

To the Graduate Council:

I am submitting herewith a thesis written by Jane A. Beebe entitled "Dreams in a Mirror: A Multimedia Work." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Music.

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DREAMS IN A MIRROR: A MULTIMEDIA WORK

A Thesis
Presented for the
Master of Music
Degree
The University of Tennessee, Knoxville

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June 1980

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ABSTRACT

The purpose of this study was to determine how best to solve the aesthetic problems posed from its inception, by a multimedia work for electronic tape and projected visuals. In an attempt to place this work in historical perspective three works were chosen which incorporate similar media:

(1) *Four Butterflies*, composed by Morton Subotnick,
(2) *Like Waking Dreams*, composed by Byron Tate, and
(3) *Voyages*, composed by Maggie Payne. Three additional works were chosen which, although scored primarily for conventional acoustic instruments, represent contemporary trends in compositional procedure: (1) *Bird of Passage*, composed by Karlheinz Stockhausen, (2) *Six Pianos*, composed by Steve Reich, and (3) *Strung Out*, composed by Philip Glass.

The primary means and procedures used in data assembly for this research involved analysis of the above works as well as a similar analysis as to compositional procedure in the work of this composer: "Dreams in a Mirror: A Multimedia Work." Information concerning specific works and their composers was found primarily in magazine reviews and in biographies, monographs, or philosophical treatises prepared by the composer himself.

The major conclusions of the research were that certain possibilities posed by the tape medium such as indefinitely

sustained sound, vertically dense texture, infinite variety of timbres, and rhythmic complexity also impose certain limitations of form and procedure. Form and procedure arise from the nature of the sounds chosen at the outset by the composer and are applied in an intuitive fashion by the composer.

The further limitations imposed by the inclusion of abstract visuals projected with the aid of a slide projector, particularly a possible failure to integrate disparate elements, called for a means whereby the unfolding and development of one medium would reflect and enhance the other. A dissolve unit with a hand control used in conjunction with two slide projectors provided this means of coordination. Too, the visuals were prepared in such a way that density of color would correspond to vertical density of the music and complexity of image detail would correspond to horizontal density of the music.

A careful attention to procedure, subtlety in form, and an emphasis on the intuitive processes of the individual have emerged as aesthetic goals in the late 1970's. As another decade begins it is probable that these goals will consolidate into a directive for the further evolution of multimedia works in the twentieth century.

TABLE OF CONTENTS

SECTION	PAGE
I. HISTORICAL DEVELOPMENT OF MULTIMEDIA ART FORMS	1
II. ANALYSIS OF TECHNIQUES EMPLOYED IN THREE REPRESENTATIVE WORKS WHICH INCLUDE PROJECTIONS	6
III. ANALYSIS OF TECHNIQUES EMPLOYED BY THREE COMPOSERS WHO HAVE CONTRIBUTED TO THE DEVELOPMENT OF CONTEMPORARY COMPOSITIONAL PROCEDURES	11
IV. ANALYSIS OF COMPOSITIONAL PROCEDURES IN "DREAMS IN A MIRROR: A MULTIMEDIA WORK"	18
V. CONCLUSIONS	20
BIBLIOGRAPHY	23
APPENDIX	25
VITA	29

LIST OF PLATES

PLATE

1. Cassette Tape of Electronic Music Which
Is Part of a Multimedia Work Entitled
"Dreams in a Mirror: A Multimedia Work" . . . In pocket

I. HISTORICAL DEVELOPMENT OF MULTIMEDIA

ART FORMS

Mixed-media is a loosely applied term for theater works or events that involve some merging of arts, forms, techniques, means, and electronic media, all directed at more than one of the senses and generally involving some kind of total surrounding (as opposed to the use of only a proscenium stage).¹

Mixed-media events can be roughly divided into three categories: environments, happenings, and music theater.

