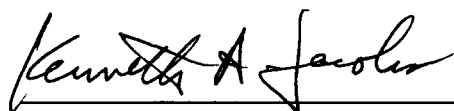


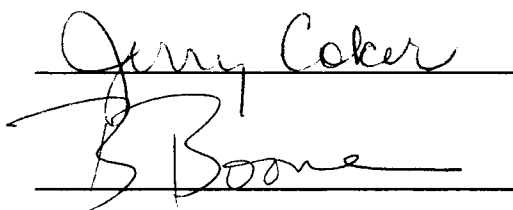
To the Graduate Council:

I am submitting herewith a thesis written by Jonathan D. Peters entitled "Soliloquy for Piano and Tape." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Music, with a major in Music..



Kenneth A. Jacobs, Major Professor

We have read this thesis
and recommend its acceptance:



Accepted for the Council:



Associate Vice Chancellor and
Dean of The Graduate School

SOLILOQUY
for Piano and Tape

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

Jonathan D. Peters

December, 1998

DEDICATION

I would like to dedicate this thesis to Robert Bonham of Maryville College, whose instruction in piano, twentieth century history, and world music while I was an undergraduate student, and whose continued friendship, support and encouragement, are in no small degree responsible for the success of my graduate studies.

ACKNOWLEDGEMENTS

There are many people to whom I am grateful for my time at the University of Tennessee. I would like to thank the Music Department for their financial support, and Don Pederson for helping provide for a valuable and enjoyable teaching experience. I am also greatly indebted to my committee, Jerry Coker, Benjamin Boone, and Kenneth Jacobs, for their support, invaluable experience and helpful advice throughout my studies.

Many people aided me in the location of scores and information about the music discussed in this study. I would like to thank Fred Scott, Business Manager of Composers Recordings Inc., for providing information on locating the publishers of works found on Aleck Karis' compact disc Music for Piano and Electronic Tape. I would also like to extend thanks to the publishers: Tara Mullaney who represented the Edward B. Marks Music Company in granting me permission to quote excerpts from Mario Davidovsky's Synchronisms No. 6, Thomas Broido, president of Theodore Presser Co., who granted me permission to quote from James Primosch's Secret Geometry, and Bethany Winham of the Association for the Promotion of New Music, who granted me permission to quote excerpts from Arthur Kreiger's Fantasy. I would also like to extend my appreciation to Aleck Karis at the University of California, San Diego, for his correspondence regarding Joji Yuasa and the score to Towards "The Midnight Sun". Joji Yuasa was also extremely helpful in providing information and permission to quote his score.

ABSTRACT

The purpose of this study is to examine the historical development of electronic and electroacoustic music, and to analyze specific works for piano and tape. Six works were selected for their unique contributions to the genre, including Mario Davidovsky's Synchronisms No. 6 (1970), Arthur Kreiger's Fantasy (1979), James Primosch's Secret Geometry (1992), Barbara Kolb's Solitaire (1971), Joji Yuasa's Toward "The Midnight Sun", and Kenneth Jacobs' Tracing Infinity (1989). Soliloquy for Piano and Tape (1998) by Jonathan Peters will also be examined and placed into historical perspective. Problems involved in writing for instrument and tape will be discussed, including different methods of synchronization with live instruments and the notation of electronic sounds. Issues relating to form and the emotional and aesthetic implications of writing for this genre will also be discussed.

The primary means of acquiring data was the examination of scores and recordings of the above mentioned works. The results of the study are that composers have employed many different means for notating electronic sounds, and for synchronizing them with live instruments. Composers have also taken different approaches to issues involving the importance of the instrumentalist and the dramatic impact of a musical work. The study further concludes that Soliloquy for Piano and Tape contains several of the compositional techniques found in the representative works, while emphasizing some that are less common to the genre.

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I. HISTORICAL BACKGROUND

Throughout the history of civilization the practical and external methods by which people make music have been directly related to the level of technology available to them. The construction of instruments, and thus the medium through which musical creativity takes form, has always been a product of a people's ability to manipulate their environment. Musicians have for millennia ingeniously constructed a myriad of different types of instruments from elements found in their surroundings. They have subsequently created complex systems of music based on the strengths of these instruments.

Technological developments during the Industrial Revolution of the eighteenth and nineteenth centuries made it possible to construct stronger and more intricate instruments. In the piano, for example, the metal supported soundboard and the complicated mechanism through which hammers strike the strings account for the instrument's ability to produce extremes in range and dynamics unmatched by instruments designed in previous centuries (see Figure 1).

In the nineteenth century, music was composed to utilize the capabilities of the new instruments. Beethoven's Appassionata, Op. 57 (1804), for example, exploits the piano's capabilities for sudden and extreme dynamic changes, and uses them to create abrupt changes in mood. Although dynamic changes had been a compositional tool in works for large ensembles since the early seventeenth century, it was not until a single instrument was capable of

