, sometimes through a kind of intense struggle (*Famine*), sometimes as a psychologically transformative progression (*Towards the Center*), and in the two most recent pieces (*Flora* and *Bug-Mudra*) with a more stable sense of balanced synthesis. All four pieces combine acoustic instruments or voices with computer electronics, using "hyperinstrument" techniques. Developed at the MIT Media Laboratory (under the direction of myself and Joseph Chung), "hyperinstruments" are designed to augment and expand performance virtuosity in real-time, using intelligent, interactive machines.

Flora was composed in the summer of 1989 as a collaboration (mostly by Fax!) with Japanese computer graphics artist Yoichiro Kawaguchi. The music does not attempt to slavishly follow the content or progression of his video (which has been celebrated as probably the first artistic use of new High Definition video technology). Rather it uses Kawaguchi's astonishing mixture of abstract, synthetic images

and organic, life-like evolution as a metaphor for the musical composition. Although much of my music of the last ten years has involved the combination of acoustic instruments and voices with computer electronics, *Flora* is the only piece of mine that was imagined for pre-recorded medium only, without any live performance version. It is also the shortest piece I have ever written.

The piece starts and ends with a simple *a capella* chorale. Melodies become splintered, voices turn into electronic clouds and snap back again into lively rhythmic punctuations. The whole is a sort of miniature set of variations, based on the opening melodies, and on the sound, texture and feeling of the female singing voice. *Flora* is based on soprano Karol Bennett's voice, recorded, transformed, and complemented by computer electronics at the MIT Media Lab, including a Synclavier Direct-to-Disk and Sampling system controlled and manipulated by specially developed "hyperinstrument" tools. The piece was commissioned by Tokyo's Fuji Television and Nippon Electronics College, and received its premiere at the 1989 Tanglewood Festival.

Towards the Center was composed between July 1988 and the beginning of January 1989, as an NEA Consortium Commission for the New York New Music Ensemble and Boston's Collage. It is scored for six instruments, four of which (violin, cello, flute and clarinet) are amplified and slightly transformed electronically, while the keyboard and percussion parts are performed on MIDI controllers (Kurzweil Midiboard and KAT 4-octave mallet percussion) connected to the real-time computer "hyperinstrument" system.

As its title suggests, *Towards the Center* dramatizes the search for common musical ground on a variety of levels. Electronic sound is contrasted with acoustic, melodic expressivity with rhythmic dynamism, and solo virtuosity with ensemble togetherness. The work consists of three movements framed by a short introduction and coda. The first movement is a very rapid, pulsating song that moves from precisely interwoven hockets to complex rhythmic desynchronization. The second movement abruptly halts the previous rhythmic propulsion. A playful trading back-and-forth between electronic and acoustic instruments

leads to a meditative section which builds up changing sound spectra over a powerful bass pedal point. The movement ends with a gentle, lyrical song and a few moments of absolute stillness. The third movement is a pascaglia (interrupted by a sweeping bass melody over which the work's harmonic and melodic material is densely recapitulated) that accumulates more and more layers, building up intensity until the work's climax and abrupt ending.

All of the computer electronics in *Towards the Center* are performed live; nothing is pre-recorded, making this an especially ambitious piece to perform. The use of the computer was designed to follow, complement and emphasize the work's musical development, and differs functionally in virtually every one of its sections (including such concepts as rhythmic enhancement and time warping, timbre tremolos, and automated arpeggios). One of the more interesting aspects of the system designed for *Towards the Center* is that the relationship of control versus independence (of the two electronic soloists) is mediated by the machine. At moments the players are

free from each others' influence, while at other times they group together to form a single "double instrument" (in the middle of movements two and three, for instance) where each controls only part of the musical result (see Figure 1). The flow from independence, to synchrony with the machine, to total instrumental unity, is a metaphor for the general musical considerations of *Towards the Center*.