Environments are nonlinear and nondevelopmental in scope and are generally walk-through events. Happenings are simultaneous and/or sequential arrangements of two or more actions, events, or performance-participation units. Music theater involves a defined performance as to time, space, and involvement as well as movement, electronics, and other elements.²

An early example of a mixed-media approach in musical expression is that taken by Richard Wagner in his *Gesamt-Kunst-werks* composed near the close of the nineteenth century. In works composed between 1915 and 1934 Stravinsky devised rituals of stylized form and intertwining planes which include various combinations of acting, narration, mime, choral and solo singing. These works are *Renard*, *Les Noces*, *L' Histoire du Soldat*, *Oedipus Rex*, and *Persephone*. Scriabin

¹John Vinton, ed., *Dictionary of Contemporary Music* (New York: E. P. Dutton and Company, Inc., 1974), p. 489.

²Ibid.

experimented with synthesia through the use of lights and perfumes.

In the 1920's there were some experiments with film. Examples of these experimental works are Alban Berg's *Lulu*, Darius Milhaud's *Christophe Colomb*, and George Antheil's *Ballet Mécanique*. In the 1930's Edgard Varèse began to experiment with technology and multiple sensory impact. There was a hiatus of activity in this area during the second World War, but it started up again in the early 1950's.

In 1952 the first happening (a term coined by Allen Kaprow in 1958-1959) was staged at Black Mountain College in North Carolina which involved the efforts of Merce Cunningham and John Cage. Composer Henry Jacobs and filmmaker Jordan Belson developed mixed-media concerts for the Morrison Planetarium in San Francisco in 1957-1960. Fifty speakers were used which effected the movement of sound through space; this movement was synchronized with the movement of the projections. In 1958 Jacobs and Belson also conceived works for the Brussels World's Fair. It was at this World's Fair that *Poème électronique* composed by Edgard Varèse was first heard. Varèse composed the music for three tapes and 425 loudspeakers. The sounds were comprised of the human voice, percussive sounds, and pitch clusters which moved across the surface of the Phillips Pavilion through the aid of the speakers. In collaboration

the architect Le Corbusier devised visuals and the architect-composer Iannis Xenakis designed the pavilion itself. The performance was repeated at eight-minute intervals. Multimedia works were composed for subsequent World Fairs in New York (1964), Montreal (1968), and Osaka (1970).

In the early 1960's the San Francisco Tape Center was established by Morton Subotnick, Pauline Oliveros, and Ramon Sender.

Subotnick's work with visuals artist Anthony Martin was particularly important in pioneering mixes of film, projections through liquids, [and] taped and live electronic music.³

Milton Cohen, a painter-sculptor, formed the ONCE group in 1958 at Ann Arbor, Michigan. The members were Cohen, Robert Ashley, George Cacioppo, and Gordon Mumma. They coined the term "space theater" for their works which were environments including sculpture, choreographed movement, projections, sound, group improvisation, and audience participation. Annual ONCE festivals were held between 1961 and 1968.

³Vinton, p. 490.

With the onset of the 1970's

. . . increasing work was being done with environments. These were usually nondirectional or nonlinear in form, i.e., without necessary beginning, middle, or end. They typically are static or steady-state events organized in long, slow repeating cycles. Sometimes a maximum amount of detail is presented in a highly restricted, minimal field so that the averaging out of elements over any period of time yields the same statistical result.⁴

Prototypes for these environments are two works by John

Cage: *Cartridge Music* (1960) and *Variations* (1958-1966).

La Monte Young composed music for visuals created by Marion Zarzeela comprising single pitches or intervals which were sustained for hours with only small internal variations; the images were sustained for long periods also, again with small variations.

There is no necessary connection, however, between minimal art and environmental techniques. Quite the contrary; multimedia suggests multilayer experience, information overload the electronic transmission of simultaneous messages from the Global Village.⁵

The character of all these music-theater forms depends on multiple layers of sound, of kinds of sound, of word movement, light, and image; it is therefore maximal rather than minimal.⁶

It seems likely that the future of such a complex medium lies largely with ensembles—groups or companies of performers, creators, and creative technicians working collaboratively.⁷

⁴Vinton, p. 490.

⁵Ibid., p. 491.

⁶Ibid.

⁷Ibid., p. 492.