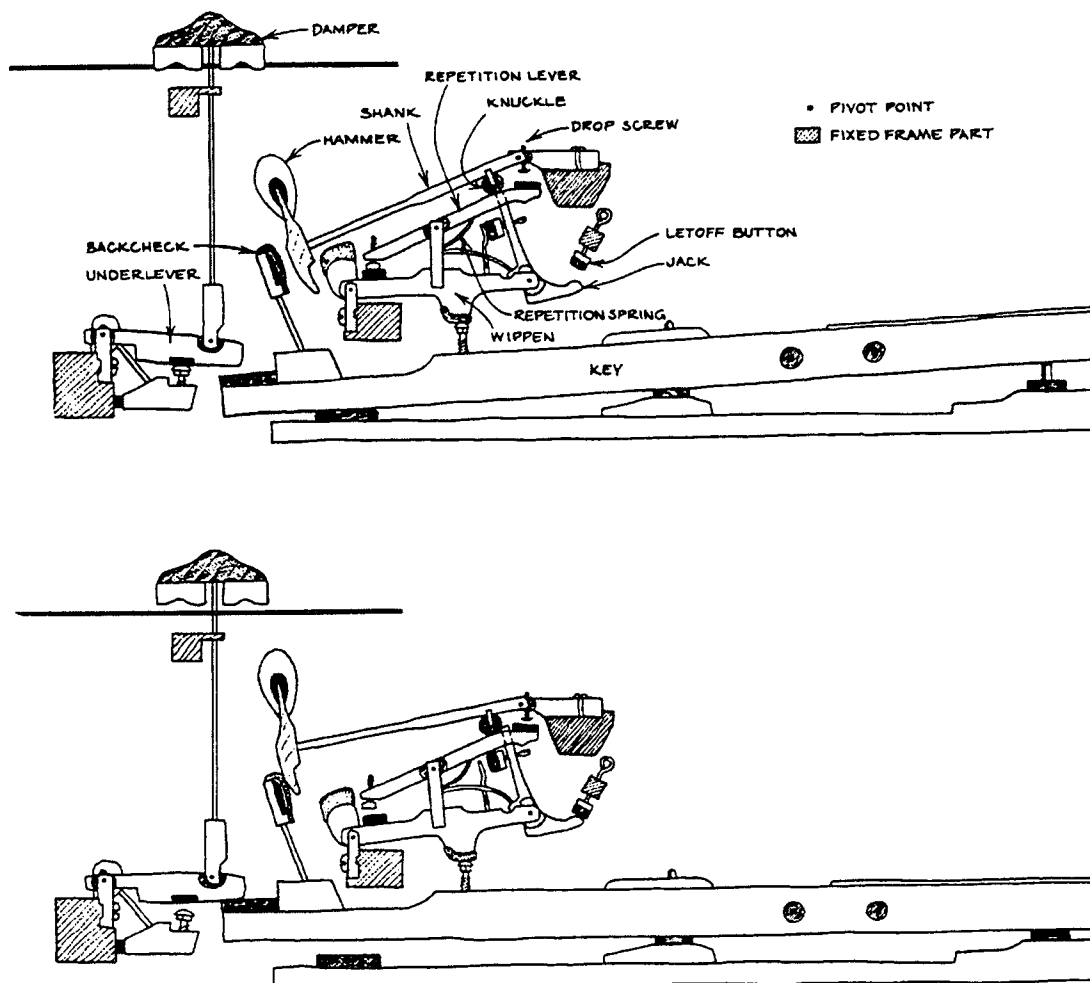


FIGURE 1 The grand piano action (top) at rest and (bottom) after the hammer has hit the string, rebounded and been caught by the backcheck. Source: Larry Fine, The Piano Book, 3rd ed. (Boston: Brookside Press, 1994), 10.

such contrasts that sudden mood changes became common in music. While it is not important to distinguish between whether it is developing technology that inspires new compositional philosophies, or if it is new musical thinking that inspires the expansion of resources, it is clear that both technology and compositional thought change over time in connection with one another.

The need for compositional philosophies to change over time is due in part to the nature of the musical experience itself. Leonard B. Meyer's Emotion and Meaning in Music (1956) states that emotional responses in general are caused by blocked tendencies to respond, or the frustration of expectations.¹ In order for music to have an effect, it must both create expectations (according to the style) and delicately break those expectations in ways that the listener can ultimately understand. In a musical experience, the listener is constantly playing a guessing game to predict the composer's next move. The emotional effects of the music and its level of enjoyment are based on the results of this game. Too many surprises and the music is confusing and ineffective. Too few surprises and the music is boring and equally ineffective.

Each item of surprise, according to Meyer, has the tendency to change in function as the result of repeated use. A single musical idea, such as a trombone glissando, or a deceptive cadence, functions in one time as the surprise and in the next as the cliché. Others agree: "Indeed, the history of tonal-harmonic music can be seen from one point of view as the constant struggle to keep ahead of cliché; once one starts to ride the tiger of harmonic surprise it is very difficult to dismount."² The continuation of effective musical experiences through history relies upon this process. "It is in fact this ability of our society to absorb into itself and neutralize revolt that has characterized the history of music."³ And so, as Beethoven's revolutionary contrasts and the technology that led to their creation became commonplace, the procreation of

¹ Leonard B. Meyer, Emotion and Meaning in Music (Chicago: The University of Chicago Press, 1956).

² Christopher Small, Music Society Education (1977; reprint, with a forward by Robert Walser, Hanover: Wesleyan University Press, 1996), 18.

³ Ibid., 101.

new musical systems continued to develop in connection with evolving technology.

In the early twentieth century composers began to look beyond functional harmony to systems of atonal organization. This also led to the idea that a musical composition did not have to be limited by the traditional sounds produced by Western instruments. In the early part of the twentieth century Henry Cowell (1887-1965) was part of this transition away from the importance of harmony by writing tone clusters on the piano in such pieces as The Tides of the Manaunaun (1912). Cowell's later pieces Aeolian Harp (1923) and The Banshee (1925) continued this movement by utilizing sounds created from playing inside the piano. Bands of sound produced by tone clusters in the strings were utilized in pieces such as Threnody for the Victims of Hiroshima (1960) by the Polish composer Krzysztof Penderecki (1933-). New sounds from traditional instruments were created through multiphonics, glissandi, flutter tonguing and other extended techniques. The use of voice was greatly expanded even beyond the non- traditional sounds of Schoenberg's *Sprechstimme*. The continuing expansion of the percussion section in orchestral music also indicated a move toward the philosophy of music being organized by sound qualities other than pitch. The availability of these new sound resources led composers to organize compositions in terms of musical successions, rather than progressions. In musical progressions, strict voice leading tendencies push the music forward in a system where each instantaneous musical event is meaningful only in relation to its surroundings. While a succession of sound textures must similarly flow together and create a sense of interconnectedness, each element is an independently meaningful event. As technology progressed, composers thus began creating and

manipulating sound textures through new electronic resources in conjunction with this compositional philosophy.