Famine was composed from September 1985 through January 1986, and was commissioned by Electric Phoenix, the British vocal ensemble, as one of a series of works by American composers representing the four horsemen of the apocalypse. It is scored for four amplified voices (soprano, mezzo soprano, tenor and bass) and computer-generated tape. I worked closely with the writer Rose Moss to craft a text which is more like a miniature libretto than a traditional poem. Instead of attempting to narrate the horrors of famine directly, or to preach a moral position, the text juxtaposes different scenes related to feelings about the fact that famine persists, hoping to make these thoughts tangi-

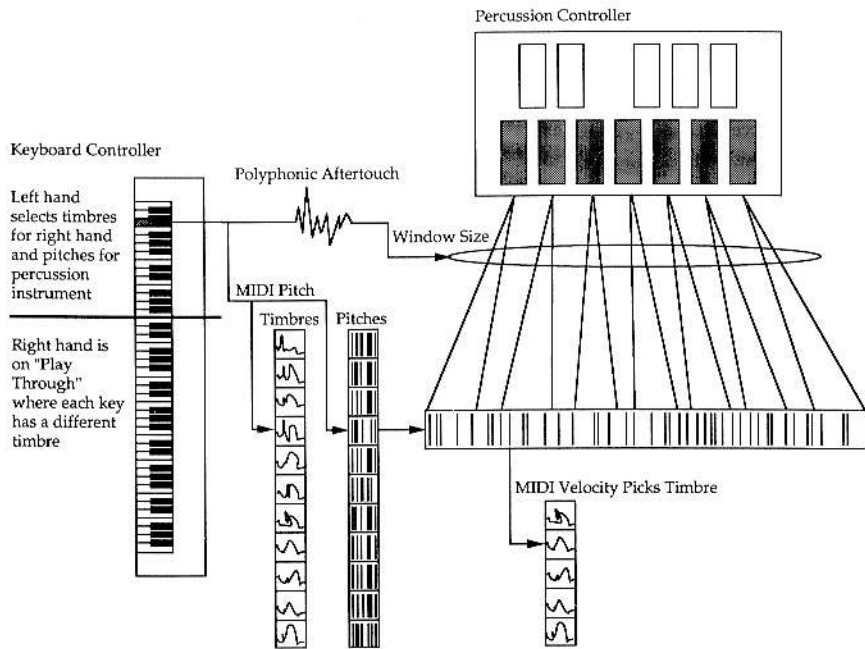


FIGURE 1

Diagram of "Double Instrument" for Electronic Keyboard and Percussion from *Towards the Center*.

ble and immediate to the listener. Eating and nibbling sounds are heard; numbers are counted to represent painful human reality reduced to distancing statistics; prepositions fly by, disconnected one from the other, or from any objects; lovely images of plenitude vanish mirage-like; rhythmic protests are reduced to mourning moans, a blood-curdling scream, and the ending's expiring breath.

Famine is divided into two sections, separated by an eerily tranquil electronic interlude. Within these sections, the piece travels through many musical moods, often expressing several simultaneously. The piece begins and ends with the sound of breathing. In between is anguished, passionate, sometimes violent and even painful music, sprinkled with moments of gentleness and calm, and even a ray or two of hope.

Bug-Mudra was composed between November 1989 and January 1990, and was given its premiere at Tokyo's Bunkamura Theater during nine concerts of my music in January and February 1990. The piece was commissioned by the Fromm Music Foundation of Harvard University, was com-

posed at the request of guitarist David Starobin, and is dedicated to my dear friend Tomoyuki Sugiyama. *Bug-Mudra* is scored for two guitars (one acoustic and one electric), percussion (KAT electronic mallet controller plus three acoustic suspended cymbals), and conductor. The three instrumentalists are connected to the "hyper-instrument" system, as is the conductor through the use of a special glove (the EXOS Dexterous Hand Master) worn on the left hand (see Figure 2), and adapted for music use under the direction of David Sturman. This glove measures the nuances of the conductor's left-hand gestures, translating them to influence the piece's overall sonic result. The title *Bug-Mudra* comes from two sources put together: *mudra* being the word for hand gesture in classical Indian dance, and *bug* referring to computer "bugs", a pun on the difficulty of getting such a complex interactive system to work in a live concert situation. The present recording is of our last performance in Tokyo. It was recorded directly from the mixing board, with the acoustic cymbal part recorded later.