This prediction is further underlined by Gordon Mumma:

Because of the increasing complexity of technology and the greater facility of group performances (as well as a great attraction to working with multimedia), artists seem inclined to work in collaborative groups more so than in the past. The sharing of resources and ideas has made possible the survival of many artistic endeavors outside traditional institutions of support, and has thereby nourished an unusually roborant quality of creative freedom.⁸

⁸ Jon H. Appleton and Ronald C. Perera, *The Development and Practice of Electronic Music* (New Jersey: Prentice-Hall, Inc., 1975), p. 315.

II. ANALYSIS OF TECHNIQUES EMPLOYED IN THREE
REPRESENTATIVE WORKS WHICH
INCLUDE PROJECTIONS

Morton Subotnick studied composition at Mills College from 1957-1959 with Darius Milhaud and Leon Kirchner. The following year he was invited to join the Mills College faculty. He was one of the cofounders of the San Francisco Tape Center. When Subotnick moved to New York in 1967 he became involved in the Repertory Theater at Lincoln Center, was director of electronic music programs at the Electric Circus discoteque, and taught in the Intermedia Program in the Arts at New York University. Subsequent to his stay in New York he taught at the University of Maryland and set up a studio at the University of Pittsburgh. In 1969 Subotnick returned to California to teach at the California Institute of Arts in Los Angeles.

An important underlying motivation for Subotnick's work is the wish to emphasize the spirit of play.

Subotnick aspires to get away from what he calls the "museum" quality of most concerts today by creating a live and lively electronic music that can involve listeners not only through its accessibility but also through audience participation.⁹

⁹ Joseph Machlis, *Introduction to Contemporary Music* (New York: W. W. Norton and Company, 1979), p. 591.

The essence of his style is a balance of traditional elements of form such as repetition and continuity with timbral manipulations which constitute the aesthetic content of his works.

Four Butterflies was conceived for the "Electric Voice Box," a synthesizer designed by Donald Buchla. The transformation of a larva into a butterfly suggested a way of organizing the piece through metaphor. Each of the stages of the butterfly (larva, cocoon, and butterfly) was translated into energy shapes. The three parts of the butterfly itself (wing, body, wing) were translated into timbral identities. All the possible pairs of combinations of butterfly stages and butterfly body parts were translated into types of musical gestures: continuous or periodic actions, increase and decrease (of a particular parameter), and momentary events.

In the shaping of a complete section the concept of body became the overall image or timbral quality; each of the stages of the butterfly became particular shapes; and assignments were made as to number of repetitions, variations, or overlays to each musical gesture. In notes prepared for the recording of this work Subotnick states:

One of the essential features of this model was that one form transformed into another (larva to butterfly) but through a hidden and seemingly inactive mode (cocoon). And, the resulting transformed object seems only distantly related to the original form.

As the butterfly metaphor is an essentially visual image Subotnick enhanced the experience of his work through the use of visuals consisting of projections. "His mixed-media works combine instruments, tape, and films with abstract theatrical actions that extend the purely musical ideas."¹⁰

It is the idea of extending a visual image suggested by the music into actual visual images projected on a screen which most impressed this composer. The image in "Dreams in a Mirror: A Multimedia Work" is that of a dream-world. The image is abstract and suggestive rather than specifically programmatic. In the process of coordinating the visuals with the motion of the music the composer attempted to create an impression that one is moving through a fantasy world with a sense of time outside that of the real world.

Byron Tate studied composition with Karl Korte at the University of Texas at Austin and with Leslie Bassett and William Albright at the University of Michigan. In

¹⁰Vinton, p. 718.

Like Waking Dreams, Tate sets up a relationship between a computer and a flutist. He explores this relationship in his multimedia work involving tape, slide images, and live performer on flute. The slides illustrate the narrative of the work almost as a film would with the live performer interacting with the images at times and at other times participating in a dialogue with the taped music, offstage. This composer chose to exploit more abstract images in her work; however, as Tate took great care in ordering his images in such a way as to establish continuity, this was an influence on this composer's ideas as to how to organize her visuals.