Edgar Varèse (1883-1965), being influenced by Ferruccio Busoni's "Sketch of a New Aesthetic of Music" (1911), exemplifies this philosophy of music as "organized sound," as well as the premise that sounds themselves are the basic structural elements in music.⁴ This philosophy is demonstrated in his instrumental composition Ionisation (1933), which is written for a large ensemble of unpitched percussion instruments. These include many non-traditional instruments such as chains, sirens and anvils. Varèse organized the work with contrasting blocks of sound.

As a pioneer in the quest for new sound resources, it is not surprising that Varèse would work in the electronic medium, or that he would be one of the first to compose for live instruments and tape. Déserts was completed in 1954 and scored for a group of wind, brass and percussion instruments with tape. It contains seven separate sections of music. Four instrumental sections are separated by three tape sections. Because the instruments and tape do not play simultaneously, Varèse avoided problems of synchronization and notation that would later become challenging intricacies in the genre he helped to create.

Other new technologies in the 1950s included recording devices, oscillators, filters and sound processors such as reverberation. Synthesizers appeared in the 1960s, and in the 1980s computers, *Musical Instrument Digital Interface* (MIDI), and several programming languages appeared. Tools such as these gave composers the opportunity to create new sound

⁴ Peter Manning, Electronic and Computer Music, 2nd ed. (Oxford: Clarendon Press, 1993), 7.

resources. Perhaps more important, however, was the way that this new medium gave the composer complete control over his or her product. The existence of debates over how to produce the most historically accurate performances of compositions by Palestrina, Bach, and even Mozart, demonstrates that it is very difficult for a composer to remove elements of chance in a performance and to prevent the possibility of incorrect musical interpretations. Prerecorded electronic music eliminated such inconsistencies by allowing the composer to govern every aspect of sound production.

I don't think there's so much variety as you still have in orchestral sounds-- theoretically, yes, but in reality, no... The genuine value in electronic music concerns such aspects as the control of dynamics in time. For example, you can control a crescendo or a diminuendo in time with a precision that is not available anywhere else. Since you are not limited by the anatomy of an individual player, you can use the most sophisticated dynamics in the most incredible situations. You also have access to generating speeds and successions of attacks that are not available in conventional music.⁵

What electronic composers gain in the area of precise control over sound, however, is paid for in other areas of the musical experience. One problem with electronic music is that it lacks the drama of a live performance. In a way, the elements of pressure and surprise inherent in live concerts build the tension of the event before it even begins. The character and effectiveness of a performance is determined in large part by the charisma and energy of the performer and the quality of his or her communication with the audience. Composers of tape music have made up for the visual absence in their art by creating multi-media projects. The incorporation of slides, film or light shows

⁵ Mario Davidovsky, interview by Cole Gagne and Tracy Caras, in Soundpieces Interviews With American Composers (Metuchen, New Jersey: The Scarecrow Press, Inc., 1982), 133-134.

into the presentation of electronic music has been an effective solution. The combination of electronic music with live performers provides another solution, one which has a distinct and unique set of advantages and challenges.

One advantage is that of simplified rehearsal time for performers. Scheduling conflicts and financial obligations to accompanists are eliminated. With an instrument and tape work the accompaniment can be put on CD and the music rehearsed at any time. The advantage to the composer is that he or she gains the freedom to create intricate electronic music without having to deny audiences the visual and emotional entertainment of a live performer.

There are also several unique challenges in composing for instruments and tape that are unique to the genre. One problem has been that it is easy for a composer to become focused so much on the development of the electronic sounds in a work that more emphasis is placed on the tape than on the instrumental part. The result is that the instrumentalists end up feeling "outgunned" on stage by their own accompaniment. Morton Subotnick, a particularly accessible composer of electronic music, stated it this way:

The chamber group should always be the focus. I've coined the term 'a theater for sound,' and these people, the chamber musicians in the pieces I do for them, are the Ophelias on the stage. The music should never diminish them; it should always make them bigger than life, not smaller than life.⁶

Synchronization between the tape and performer is a second issue that is unique to this kind of composition. Solo chamber musicians have the ability to communicate with gestures on stage to give each other cues when

⁶ Morton Subotnick, interview by Cole Gagne, in Soundpieces 2 Interviews With American Composers (Metuchen, New Jersey: The Scarecrow Press, Inc., 1993), 346.

performing complicated counterpoint. They also have the ability to play off each other's tempo changes and phrasing interpretations. Tape music by itself has no need to synchronize with anything outside itself, so a composer has the freedom to create rhythms of staggering complexity and textural changes that would be impossible to notate. These particular strengths of both tape music and instrumental music are necessarily infringed upon by the combination of prerecorded sounds with human performers. A question thus arises regarding whether a composer, when writing a new piece, will choose to treat the tape and the instruments as a duet (either with different timbres or with sounds synthesized to imitate the acoustic instrument), or if he or she will instead use them together in such a way as to create a single sound source.

Related to these issues of synchronization is the problem of notating electronic music. If the electronic sounds are prerecorded and the tempos inflexible, there must be notated cues that clearly communicate to the performer where they are in the music. These cues can be made by use of a stop watch and exact timings in the score, or by notating the rhythmic patterns and pitches of the tape.

Many electronically synthesized sounds do not resemble acoustic instruments and, due to complicated textural changes, internal rhythmic movements and stereo panning effects, are difficult to notate traditionally. New developments in notational practices have been able to accommodate many types of new sounds (see Figure 2). The possibilities for notating electronic sounds are limitless, and the degree of importance that composers have chosen to give to graphically representing details in their work has varied. Many have chosen, in an attempt to make the performer the most important aspect of the work, to notate only the parts of the tape that function as cues.

Some modern inventions have made it possible for the performer to control aspects of the tape so they are no longer tied to a metronomic accompanist. Charles Dodge of Dartmouth College describes how some of this technology works:

In the *score following mode* of interactive performance, the computer becomes an accompanist that responds to the sounds created by a live performer... Pattern- matching algorithms are used to determine the current position in the performance score. These algorithms examine the sequence of onset times, the detected sequence of pitches, or both. The pattern matching algorithm compares the musical information from the performer with its record of the performer's score. A match generates the appropriate musical event from the computer.⁷

Other devices include realtime effects processors, and foot pedals that can be used to set the tempo of a computer controlled electronic sound file. These developments allow composers to capture the expressiveness of instrumental music while continuing to expand sound synthesis technologies.

