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A Singer's Guide to Performing Works for Voice and Electronics

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A Singer's Guide to Performing Works for Voice and Electronics

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A Singer's Guide to Performing Works for Voice and Electronics

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Contemporary vocal music with electronics is often overlooked due to its "special needs", such as electronic tape and compact disc accompaniments; amplification systems and microphones; processing units and samplers; and interactive computer systems. This neglect is unfortunate because music for voice and electronics provides a unique opportunity for the performer. With electronics, it is possible for a singer to perform a duet with herself in real time or alter her voice to sound like something else. She can sing with a pre-made electronic accompaniment that provides an otherworldly environment to sing in, or perhaps an alter ego to sing with. Computer systems can "listen" to the singer and respond as a real time accompanist.

The incorporation of technology into a live vocal performance can be very intimidating for someone who is not well-versed in computers or hi-fidelity. But working with electronics does not require extensive knowledge about the technology – just as performing with piano does not require the ability to play the accompaniment.

This document reviews the literature, performance practice, and technology required for vocal performance with electronic media. Performers will gain a better understanding of the breadth and demands of the literature and will learn to foster an appreciation for the wealth of the genre. In Part I, the historical and aesthetic significance of electronic music and the influence of the voice on its development is discussed. Part II defines and demystifies specific technical terminology and equipment specifications. Part III lists pieces for voice and electronics and provides basic information about what is needed for performance and where/how to locate the necessary materials.

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Introduction

In the voice studio and on the recital stage, singers prepare and perform a variety of repertoire from the past four hundred years. Bach cantatas, Händel oratorios, Schubert song cycles, and opera arias from Monteverdi to Carlisle Floyd are standard fare for today's singers. While twentieth-century music is becoming more commonly studied and performed, modern vocal music with electronics is often overlooked due to its "special needs", such as electronic tape and compact disc accompaniments; amplification systems and microphones; processing units and samplers; and interactive computer systems. This neglect is unfortunate because music for voice and electronics provides a unique opportunity for the performer. With electronics, it is possible for a singer to perform a duet with herself in real time or alter her voice to sound like something else. She can sing with a pre-made electronic accompaniment that provides an otherworldly environment to sing in, or perhaps an alter ego to sing with. Computer systems can "listen" to the singer and respond as a real time accompanist.

The incorporation of technology into a live vocal performance can be very intimidating for someone who is not well-versed in computers or hi-fidelity. A performer will often avoid this genre rather than spend the necessary time and energy (and in many cases, frustration) that is required to understand the technological and performative aspects of a given electronic piece. But working with electronics does not require extensive knowledge about the technology – just as performing with piano does not require the ability to play the accompaniment. There are many works for voice and electronics that could be performed by anyone who can push "play" on a compact disc

player. More ambitious performers can work with live electronics or collaborate with composers and/or engineers to create works that are unique to their voice.

This document will review the literature, performance practice, and technology required for vocal performance with electronic media. Performers will gain a better understanding of the breadth and demands of the literature and will learn to foster an appreciation for the wealth of the genre. In Part I, the historical and aesthetic significance of electronic music and the influence of the voice on its development will be discussed. Part II will define and demystify specific technical terminology and equipment specifications. It will also include a chronology of the significant developments in electronic sound, including the invention of electronic instruments and recording media, as well as the advances in computer technology.

It is assumed that the singer who is consulting this guide is somewhat new to this genre of music, so a significant portion is devoted to listing works for voice and electronics, which are easier to coordinate and prepare than those that include live electronic components. In the interest of offering singers new repertoire, the choice of works was contingent upon those which are available for purchase or rental. Many older works are not included because the tape parts are in disrepair or unattainable. Notably, the majority of these pieces have been written for the female voice, however there are several written for the male voice. Works for baritone include Ton Bruynèl's *Denk mal das Denkmal,* Richard Felciano's *Glossolalia,* and Gerard Pape's *The Sorrows of the Moon*. Tenors can look at Vivian Adelberg Rudow's *Portrait of a Friend* and Olly Wilson's *Sometimes.* Some composers do not specify a voice type, such as John Cage in *Aria,* while others require the singer to prepare the tape himself (e.g., Paul Mefano's *They*).

PART I: HISTORICAL AND PRACTICAL CONSIDERATIONS

The Development of Electronic Music

The twentieth century signaled a new beginning in all areas of human thought and expression. The period between 1900 and 1914 was one of the most turbulent in the entire history of the arts. Realism and representational art, which had dominated since the Renaissance, were being challenged by a new approach – one of inward reflection and inspiration. Industrialization continued to rise, and with it came improvements in transportation and communication. Musicians, artists, writers, and architects began looking for ways to break out of the worn-out conventions of previous centuries. The advances made in science and technology influenced many of these artists, since these improvements had far-reaching social implications that would irreversibly change the world as they knew it.