Maggie Payne received a Bachelor of Music degree from Northwestern University and Master's degrees from the University of Illinois and Mills College. She was awarded a composition Fellowship by the National Endowment for the Arts 1979-1980. In her work for synthesized tape and computer-generated visuals, *Voyages*, Payne attempted to create a texture which changed continually on a small scale. Impetus for the forward motion of the piece is provided by complex changes in timbre and by spatial manipulations. As the images seemed disjunct with no particular synchronization with the music it was the design of the music itself which influenced this composer.

The aesthetic of gradual change (which is shared by Steve Reich) emerged in the early 1970's and has posed compositional problems which have in turn triggered new pieces of music. This is the essential aesthetic problem which concerned this composer and required certain kinds of solutions. It proved very difficult to introduce any kind of sudden movement without first anticipating it through an increase in intensity. In order to establish a coherent form overall, each increase in intensity had to be balanced against those that came before. A sense of proportion had to be arrived at intuitively so that the high points achieved in the music and visuals corresponded to other and to the appropriate placement in time.

III. ANALYSIS OF TECHNIQUES EMPLOYED BY THREE COMPOSERS WHO HAVE CONTRIBUTED TO THE DEVELOPMENT OF CONTEMPORARY COMPOSITIONAL PROCEDURES

Procedures developed by the composers Steve Reich, Philip Glass, and Karlheinz Stockhausen in pieces which are primarily instrumental have had some application in the work of this composer. Therefore these procedures will be surveyed as they apply in three specific works: Reich's *Six Pianos*, Glass's *Strung Out*, and Stockhausen's *Bird of Passage*.

Steve Reich studied philosophy (chiefly the work of Wittgenstein) at Cornell University from 1953 to 1957 and composition at Juilliard (1958-1961) and Mills College (1962-1963), where he worked with the composers Darius Milhaud and Luciano Berio. In addition, Reich completed two years of work (1964-1965) at the San Francisco Tape Center. Although he has since abandoned the electronic medium, an important seed for his ideas was sown by extensive use of tape loops while at the Tape Center.

The fundamental concept which underlies all of Reich's music since leaving the Tape Center is that the compositional process should be audible. An unaudible process would be that demonstrated in music which is highly serialized or conversely, that demonstrated in

music which has been composed through chance methods.

"What I am interested in is a compositional process and a sounding music that are one and the same thing."¹¹

The audible process at work in *Six Pianos* is phasing. Reich defines "phasing" as being the result when two or three identical instruments playing the same repeating melodic pattern gradually move out of synchronization. It is necessary for the instruments to be identical so that the phasing technique is perceptible. Form is derived from this technique in two ways:

1. The pattern which is phased is introduced gradually through the substitution of beats for rests against another performer forming a percussive build-up of beats which constitutes a forward rhythmic drive; and

2. Once the phase relationships are worked out the resulting melodic patterns are doubled and introduced through a gradual increase in volume which provides an element of change over a static background texture.

In more general terms this composer has applied the above process. A complex texture of sounds which pulsates rhythmically was formed as a background to certain melodic ideas and areas of color. The background remains relatively

¹¹ Steve Reich, *Writings about Music* (Halifax: The Press of the Nova Scotia College of Art and Design, 1974), p. 9.

static while the proliferation of foreground material provides the forward impetus. An essential difference, however, in Reich's work *Six Pianos* and the work of this composer is that whereas the timbres of the former are deliberately homogeneous, those of the latter are varied both abruptly and through slow changes.

Philip Glass studied with Vincent Persichetti, William Bergsma, and Nadia Boulanger. "Glass is related to the school of so-called minimal composition, based on the repetition and slow change of short modal fragments."¹² Although Glass is probably best known for his operatic work *Einstein on the Beach* which was completed in 1977, the essential tenets of his approach are revealed in his early work for solo violin, *Strung Out*.

The violin is amplified and the sound is conveyed through a preamp and amplifier to two speakers in order to create a stationary sound source. A score of twenty continuous pages is arranged on stands in an "L" shape and the performer walks from the small arm of the "L" throughout its entire length. The duration of the piece is approximately twenty minutes.