Bug-Mudra is organized into six sec-

tions (actually eight, since section four is subdivided into three parts), but in fact is imagined as a dynamic *moto perpetuo*, unfolding in a burst of energy from beginning to end. The first section is a rapid, syncopated and contrapuntal song, whose rhythm and harmony become the subject of development in section two. Section three features a virtuosic electric bass melody, over which acoustic guitar tremolos and electronic percussion washes build up interchanging harmonies and harmonic spectra. Section four is melodic and lyrical, although fragmented guitar tremolos and "hyper-instrument" arpeggios keep the piece moving forward. The melody and accompaniment moves into the highest register as the three instruments approach their first moment of total unity, together playing the triumphal melody that leads to section five. Section five is a vivid fantasy that combines a descending bass line played by "hyper"-acoustic guitar, an ascending soprano *cantus firmus* played by "hyper"-percussion, and a virtuosic "hyperized" electric guitar melody (with the live guitar adding timbre and phrase articulation to a

pre-sequenced track) that sweeps wildly through all registers. Section six is a recapitulation of section one, with an elaborately accumulating harmonic and rhythmic accompaniment, and with extra music added at each reprise. The piece gathers intensity constantly, and ends on an affirmative unison.

Bug-Mudra represents my ideas about diversity and unification of musical materials more completely than my other works to date. While homogenous in its form, mood, and sonic quality, the work manages to combine many quite distinct elements. Electric and acoustic guitar are brought together integrating different "styles" of guitar playing (folk-like strumming, rock rhythms and melodies, improvisatory jazz-like riffs, classical *cantabile*, "new music" figurations, etc.), and classical form and developmental procedures are applied to "riffs" that most suggest rock music. *Bug-Mudra's* forcefully amplified dynamic level functions as an energizing factor throughout the work.

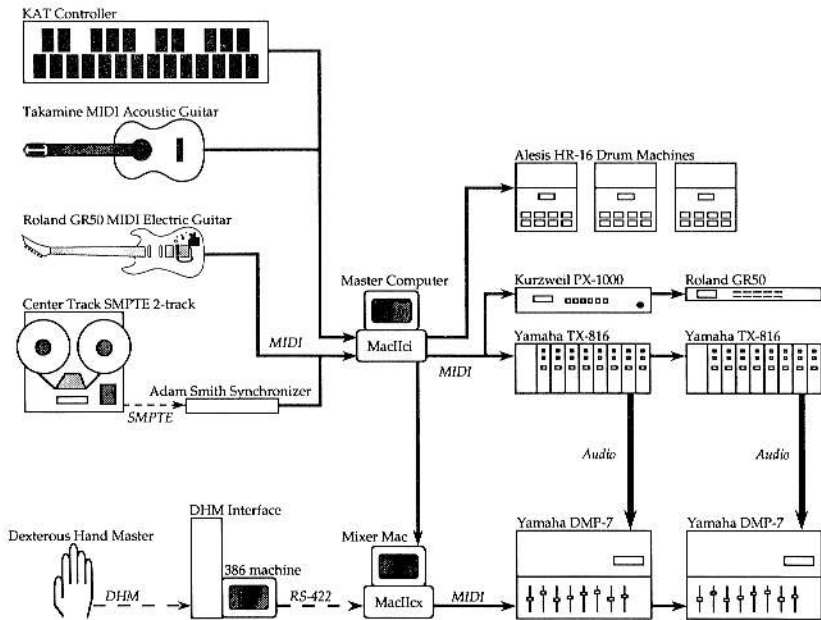


FIGURE 2

"Hyperinstrument" setup for *Bug-Mudra*.