Composers were dreaming about the possibilities of sound-producing machines long before these devices could be created. The innovations and transformations made by many of the late-Romantic composers foreshadowed those of the electronic composer – the use of new timbres, new compositional forms, and new methods of pitch organization. The size of the orchestra was expanded to seemingly infinite proportions by expressionists such as Mahler and Strauss. Debussy challenged form and tonality, as was evidenced by his static textures, additive structures and exploitation of new sonorities. Subsequently, the destruction of traditional tonality that had begun with increased chromaticism in the mid-nineteenth century reached complete collapse in 1907 with Schoenberg's break from the traditional tonal system and formulation of the 12-tone theory.

It was during this time that the first electronic instruments were invented, but the compositional possibilities offered by these devices were very limited. They produced simple, monophonic waveforms and some, like the theremin (1918) and the telharmonium (1906), required great skill to play accurately. As more composers became interested in writing for electronics, instrument designers found ways to make these instruments more user-friendly (i.e., incorporating a keyboard so it could be played like a piano). Darius Milhaud, Arthur Honneger, and Olivier Messiaen composed serious works for the ondes martenot (a keyboard-based instrument that resembled the clavichord) during the 1930's. The theremin was not controlled by a keyboard, but rather by the proximity of the performer's hand to two antennae that would control pitch and loudness. Perhaps due to its imprecise pitch wavering and "spooky" tone quality, it was most often relegated to the role of sound effect (i.e., horror films) but perhaps its most well-known cameo appearance is in the Beach Boys', "Good Vibrations".

The phonograph was invented in 1877, but it was the invention of magnetic tape in 1935 that was truly revolutionary for the modern composer. Sounds could be dissected, reordered, combined, and transformed by slowing them down, speeding them up or playing them backwards. In a lecture at the University of Southern California in 1939, Edgard Varèse addressed the need for new electronic instruments:

> …We composers are forced to use, in the realization of our works, instruments that have not changed for two centuries… Personally, for my conceptions, I need an entirely new medium of expression: a sound-producing machine… It will work something like this: after a composer has set down his score on paper by means of a new graphic, he will then, with the collaboration of a sound engineer, transfer the score directly to this electrical machine. After that, anyone will be able to press a button to release the music exactly as the composer wrote it…

> …And here are the advantages I anticipate from such a machine: liberation from the arbitrary, paralyzing tempered system; the possibility of obtaining any number of cycles or, if still desired, subdivisions of the octave, consequently the formation of any desired scale; unsuspected range in low and high registers; new harmonic splendors obtainable from the use of subharmonic combinations; new dynamics for beyond the present human-powered orchestra; a sense of sound-projection in space by means of the emission of sound in any part or in as many parts of the hall as may be required by the score; cross-rhythms unrelated to each other, treated simultaneously…all of these in a given unit of measure or time which is humanly impossible to obtain…[1]

Pierre Schaeffer, a French sound engineer working at Radiodiffusion-Télévision Française (RTF) in Paris, began composing with recorded sounds in 1948. His first experiments relied on the musical treatment of sounds from phonograph records. Much like a traditional composer combines the twelve tones of the scale to create complex timbres and establish musical form, Schaeffer would use pre-recorded sounds from phonograph records (many of which were sound effects from the radio station's library) as source material, change the speed of the recordings, repeat the sounds and juxtapose familiar sounds in unfamiliar ways. He coined the term "musique concrète" to describe music that was built from natural sound (as opposed to electronically generated sound of electronic instruments like the theremin). His first piece of musique concrète, *Etude aux chemins de fer* ("Study on a Railway"), was a collage of railroad sounds. In 1951, with the increased availability of tape recorders, RTF created the Paris electronic studio. Several prominent composers spent time working in the RTF studio, including Boulez, Stockhausen, Messiaen, Xenakis, and Varèse.

An electronic studio at the West German Radio (WDR) in Cologne, Germany was also established in 1951. Composers Herbert Eimert and Robert Beyer, and the physicist,

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[1] Peter Manning, *Electronic and Computer Music* (Oxford: Clarendon Press, 1993), 14.

Dr. Werner Meyer-Eppler used early electronic instruments like the Monochord and the Trautonium; audio oscillators (to produce pure sine and sawtooth waves); and series of audio filters to create "pure" electronic music (in contrast to the "concrete" music of the Paris studio). In 1953, Stockhausen began working extensively in the Cologne studio, creating many influential works, including his first two electronic studies, *Studie I* and *II*. Phonetic research was also a topic of investigation at Cologne. Meyer-Eppler's interest in formant synthesis led to an integration of natural voice sounds with electronic sources. Stockhausen's ground-breaking *Gesang der Jünglinge* (1955-6) exhibits Meyer-Eppler's research.