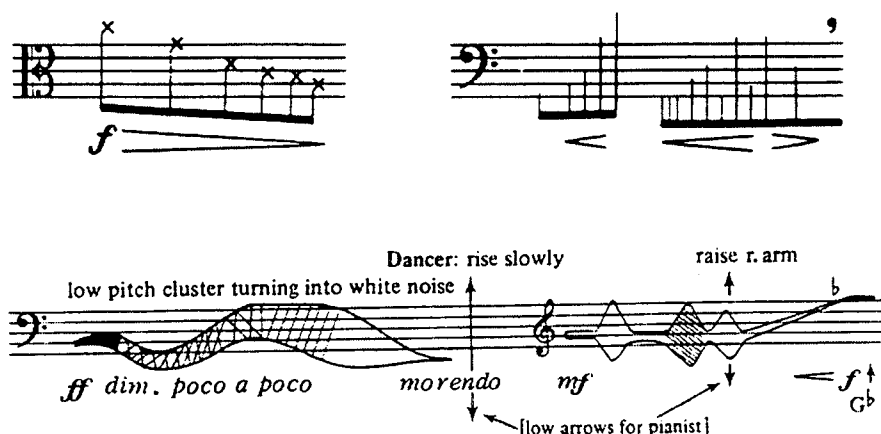


FIGURE 2 Symbolic and spatial notation techniques for electronic sounds. Source: Kurt Stone, Music Notation in the Twentieth Century A Practical Guidebook (New York: W. W. Norton & Company, 1980), 317-318.

⁷ Charles Dodge and Thomas A. Jerse, Computer Music Synthesis Composition and Performance (New York: Schirmer Books, 1997), 415.

II. REPRESENTATIVE PIANO AND TAPE WORKS

Mario Davidovsky (b. 1934) has long been a pioneer in the field of electronic music. He was born in Mendanos, Argentina, and first came to the United States after it was suggested to him by Aaron Copland that he should study at Tanglewood. In 1960 he settled in New York City and began to work closely with the Columbia/Princeton Electronic Music Center.

The Columbia/Princeton Electronic Music Center has been known for being at the forefront of electronic music since it was founded in 1951 by Otto Luening (1900- 1996) and Vladimir Ussachevsky (1901- 1990). Some of the more famous works produced at the center have included Luening and Ussachevsky's Rhapsodic Variations (1953) for orchestra and tape, and such serial works as Composition for Synthesizer (1961), Philomel (1964) for soprano and tape, and Reflections (1974) for piano and tape by Milton Babbitt (b. 1916). Other piano and tape works produced at the Columbia/Princeton Electronic Music Center have included James Primosch's Secret Geometry (1992), Arthur Kreiger's Fantasy (1979), and Mario Davidovsky's Synchronisms No. 6 (1970). Davidovsky's series of Synchronisms for instruments and tape is considered to be his greatest contribution to the field of electronic music. The latest, Synchronisms No. 10 (1992) uses guitar with electronic sounds. Synchronisms No. 6 (1970) is one of the strongest works in this series and in electroacoustic music in general. This is due in large part to the elegance and ease with which Davidovsky weaves the electronic sounds with the piano, the simplicity and effectiveness of his notational system and the success of his goal to unify the electronic sounds with the piano.

One of the main ideas in Synchronisms No. 6 is the treatment of acoustic and electronic sounds not as separate entities but as one unified sound source. In the notes to his score Davidovsky states,

In this particular piece, the electronic sounds in many instances modulate the acoustical characteristics of the piano, by affecting its decay and attack characteristics. The electronic segment should perhaps not be viewed as an independent polyphonic line, but rather as if it were inlaid into the piano part.¹

The music begins with a single note that appears to become louder as it is sustained. Davidovsky uses this idea to unify the seven minute work by restating it at the dramatic mid-point division. The figure is developed throughout, sometimes making a single sustained note appear to turn into chords and complex sounds.

Throughout the piece electronic sounds interact with the piano in varied ways. In addition to altering the piano's decay envelope, the tape is often used to accentuate its percussive qualities. Sounds with quick attack envelopes that are rich in overtones are used to double the piano's notes in precise rhythmic unison, creating the illusion that the piano is an altered percussion instrument. The tape is also seen occasionally to contain contrasting counterpoint to the piano. The interweaving and conflict between these opposite methods of interaction help to create the well placed climax of the work, after which the tension level is brought back down by thinning the texture and elongating the sounds. Sections that contain less precise rhythmic interaction between the tape and piano are found in places throughout the piece, and are always seamlessly linked with the strictly metered sections. The intervals of a major

¹ Mario Davidovsky, Synchronisms No. 6 for Piano and Electronic Sounds (New York: Edward B. Marks Music Company, 1971).

seventh and a minor ninth are structurally important as well. Tremolo figures of these intervals are heard in the quiet section after the climax. They function to remind the listener of material used in the beginning and throughout the work, which in turn creates closure.

Davidovsky uses a hybrid of notational systems. When applicable, traditional notation is used to indicate attack points, pitches and durations. However, feathered beaming, notes with percussive symbols or solid bands, slashed grace note figures and other modern inventions are used as necessary to indicate complicated rhythms and timbral changes (see Figure 3).