Famine

Text by Rose Moss

Hear

Sixty-six thousand four hundred and twenty-eight; seven hundred and thirty two; ten thousand, two point five; twelve to the twelfth; pi; oh eleven; six four oh four;

Infinite negative

Divide naught by

One.

Hear

(With... by... close... where... under... now... soon... to... here

(
(Me. You.

(
(Chew retch, gnaw knots, tongue blunts, crunch which, suck dust, crave numb, (grovel

One.

Hear

Still

Breath without milk

Breathe one breath, shallow as light

If there were leaf and mist to forever flow it would be

As then as light had opened

And we heard true note beyond eye

Tell, bone, toll, lost, skull, chew, stone, count, account.

Bound before birth in warmth and blood we learn to mourn

Drought nought flood nought pest nought rot rat rut out

Ah! Aaai! Oh! Oh!

(Silence)

None.

The Performers

Karol Bennett, soprano (Flora), received her M.M. in vocal performance from the Yale School of Music, where she was a student of Phyllis Curtin. She is a member of the Boston-based composer/performer consortium Extension Works, and has premiered many pieces written especially for her.

The New York New Music Ensemble has premiered more than 60 new works by America's foremost composers, as well as performing classical twentieth century literature. Since its inception in 1975 at The Juilliard School, NYNME has been the recipient of many awards and grants, including NEA, Fromm, Ditson, and Chamber Music America. NYNME has recorded for Bridge, CRI, Opus One, and Owl Records.

Electric Phoenix has made its mark in the adventuresome world of extended vocal techniques, bringing together precisely controlled vocal sounds matched with state-of-the-art electronic technology. The British ensemble has pioneered a repertoire of new music including collaborations with such composers as Luciano Berio, Henri Pousseur, and John Cage. Electric Phoenix's first recording (for Wergo) was voted "Record of the Year" by the Sunday Times of London.

Rose Moss was born and raised in South Africa, emigrating to the United States in 1964. She has taught at Wellesley, Holy Cross and the University of Massachusetts. She has published two novels, many prize-winning short stories and non-fiction. Her newest book, *Through the Fire*, an edited version of the trial transcripts of South Africa's Delmas Trial (of Popo Molefe, Patrick Lekota and others), will be published by Beacon Press in 1990.

David Starobin has been recognized as an important force in the expansion of the guitar's repertoire. To date, more than 200 works have been composed for him, including pieces by Elliott Carter, George Crumb, Mel Powell, Lukas Foss, Poul Ruders, Roger Reynolds and Milton Babbitt. Mr. Starobin has recently been honored with prizes from Harvard's Fromm Foundation and Lincoln Center's Avery Fisher Career Award.

Oren Fader is active as a performer of classical guitar repertoire, both old and new. Mr. Fader is a member of the Cygnus Ensemble, and has performed in England, Japan and throughout the USA. His other recordings for Bridge include BCD 9004 (Sor) and BCD 9014 (Carter).

Daniel Kennedy has premiered numerous works and performed throughout the United States and Europe with ensembles including the CalArts Twentieth Century Players, the California E.A.R. Unit, and the New Jersey Percussion Ensemble. He has studied Middle Eastern drumming, Balinese and Javanese gamelan, and attended the Ali Akbar College of Music, where he studied Hindustani music and tabla with Swapan Chudhuri.

Paul Zinman's work as a recording engineer has had a particular emphasis on contemporary music and multimedia projects featuring advanced technology and techniques. In addition to sound designing productions of Tod Machover's opera *VALIS*, he has recently worked with composers John Adams, Elliott Carter, Ingram Marshall, and Steve Reich. Paul Zinman is currently a staff engineer for New York Digital Recording, Inc., and the Marlboro Music Festival.