These first studios were soon followed by several more. In the United States, Otto Luening and Vladimir Ussachevsky were conducting experiments with tape music at Columbia University. In Milan, one of the first studios to incorporate both tape and electronic techniques was created in 1953 at the Studio di Fonologia (RAI). Several composers worked in the RAI studio in these early years, including Luciano Berio, Henri Pousseur, Bruno Maderna, and John Cage.

A few early works from these studios stand out as masterpieces (e.g., Varèse's *Poème Électronique* in 1958), but a majority of the works produced were etudes and experiments. Composers were working not only with new technology, but with a whole new method of sound-building and organization. For the first time in the history of music, a wide array of new sound was available in an accessible format. Some might say that working with early technology was not particularly accessible, but in comparison to inventing and building traditional instruments, the synthesizer was quite facile.

The Mark I synthesizer was introduced in 1955. This self-contained, modular system was able to generate, modify, process, record, and "perform" complex sonorities for the first time in electronic music. It was fairly easy to use and all of the basic

parameters of the sound could be discretely controlled, thus allowing for a great degree of control. Cumbersome codes were punched onto paper-rolls, similar to player piano rolls and then the composer could construct and edit the piece from a typewriter keyboard. Vacuum-tube components had to be used to control the electronics and as a result, the Mark I was a very large machine that filled a substantial portion of the studio where it resided in Princeton as part of the Columbia-Princeton studio. Ussachevsky and Luening were joined by Princeton composers Milton Babbitt and Roger Sessions.

In the 1960's, electronic music entered a new era. The Mark I and II synthesizers had been developed by RCA in the 1950's, but this technology did not become commercially available (or viable) until the voltage-controlled synthesizer was conceived by Robert Moog in 1964-5. The Moog synthesizer was the model for all subsequent synthesizers and though its operation did require some learning on the part of the composer, it was much more accessible than the Mark II. The advantage of the voltage-controlled synthesizer was that everything the composer needed was in one package – the sound generators and modifiers could be operated simultaneously – and everything could be controlled with one input device (i.e., alphanumeric keyboard or piano keyboard). The composer could predetermine what the synthesizer was going to do by pre-setting the parameters, or the synthesizer could be "played" in real time by adjusting knobs and/or playing a keyboard.

Since the synthesizer was voltage-controlled, modules containing oscillators (machines that produced simple tones), filters (to modify the frequency content of the tones), and amplifiers (machines that make the sound loud enough to be heard) were all activated and controlled with voltage. By using a modular approach, the Moog could be expanded with the addition of other voltage-control components, effect units, and control

devices. These modules were connected with “patch cables” (audio cables with a plug on each end) and this enabled the electric signal to get from one module to the next.

In 1969, a portable version of the studio Moog, called the Minimoog, became the most widely used synthesizer in both popular music and electronic art music (the company continued to produce updated models until the early 1980’s). The first polyphonic synthesizer, the Polymoog, was introduced in 1975. It resembled an organ and was the first instrument to use integrated-circuit chips instead of the wiring and patch cords of the original synthesizer. This was the first example of a synthesizer with factory and user-programmable sounds that could be changed with the push of a button.

The next stage in the development of electronic music was the use of computers for generating digital sound, controlling analog synthesizers, and processing recorded sounds. In the mid-1950’s, the first computer music was performed on large central computers that were designed for other data-processing tasks. These machines were extremely slow and had very little memory, taking many hours for a single sound to be “realized” (sounded) by the computer. Also, programming languages had to be created and adapted in order to translate the composers directions into computer-speak. The sounds that composers were able to produce with primitive computers were less than satisfactory, but they formed the basis on which computer music was to be built. As computers increased in speed and memory, the quality of the sounds improved.

Computers are very good at storing data and parceling it out at the appropriate time and in the 1970’s, electronic musicians began using them for this purpose. Thanks to Moog (and others), the synthesizer was becoming more versatile, but it was still primarily a live performance instrument – a human had to operate the machine and the exact repetition of a performance was only possible with magnetic tape. Composers were interested in the possibilities that programming a synthesizer could offer. A

"performance" could be repeated exactly at any time – a luxury to composers like Milton Babbitt or György Ligeti who chose to write technically complex music that was very difficult to perform. Hybrids like the Fairlight Computer Musical Instrument (CMI) and the Synclavier II could store information on floppy disk and reproduce any sound, whether natural or newly created. Many, like the Fairlight, included a microphone input so that sounds could be recorded ("sampled") and then stored digitally for later reproduction or modification.

Today, personal computers can do everything that these complex, integrated systems could do – and they can do it better, faster, and cheaper. A fairly modern laptop computer (i.e., less than three or four years old) and some software can synthesize, sequence, sample, and even interact with the composer and/or performer in real time. Digital sound can be fed into a computer through its USB or firewire connection. It is quite impressive that all of this development has taken place over the past fifty years or so.