A similar treatment of interaction between electronic sounds and piano is found in Arthur Kreiger's Fantasy (1979), also composed at the

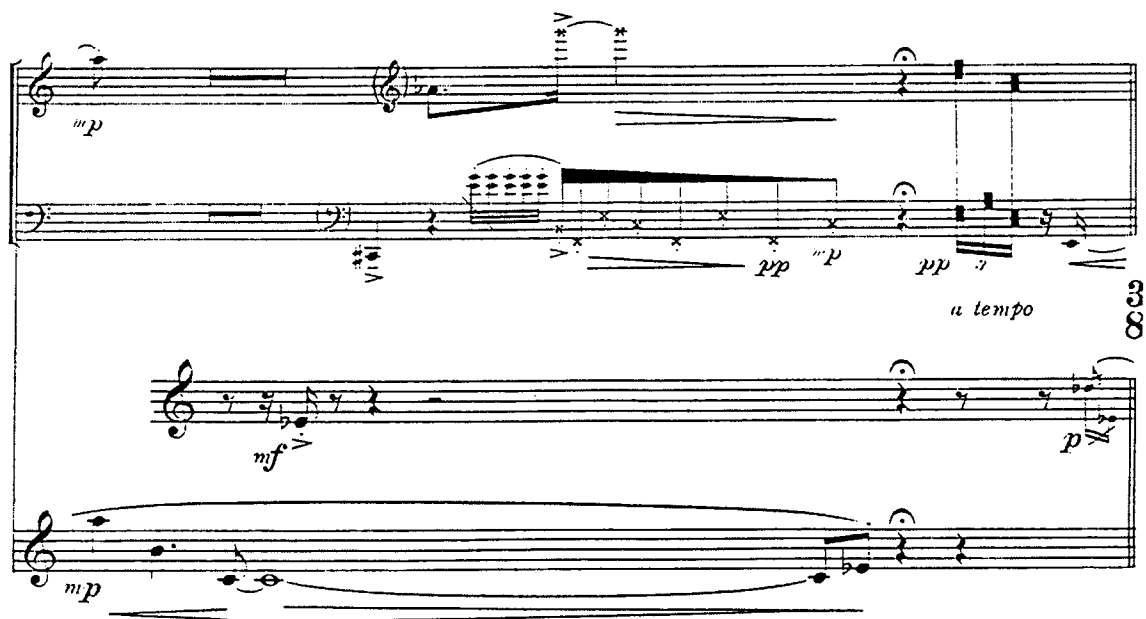


FIGURE 3 Excerpt from Mario Davidovsky's Synchronisms No. 6 for Piano and Tape. ©1972 Edward B. Marks Music Company. All rights reserved. Used by permission.

Columbia/Princeton Electronic Music Center. The composer describes this in the performance notes of the score.

The electronic tape is to be thought of as an integral voice within the composition and not as a separate backdrop. Playback equipment of only high professional caliber should be used in performance.

Loudspeakers should be located near the piano.²

A tape player that plays too fast or slow would not only sound out of tune, but would fail to alter the piano's sounds the way they are designed to be. This merging of electronic and acoustic sound often results in sustained piano notes appearing to increase in volume and evolve into complex timbres. Just as with the Davidovsky piece, this kind of figure serves as a unifying structural element.

The opening chords of this seven minute work, marked "lontano," meaning "far away," are stated first without the tape. Their recurrence throughout the piece serves as another unifying link. Equally important in the development of this work is the intense contrast between these slow, dark chordal ideas and precisely executed bursts of virtuosic activity. The tape part is notated above the piano and intense detail is given to the graphic notation of the electronic sounds, indicating the dominance of the tape and the organization of the work around changing timbres (see Figure 4). Dramatic shape is achieved by weaving the above mentioned contrasts between placid dark chords and energetic bursts of activity, with an increasingly intense timbral rhythm. After the climax, the work is brought to its conclusion by thinning the texture and slowing the rate of timbral change until unison sounds diminish the tension.

² Arthur Kreiger, Fantasy for Piano and Tape (New York: Association for the Promotion of New Music, 1979).

A third and more recent piano and tape work is James Primosch's Secret Geometry (1992), which was written for pianist Aleck Karis of the University of California, San Diego. Of the piano and tape works produced at the Columbia/Princeton Electronic Music Center, Secret Geometry is the most connected with musical values of past centuries. It embraces the shape of a traditional piano sonata. A fast "Variations" movement is contrasted with a slower "Nocturne" movement, which leads to the final rhythmically energetic "Toccata" movement. Motives where the tape and piano are in rhythmic unison do occur, as do figures where the piano's notes are altered by the electronic sounds. However, these ideas, while structurally foundational in the Davidovsky and Kreiger pieces, simply add color and interest to Primosch's development of melodic and rhythmic ideas. The tape is sometimes in unison with the piano, but usually acts contrapuntally to it, offering a delicate interweaving of well placed cues and timbral color (see Figure 5).

The image displays a musical score excerpt for Arthur Kreiger's Fantasy for Piano and Tape. It consists of two staves: the top staff is labeled 'Tape' and the bottom staff is labeled 'Piano'. Both staves are in 3/16 time. The score is marked with measure numbers 110 and 111. The notation is highly complex, featuring numerous sixteenth and thirty-second notes, often beamed together in groups of six or three. There are also rests and dynamic markings such as 'ff' (fortissimo) and 'mp' (mezzo-piano). The 'Tape' staff includes some electronic sound effects represented by shaded areas and specific rhythmic patterns. The 'Piano' staff shows a more melodic line with many grace notes and slurs. The overall texture is dense and rhythmic.

FIGURE 4 Excerpt from Arthur Kreiger's Fantasy for Piano and Tape. ©1979 Association for the Promotion of New Music. All rights reserved. Used by permission.

The opening rhythmic motive sets the stage for a work that, while in the tradition of the previous generation of composers at the Columbia/Princeton Electronic Music Center, is somewhat more permissive of pitch centers and the establishment of steady beats. As the title implies, motives appear in altered form throughout the three movements and serve to unify them. The opening rhythmic figure, for example, is repeated exactly at pivotal points, and is the basis for the rhythmic interaction between the piano and tape in the “Variations” movement. The interval of a major seventh appears eight times in the first five measures of the “Nocturne” movement, and recurs in structurally important breaks from the flurry of virtuosic sixteenth note runs in the “Toccata” movement. The intense rhythmic drive, along with the recurrence of rhythmic fragments from the “Variations” movement, creates a dramatic climax in the “Toccata” movement and unifies the overall work.