The compositional elements of repetitive structure, stable harmony and continuous eighth note movement which

¹²Machlis, p. 552.

appear in later ensemble pieces are present in *Strung Out*. The work opens with the outlining of a first inversion major triad. The upper notes are used as a point of departure for a series of rhythmic devices. Gradually, notes are added to the initial triad motive until ascending and descending scales result. Contrast to the continuous motion of the scales is provided by melodic figures which are broken into discontinuous rhythmic fragments.

The device of using a constantly evolving melodic motive as a unifying element is exploited by this composer in her work. The motive is varied only slightly as to rhythm but the pitches are varied with each repetition. The essential shape of the motive is retained. Again, the timbre does not remain constant but is subject to variation. Emphasis on small changes in the melody directs the attention of the listener. The changes are wrought in an intuitive fashion with attention given to overall proportion. This was the essential approach used by this composer to allow for continuous sound without resultant stasis.

Karlheinz Stockhausen studied music at the Musikhochschule in Cologne and later studied composition with Olivier Messiaen in Paris. At the University of Bonn he undertook study in the fields of physics and acoustics. He then became associated with the studio for Electronic Music at the West German Radio in Cologne.

Stockhausen's compositional point of departure was the techniques which he found in the music of Anton Webern; he was not concerned with the musical gestures themselves. Stockhausen established five parameters of sound: pitch, intensity, duration, timbre, and position. From these sound parameters he derived what he termed "compositional" parameters including tempo, rhythm, instrumentation, melody, density, harmony, register, meter, etc. As these parameters were traditionally those exploited as being more important their systematic control constituted a challenge to traditional hierarchy. Of the five parameters of sound, timbre emerges as being the more audible basis for the organization of a work.

The units of Webern's music are quite small; however, Stockhausen organized his musical gestures into larger units, the boundaries of which were determined by a self-contained process such as fixed registration, dynamics, intervals, or durations. The overall formal plan for a piece was derived from relationships among the units or groups. This method of composition culminated in the work *Momente*. The organization of groups into a formal plan led logically to the idea that these groups could be mobile without destroying the essential relationships.

According to Jonathan D. Kramer: "With the advent of tape and live electronic music Stockhausen changed his

idea of what a composer should specify in his music."¹³

In the piece *Carré* procedure determines the compositional process. Stockhausen began to allow his intuition to guide the formulation of a piece of music.

Bird of Passage is based on a cultural impression of Ceylon. It is comparatively simple and is immediate in its rhythmic intensity. According to Robin Maconie: ". . . in *Bird of Passage* the feeling is intensely projected and the sounds seem cantilevered into space."¹⁴ The work is scored for trumpet, electric trumpet, flugelhorn, electronium, piano, chromatic rin, lotus flute, Indian bells, bird whistle, and voice.

The essential influence of this piece on the composer's work was derived from the construction of the overall texture. Layers of sound which are rhythmically intense form a continuous fabric of sound from which bird noises and voice emerge. The eruption of these sounds impels the piece forward and contrast is provided through variation of the vertical density. Although the sounds themselves were of less concern to this composer, the dynamic quality of the work suggested ways of heightening the dramatic components

¹³ Ibid.

¹⁴ Robin Maconie, "Recordings," *Tempo* 120 (March 1977), 34.

of her work. This was achieved by the use of splicing
rhythm in the electronic tape.

IV. ANALYSIS OF COMPOSITIONAL PROCEDURES IN

"DREAMS IN A MIRROR:

A MULTIMEDIA WORK"

Once the core group of sounds had been chosen for the tape portion of the work, certain limitations posed by the sounds themselves seemed to suggest the procedures whereby the work could evolve. The sounds forming the background fabric of the piece were continuous; and, although they pulsed rhythmically, the lack of discrete attacks lent them a static quality. The feeling of stasis was overcome both through the use of gradual changes in vertical density and timbre and through the use of editing. Slow builds of intensity were released through abrupt changes in color and texture.

When discrete attacks were applied to the same sounds generated as continuous, a melodic motive began to emerge. The motive appears in different forms throughout the piece and became the primary vehicle of unity. It was then possible to delineate sections which were organized in such a way as to effect a coherent overall shape. Each section had its characteristic timbre and texture. The outer sections, although not exact repetitions, were of similar character, so that the essential direction of the piece became circular.