Joseph Chung is a doctoral student in the MIT Media Laboratory Music and Cognition Group. Mr. Chung's specialty is the design of real-time music systems in an artificial intelligence environment, and he is the designer of the Hyperlisp software on which all "hyperinstrument" development is based. Besides his research activities, he is an electric bass player and has been a member of various rock bands in the Boston area.

The Recordings

Flora was recorded in July 1989 at the MIT Media Laboratory. *Flora* was engineered and mixed by Paul Zinman, Joseph Chung and Tod Machover. Synclavier programming by Joseph Chung, with assistance by Bill Cavanaugh of New England Digital. *Flora* is © 1989 by Tod Machover (BMI).

Towards the Center was recorded in May 1989 at the MIT Media Laboratory's Experimental Media Facility. The recording was produced by David Starobin, engineered by Paul Zinman, and mixed by Tod Machover, David Starobin, and Paul Zinman at Hip Pocket, Studio A, New York City. *Towards the Center* is published by Editions Ricordi, Paris (BMI).

Famine was recorded in January 1987 at October Sound, London. The recording was engineered by John Whiting and was mixed by Tod Machover and Paul Zinman at the MIT Media Laboratory. *Famine* is published by Editions Ricordi, Paris (BMI).

Bug-Mudra was recorded in live performance at Tokyo's Bunkamura Cocoon Theatre, February 4, 1990. Live sound design by Paul Zinman with technical assistance from Hadley Taylor. The recording was engineered by Paul Zinman. Acoustic Cymbals were recorded in April 1990 at Hip Pocket Studios. *Bug-Mudra* was mixed by Tod Machover, David Starobin and Paul Zinman at Hip Pocket Studio A, with technical assistance from Joseph Chung. *Bug-Mudra* is published by Editions Ricordi, Paris (BMI).

All four works were mastered at New York Digital Recording by Paul Zinman and David Starobin.

Producer: David Starobin

Chief Engineer: Paul Zinman

Technical Director, "hyperinstrument development": Joseph Chung

Cover Detail from *Flora*: © 1989 Yoichiro Kawaguchi

(High Definition Computer Graphics)

Photos of Tod Machover: © Donna Coveney, 1990

Design: Brighton Typography, Ltd.

Managing Director, Bridge Records: Becky Starobin

Acknowledgements

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"Hyperinstrument" Team: *Towards the Center*

Tod Machover, Joseph Chung, Michael Romero, Anthony Jules, Rodrigo Madanes

"Hyperinstrument" Team: *Bug-Mudra*

Tod Machover, Joseph Chung, David Sturman, Andy Hong, Jim Davis, Casimir Wierzynski

Tod Machover

Tod Machover is active in many forms of new music, from orchestral to computer-generated, chamber to operatic. After studies at the Juilliard School with Elliott Carter and Roger Sessions, he spent 1978-85 in Paris at Pierre Boulez's IRCAM institute, serving for five years as its Director of Musical Research. Since 1985 he has worked at the MIT Media Laboratory, where he is Associate Professor of Music and Media, as well as Director of the Experimental Media Facility. Mr. Machover's music has been widely performed and has been awarded numerous prizes and honors from such organizations as the Koussevitzky Foundation, the Fromm Foundation, the American Institute of Arts and Letters, the National Endowment for the Arts, the Kennedy Center, and the French Culture Ministry. His opera **VALIS** received a new production at Tokyo's Bunkamura Theater in January 1990, and the recording of the work (Bridge BCD 9007) was recently named as a "best of the year" by *The New York Times*. Mr. Machover is currently working on a series of three pieces for "hyper"-string instruments: for cellist Yo-Yo Ma; the St. Paul Chamber Orchestra; and a viola concerto for Kim Kashkashian. In addition, he is working on several new opera projects, including one with director Peter Sellars.