The sounds themselves are distinctly brighter and more often pitched than those found in the Davidovsky and the Kreiger pieces, and unlike his Columbia/Princeton colleagues, Primosch’s notational strategy is completely



FIGURE 5 Excerpt from James Primosch’s Secret Geometry for Piano and Tape. ©1994 Merion Music, Inc. All rights reserved. Used by permission.

traditional. The published score is from a hand copy, and contains no modern graphical notation elements, further indicating a connection with past aesthetic and organizational philosophies.

Barbara Kolb (b. 1939) offers a completely different approach to the combination of a piano with prerecorded sounds. Her work Solitaire for Piano and Tape (1971) does not use electronically synthesized sounds but rather a recording of two other pianos. The structure is divided into sections of one and a half minutes, each section being assigned a letter. The two channel tape is a recording of these sections arranged in particular ways. The live piano is then added to play the same sections in yet another order (see Figure 6). The composer introduces elements of indeterminacy by allowing the performer to choose, to a certain degree, the order of the sections to be played by the performer.

According to the instructions I've provided for this piece, one must always proceed consecutively. One can go from capital letter to capital letter, or from lower case to lowercase, or from capital letter to lower case. But, for instance, you can't go from "B" to "E." That would make no sense because harmonically they're too far away from each other.³

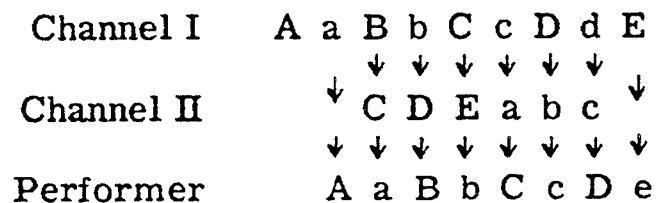


FIGURE 6 Structure of Barbara Kolb's Solitaire for Piano and Tape.

³ Barbara Kolb, interview by Cole Gange and Tracy Caras, in Soundpieces Interviews With American Composers (Metuchen, New Jersey: The Scarecrow Press, Inc., 1982), 270-271.

This harmonic progression is a slow shifting from the opening key of A major to the key of A^b major. The quotations of Chopin's Prelude in A^b signal the arrival at this new key center. However, the modulation does not take place through traditional techniques but rather as a slow phasing out of old pitches and gradual introduction of new ones. The key of D^b is used as an enharmonic bridge and helps create a smooth transition between the distant key centers. This gradual transition gives the work a sense of forward movement amidst the minimalistic treatment of repeated figures, and the uniformity of dramatic shape found in each section.

Another piece that contrasts the work of the Columbia/Princeton electronic composers is Towards "The Midnight Sun" (1984) by Joji Yuasa (b. 1929). Yuasa wrote the piece for piano and quadraphonic computer-generated tape as a tribute to Ze-Ami, who, in the fifteenth century, founded the Noh theater. Towards "The Midnight Sun" uses the tape to create "sound environments," rather than creating counterpoint between tape sounds and piano motives. The tape was created from filtered white noise, as well as concrete sounds such as bamboo and crystal glasses. Yuasa used the PDP 11/20 computer at the Center for Music Experiment at the University of California, San Diego to process the sounds. His idea was to slowly evolve sounds from chaos to order and vice versa, and to change the density of sonic events in time and also in quadraphonic space.⁴ Since the sounds evolve over long periods of time, Yuasa coordinates the tape part with the piano by writing exact timings above the piano score, and not by trying to notate the textural changes. The performer uses a stopwatch to keep his or her place (see Figure 7).

⁴ Joji Yuasa, letter to author, 27 June, 1998.

The form of Towards "The Midnight Sun" is set by four sections, each contrasting in dynamic and rhythmic intensity. Section A is organized around fast, rumbling, fortissississimo "staccatissimo" figures in the lowest register of the piano. These are mixed with filtered white noise that undergoes timbral metamorphosis and sophisticated quadraphonic panning changes. Section B begins at five minutes and twenty two seconds, where the sonic atmosphere changes from white noise to "far voices of clay bells." This tranquil movement is organized around the contrast between repeated rhythmic figures in melodic sequence and sophisticated nested tuplet motives. Section C begins at ten minutes and thirty seconds, and serves as the structural apogee of the work. Repeating rhythmic sequential figures that increase in volume and tempo return in this intense climatic section, which recalls the raw intensity of Section A by repeating the low staccato figures, this time with the instruction to "mute strings with a finger at the bridge." Section D begins at fourteen minutes and forty seconds and serves to release the tension created by earlier contrasts, and to unify the nineteen minute work. Marked "tranquillo," the tape part in this final section has a reduced dynamic level and is less active, while the piano plays consistent eerie figures reminiscent of a dream.

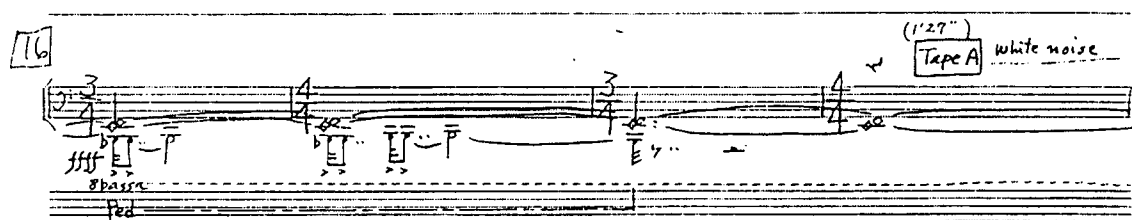


FIGURE 7 Excerpt from Joji Yuasa's Towards "The Midnight Sun" for Piano and Tape. Source: photocopy from correspondence with Aleck Karis. Also available from Schott Music Company, Japan.

The music of Kenneth Jacobs (b. 1948) embraces a more traditional aesthetic philosophy. As influenced by the writings of Leonard B. Meyer, Jacobs' works are clear and consistent in their presentation of mood, which makes them both emotionally effective and accessible. He has written orchestral music, chamber pieces, solo tape works and multi-media projects involving original artwork. A great contributor to the field of instrument and tape music, Jacobs has written electroacoustic works for nearly every instrument of the orchestra. Such works include Drifters Heart (1980) for viola and tape, and Legends (1996) for flute and tape.