The attention of the listener is directed towards momentary events which happen as a result of the juxtaposition of the melodic fragments and the underlying continuous texture. Although the location of these events in time was arrived at initially through intuition by this composer, once they were constructed it was possible to emphasize them through editing.

The visuals (abstract images on slides) posed a similar aesthetic problem: stasis was implied by the continuous movement of the slides effected by the use of a dissolve unit and two slide projectors. The slides were divided into groups which corresponded in some way to the character of each section of the music. Complexity of image detail corresponded to horizontal density of the music while intensity and layers of color corresponded to vertical density in the music. (For typical representations of the visuals involved, see Figures 1 and 2 of the Appendix.)

One of the more successful groups of slides resulted from images which were individually rather simple but when given motion by the dissolve unit formed a coherent progression. (See Figure 3 of the Appendix.) The effect was almost three-dimensional so that one felt drawn into an environment rather than confronted with confused images. The dissolve unit was essential in integrating the media; the movement of one had a perceptible relationship to the movement of the other.

V. CONCLUSIONS

It is now understood that multimedia work is more complex and demanding than was at first thought. Not only new technical facilities are needed but, more fundamentally, a commitment to basic understanding through training and experience with the material of allied arts. . . . intermedia will reemerge as an important if not dominant (in view of its experimentally wholistic nature) form.¹⁵

This statement reflects a general feeling among younger composers that there is needed a consolidation of trends which emerged after World War II. There is an emphasis now on procedures and a preoccupation with how various media can be fit together to form a whole which is integrated in expression; it is no longer enough simply to be new.

"The flashing quality of the past has become something subtle, refined, and much more intense in today's intermedia compositions and performances."¹⁶

Gordon Mumma presents the possibilities of electronic control rather than those of new sounds as applied to multimedia works. Again, there is an emphasis on consolidation of procedure rather than the proliferation of the *avant-garde*.

¹⁵"Five Questions: Thirty-five Answers," *The Composer Magazine* 9 (1977-1978), 25.

¹⁶*Ibid.*

. . . Electronic control of audio has made possible entirely new ensemble forms, from musically interactive man-machine systems to complete automation. Applications of electronic control to video technology have expanded this medium from cinema to television, video recording, and laser projection. Electronic video-control can be as simple as the synchronization of slide projectors, or as complex as the translation of sound into laser-projected images or the computer synthesis of color-television images. Finally, electronic control has given the artist a means of inter-relating different media that in the past has been vastly too complicated to consider.¹⁷

Another trend which seems to be emerging is a movement away from the traditional view of the artist as a lonely individual creating in an isolated environment. One only has to look at the number of performing groups now forming in which the composer functions as performer. Two examples are Steve Reich and Musicians, a repertory ensemble formed in 1966 and an ensemble formed by Philip Glass in 1968 of amplified keyboards and woodwinds. When the composer functions as performer there tends to be an emphasis less on the personality of the individual but more on the effects that the music creates on the performers as well as on the audience.

The logistics of multimedia production can be formidable, and may account for why multimedia projects are often collaborative efforts. But multimedia artists may also collaborate because they enjoy working on fundamental creative levels.

¹⁷ Jon H. Appleton and Ronald C. Perera, *The Development and Practice of Electronic Music* (New Jersey: Prentice-Hall, Inc., 1975), p. 326.

Increasingly, they share the languages of various media, particularly the near-universal language of electronic technology.¹⁸

Electronic technology is used not only to provide provide new layers and new kinds of sound but also to project sound throughout the entire performer-audience space, to relate live, amplified, and prerecorded sound, and to interrelate a variety of electronic-age experiences. This interplay of styles—of "ways of life"—helps integrate purely musical (or aural) structures and the other elements of the total experience and provides the basis for a truly contemporary theater.¹⁹

If there is an essential problem confronting twentieth century composers it is that of multiplicity of style. Any technique or set of procedures, such as electronic technology, which can enable one to produce integrated art forms, is of value. Disparate elements can lead one to chaotic expression, so it is important for one to develop an understanding, even if on an intuitive level, of threads of commonality in one's basic intent.