Tracing Infinity (1989) for piano and tape is dedicated to the composer's wife, Deborah, and incorporates tape sounds that use additive synthesis, frequency modulation and time slice techniques. The sounds are pitch based and often resemble chimes and bells, allowing them to be notated traditionally, even when their timbres are constantly changing.

Dramatic shape is achieved by evolving the tape's interaction with the piano lines. From their spacious and well paced beginnings, the sounds are gradually woven into unison with the piano at the climax before again separating with released tension and repose. The opening reflective measures of the piano line serve as a pivotal unifying theme that adds structural continuity by returning in altered but recognizable form throughout the work. Rhythm is also an important structural element in Tracing Infinity. The work is metered, and the pulse is more constant than any of the piano and tape works discussed in this study. Rhythmic intensity is built by alternating rhythmic groupings of three four and five, and by frequently introducing tempo changes.

In connection with the spiritual and emotional qualities of the work, the composer uses score expressions such as *Brooding*, *Tensely*, *Dreamily* and *Longingly* to communicate mood and character to the performer (see Figure 8). This quality sets Jacobs' work apart from the majority of electronic works in general, which have sometimes been described as emotionless. Tracing Infinity is a refreshing and dramatically effective work which sets a musical trend worthy of continuing.



FIGURE 8 Excerpt from Kenneth Jacobs' Tracing Infinity for Piano and Tape.
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III. EXAMINATION OF COMPOSITIONAL TECHNIQUES EMPLOYED IN SOLILOQUY FOR PIANO AND TAPE

Electronic sounds used in Soliloquy for Piano and Tape (1998) were synthesized using computer controlled MIDI hardware. The Kawai K5m Digital Multi-Dimensional Synthesizer Module is a powerful tool for creating sounds through additive synthesis techniques. Designed in the 1980s, it allows for individual amplitude editing of 126 independent sine waves, all tuned to the overtone series, and able to be passed through eight independent amplitude envelope generators. In addition to the powerful additive harmonic capabilities, the K5m is capable of altering sounds with frequency envelopes, filters, amplifiers, and low frequency oscillators. These capabilities allow for the creation of sounds that change in timbre continually over sometimes long periods of time.

A second MIDI controlled hardware device used in the creation of sounds for Soliloquy is the E-Mu Proteus Master Performance System. The Proteus is a sample based synthesizer that contains hundreds of prerecorded sounds, including a stockpile of electronic waveforms and samples of traditional instruments. These preset sounds can be altered in a number of ways and saved to one of over 200 storage units in the keyboard's internal memory. Two prerecorded sounds can be mixed together and each altered with respect to volume, amplitude envelope (delay, attack, hold, decay sustain and release rates), frequency, and panning position. Additionally, a number of effects can be applied to the newly altered sounds. Although many effects

choices exist on the Proteus, the effects applied to certain sounds in Soliloquy included only cross delay and ring modulation.

Ring modulation is a form of amplitude modulation where two signals are combined resulting in the sum and difference of all the overtones of the two original signals. Applying ring modulation to the combination of a sine wave and a sound moderate in overtones produces results that are full and pleasant. If sounds are used that contain excessive overtones, the result approaches white noise. In Soliloquy, ring modulation was used to change the sonic characteristics of the piano.

The method of notation used for the electronic sounds in Soliloquy is a mixed approach, similar to that used by Davidovsky. Pitched sounds are notated traditionally. Percussive sounds, whether pitched or non-pitched, are notated with X's for note heads. Sounds with active internal rhythms are notated with diamond shaped note heads. These indicate to the performer that only the attack should be used as a rhythmic cue. The diamond note heads should function to the performer as reminders to what he or she already knows is going to happen in the tape from having rehearsed with it.

The structure of Soliloquy is based on several main ideas. The opening thirty eight measures serve not only to set the mood, but to introduce to the listener the structural elements of contrast that are important in the work as a whole. Shifts in pitch center often occur through common tones. Dramatic shape is built through the controlled use of this figure, which has the effect of producing contrast and continuity at the same time. Increasing the rhythmic energy and the rate of modal shifts adds to the tension and leads the work to its climax.

Interaction between the piano and tape is also of great structural importance to the overall shape of Soliloquy. Three types of interaction between the tape and piano are employed. The opening is a slow dialogue between both rhythmically and timbrally disparate entities. This opening section where the interaction is slow and unmeasured offers a vantage point from where the later piano and tape conflicts and eventual timbral unification can be seen clearly. Sections that treat the electronic sounds as an integral part of the piano begin to conflict with the fast sections of independent interplay until the piano and tape come together in unison for the climax. The subsequent relaxation of tension is created by slowing the timbral rhythm and returning to the unmeasured system of interactions of the beginning.

The slower unfolding of ideas, recurring musical themes, and push toward interweaving previously independent piano and tape lines to create a dramatic climax, as well as the use of emotional qualifiers to illuminate the score, are ideas prominent in the tradition of Tracing Infinity. Soliloquy also shares characteristics consistent with Synchronisms No. 6, including the notational systems for electronic sounds and elements of unmeasured interaction.

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APPENDIX

PERFORMANCE NOTES

Accidentals carry through each measure.

Tape notations are given at attack points as cues; durations are not always indicated. Sustained pitches in the tape are notated traditionally. Percussive sounds, both pitched and non pitched are notated with x's for note heads. Electronic sounds that have active internal rhythms are notated with diamond shaped note heads. Only the attacks of these sounds should be used as cues.

All tremolos are to be considered unmeasured. Repeated note figures, if necessary, can also be treated as unmeasured tremolos.

Pedal markings sometimes indicate holding the damper for long periods of time. All pedal markings should be taken literally.

Speakers are to be placed on either side of the piano pointed at the audience from slightly behind the piano. This will allow both the performer to hear the tape directly, and the piano to be influenced by the vibrations of the speakers. Only high quality speakers and reproduction equipment should be used.

The tape part is available from the composer. The tape deck should be located off-stage and operated by a separate individual. The tape should be tightly cued to the beginning and started at the appropriate time as indicated in the score. Volume level should be set before the performance.