¹⁸ Appleton, p. 326.

¹⁹ Vinton, p. 491.

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APPENDIX

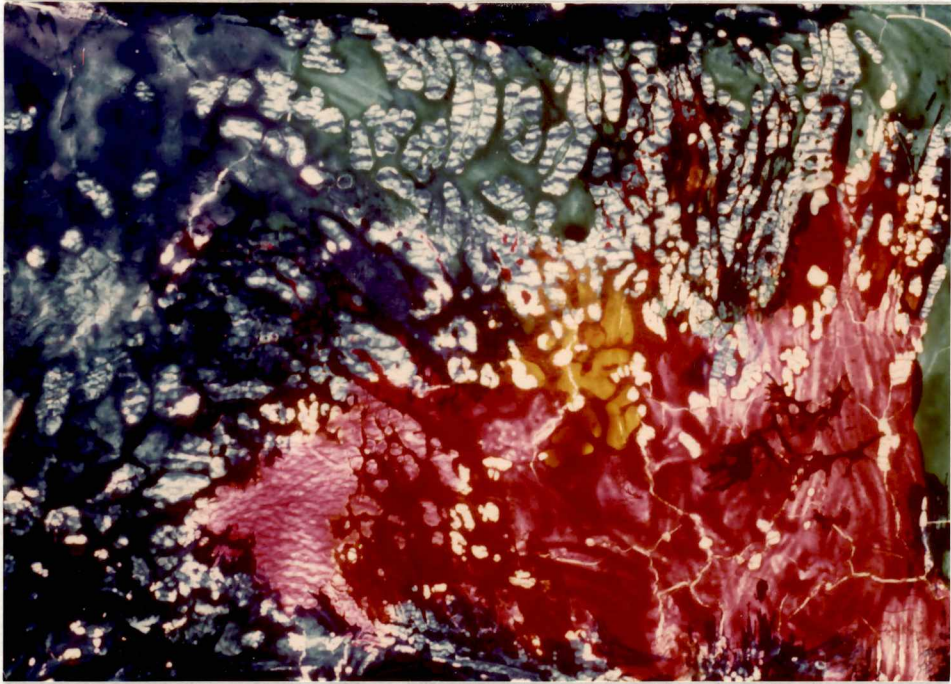


Figure 1. Representative slide belonging to the first section of the composition.

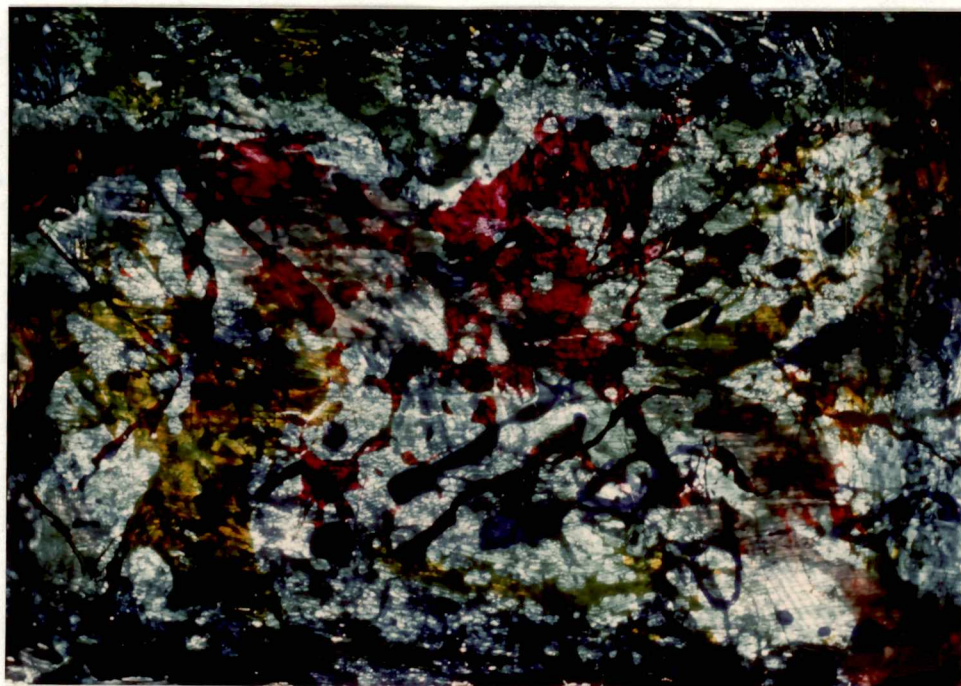


Figure 2. Representative slide belonging to the third section of the composition.

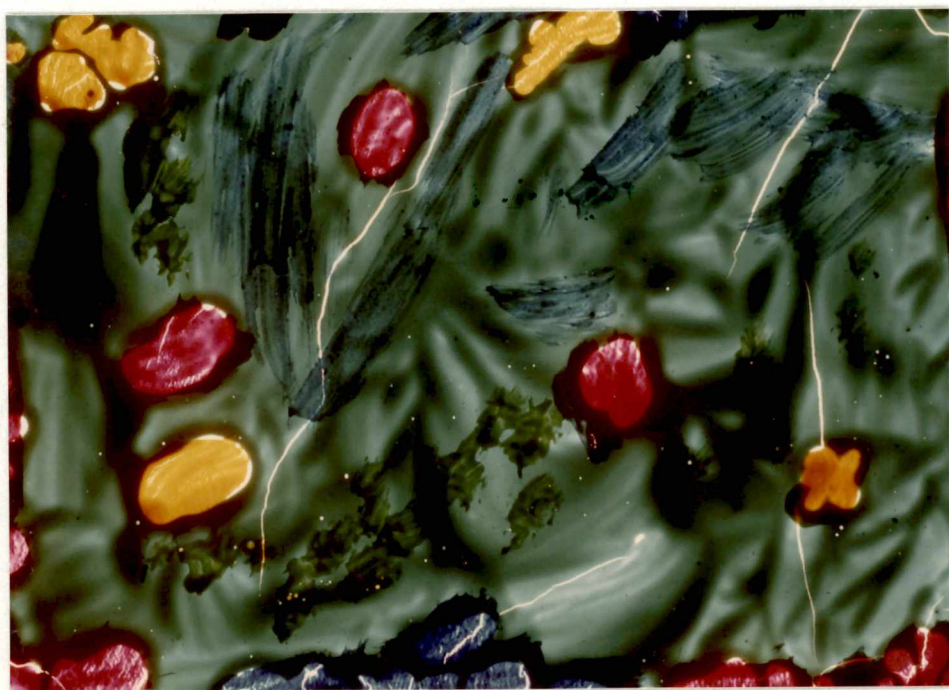


Figure 3. Representative slide belonging to the last section of the composition.

VITA

Jane A. Beebe was born in Asheville, North Carolina, on November 15, 1955. She attended elementary schools in that city and also in Buncombe County. She entered The Westtown School, a Friends' boarding school located at Westtown, Pennsylvania, in the fall of 1970 and was graduated in June 1973. She was chosen by the faculty to deliver an essay at the commencement proceedings. The following September she entered The College of Wooster, and in June 1977 she received a Bachelor of Arts degree in Music.

In the fall of 1977 she entered the Graduate School of The University of Tennessee, Knoxville, to begin work toward a Master's degree. She accepted a graduate assistantship with the Music Department the following year. She received the Master of Music degree in June 1980.

The author was a member of the Wooster Symphony Orchestra from September 1973 to June 1976 and a member of the Wooster Chorus from September 1974 to June 1977. She was also a member of the Synthesizer Ensemble in 1978 and in 1979 at The University of Tennessee. "Dreams in a Mirror: A Multimedia Work" was performed on

April 20, 1980, during the Electronic Music Festival which was held at the University.

Ms. Beebe will begin study toward a Master of Science degree in Library Science at the University of North Carolina at Chapel Hill in the fall of 1980 where she has been awarded the H. W. Wilson Fellowship.