Duration: 11 minutes 20 seconds.

Soliloquy Jonathan Peters

$\bullet = 80$ *Mysteriously*

1

Piano

mf *pp* *mf* *p* *mf*

Red. *

Tape

5

Piano

pp *mf* *p* *mf* 3

Red. * *Red.*

Tape

9

Piano

pp *mf*

Red. * *Red.* *

Tape

(= o) Questioning (= o)

12

f *mf*

14

f *mf*

16

f *mf*

18

3 5 6 6 6 6

f *p*

20

mf *pp* *mf*

* Red. * Red. * Red.

24 *Distraught*

6 5

26 *8va*

6 6 *f* 3 3

28

5 6 *f* 6

29

6 6 6 *f* 6

31 *Placidly*

pp *f*

6 6 6 6

* Red. *

34

mp *p*

Red. * Red. * Red. * Red.

38 $\bullet = 100$

mf *p*

Start Tape

(= o) *Pondering* (= o)

42

p *mf*

mp

44

p *p* *mf*

8va

6

6

Red.

p

50 (= o) (= o)

p

pp *mp*

55 $(= \text{♩})$ $8^{\text{va}} (= \text{♩})$

p *mf* *p*

Red.

58 *mf* 3 3 3 5 6 3 3

61 $\text{♩} = 80$

p *mp* *15^{\text{ma}}* ** Red.*

68

cresc. *mf* *p* * Red.

mf *p* *mf*

76

cresc. *mf* *mf* *cresc.* *f* * Red.

mf *mf* *15ma* *mf*

84

p *mf* *p* * Red.

mf *p* *mp*

89 *Determined*

mf *cresc.*

p *mf* *p* *mf*

94

f *p* *mf* *mf*

pp *p* *mp*

100

f *mf* *f* *f* *f*

mf *f* *p* *f*

8va *8va*

106

f

mf

p

mf

mp

mf

112

mf

mf

p

mf

117

Delicately

f

mf

Red. * *Red.* * *Red.* * *Red.* *

121

Red. * Red. * Red. * Red. *

cresc.

124

Red. * Red. * Red. * Red. * Red. *

cresc.

127

Red. * Red. * Red. * Red. * Red. Red.

cresc.

subito *p*

p

131

8^{va}

f

* Red. * Red. *

3

mf

8^{va}

136

*Red. * Red. * Red. * Red. * Red.*

140

mp

* Red. * Red. * Red.

144

Handwritten musical score for 'The Rose Tree'. The score is written on four staves. The first two staves are for the vocal part, and the last two are for the piano accompaniment. The key signature is one flat (B-flat), and the time signature is 5/4. The score is divided into two measures by a double bar line. The first measure contains the vocal melody and the piano accompaniment. The second measure contains the vocal melody and the piano accompaniment. The piano accompaniment features a prominent sixteenth-note figure in the right hand, marked with a '6' and a 'pp' (pianissimo) dynamic. The vocal melody is written in a soprano and alto clef. The lyrics 'The Rose Tree' are written below the vocal melody. The score is handwritten and includes various musical notations such as notes, rests, and dynamic markings.

146

6 6 6

f

6 6 6

p

8^{va}

148 6 6 6 $\bullet = 93$ Agitatedly

f

ppp $\triangleleft$ *mf*

f

151

f

3

3

3

3

3

mf

3

154

cresc.

5

3

3

3

3

8va

157

ff

f

5

3

8va

160

ff 5 6 8va

162

f 6 *ff* *f*

ppp $\triangleleft$ *mf*

164

ff 6 6 *f* 6

166

6 6 6 3 6

168

8va

6 6 6 6 ff

ppp < mf

170

6 6 6 6

172

6 6

6 6

174

Decisively

f

cresc.

6

f

176

fff

6

fff

178

subito mf

accel.

3

3

3

8^{va} bassa

181

cresc.

accel.

f

3

3

3

184

cresc.

f

3

3

3

8^{va}

187

ff

cresc.

15^{ma} 3

3

3

190

3

fff

fff

3

193

Driving

ff

8^{va} bassa

ff

196

199

203

207

fff

fff

211

215

8va -----

cresc.

8va -----

219 *Intensely* *fff*

222 *8va* *fff* *ppp < f*

225

The musical score consists of four systems of staves. The first system (measures 219-221) features a right-hand melody with a series of chromatic notes and accidentals, marked *Intensely* and *fff*. The second system (measures 222-223) includes an *8va* marking and triplet figures, with a dynamic change from *ppp* to *f*. The third system (measures 224-225) continues the chromatic patterns with sextuplets and triplets. The fourth system shows a continuation of the right-hand melody with a final note in measure 225.

227

229

232

237

ff

8va

f ff

242

f

3

8va

f

246

subito *p*

cresc.

6 6 6 6 6 6 6 6

248

mf

6 6 6 6 6 6 6 6

250

f

6 6 6 6 6 6 6 6

8va

252

6 6 6 6 6 6 6 6

8va

254

ff

3

6 6

3

6 6

256

subito p

6 6 6 6

8^{va}

258

ff

6 6

3

* Ped.

261

f

266

decresc.

mf

Peacefully

271

mf

mf

276

mp *p*

281

Release with tape

Time: 11.20

pp *p*

*

VITA

Jonathan Peters was born in Madison, Wisconsin, on April 6, 1974. After graduating from Coronado High School (California) in 1992, he moved to Tennessee to attend Maryville College, having been offered a Music Performance Scholarship, a Bonner Scholarship (for community service), an Alumni Scholarship, and a Dean's Scholarship. Mr. Peters graduated Cum Laude from Maryville College in 1996 with Bachelor of Arts degrees in Music and Chemistry. After being offered a graduate assistantship by the Music Department at the University of Tennessee, Mr. Peters began work toward a Master of Music degree, studying composition with Dr. Kenneth Jacobs.

Upon graduating from The University of Tennessee, Mr. Peters will work toward a D.M.A. degree in Composition at Louisiana State University where he has been awarded a Board of Regents Fellowship.