The Evolution of the Modern Voice

The voice is the oldest instrument in existence – as Joan La Barbara has said, it is the "original instrument"[2] – yet its sound has changed the least. Vocal ranges have increased and styles have changed, but the basic tenets of song have dominated the literature almost exclusively until the twentieth century. Even the use of sprechstimme and sprechgesang in early works, such as Schoenberg's *Pierrot Lunaire* (1912) and Berg's *Wozzeck* (1917-1922), was based on the classic principle of text expression. But

[2] Joan La Barbara "Voice is the Original Instrument," *Contemporary Music Review* 21 no. 1 (2002): 35-48.

rapid advances in society, philosophy, and science in the first half of the century led to new possibilities and new vocal concepts that launched the voice into the modern age.

Alexander Graham Bell figured out how to convert sound into electrical signals and back into sound with the telephone in 1876. From that point on, humans were intrigued by the possibilities that this type of conversion could offer. Today, the recorded voice is commonplace but a hundred years ago, hearing the disembodied voice for the first time incited fear and caution. At that time there were still many who believed that the voice and soul were connected and to record the voice was to capture the soul. In Marcel Schwob's novel, La Machine à parler (1892), a woman uses a keyboard to operate a babbling monster that frightens the narrator with its horrible phonemes[3].

Several literary movements sought to overturn conventional lyricism in order to implement new styles that would more aptly reflect the human condition in an uncertain political and economic climate. The Futurists were founded in 1909 by Filippo Tommaso Marinetti in his manifesto, *Le Futurism*. He created "parole in libertà", a style of writing that was free of syntax and logical ordering and made use of the sonic properties of words (i.e., onomatopoeia). Those who wrote in this style had no use for adjectives, adverbs, finite verbs, or punctuation – they wanted to depict the sped-up world of mass transportation, communication, and mechanization by using words violently, rapidly, and with intense emotion. They were also reflecting the violence that was going on around them – allowing their words to be bullets.

Dada (founded by a group of exiled Germans in Zurich in 1916) was also a movement interested in freeing syntax and text ordering, but they were primarily

[3] Douglas Kahn "Introduction: Histories of Sound Once Removed," In *Wireless Imagination: Sound, Radio, and the Avant-garde*, eds. Douglas Kahn and Gregory Whitehead (Cambridge, MA: MIT Press, 1992), 5-6.

concerned with the sonic properties of their poetry. They often used invented words for their acoustical qualities and their ability to summon thoughts of primitive, pre-language culture. Often, the performance of the poem, rather than the written poem, was viewed as the final product. The phonograph enabled these early poets to record their poems as an exact replica of their performance and poetic intent.

By the 1950's, sound poets were taking advantage of the new possibilities offered by the tape recorder. Now they could transform their recorded poetry by cutting and splicing magnetic tape, applying sound processors to it, and changing the pitch and speed of the voice by changing the speed of the tape playback. This fusing of sound art and verbal art into a cohesive unit is similar to the fusion of text and music in a song, as a result it is not uncommon for composers to write sound poetry (John Cage wrote some for broadcast on WDR in Cologne).

At this time, composers also became interested in finding ways to electronically free the voice from its timbral and semantic shackles.

> It is striking that the most significant tape and electronic pieces of the 1950's and early 1960's used the human voice – on tape or live with tape – as an essential part of the conception: Stockhausen's *Gesang der Jünglinge*, Berio's *Omaggio a Joyce* and *Visage*, Babbitt's *Vision and Prayer* and *Philomel*.[4]

Perhaps this was an extension of the work being done by sound poets, or perhaps it was inevitable that the tape recorder would be used for this purpose. In *Gesang der Jünglinge* (1956), the voice of a boy soprano symbolizes human reality in its purest form. The electronics express "the physical, the cosmic, and perhaps the mystical."[5] Stockhausen

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[4] Eric Salzman, *Twentieth-Century Music: An Introduction*, 2nd ed. (Englewood Cliffs, NJ: Prentice Hall, 1974), 143.

[5] Istvan Anhalt, *Alternative Voices: Essays on Contemporary Vocal and Choral Composition* (Toronto: University of Toronto Press, 1984), 4.

deconstructs the electronically-altered fragments of the boy soprano and categorizes the sound according to its sonic properties. Once the sounds had been categorized, he used their acoustical data to interpolate electronic and recorded sounds into "the greatest possible homogeneity".[6] Significantly, this was also the first electronic piece to combine electronic sounds and concrete sounds in one piece. Prior to this, all electronics works had used one type of production or the other.

Luciano Berio, an Italian composer working in the RAI studio in Milan, was interested in creating sound poems for the radio. His work, *Thema (Omaggio a Joyce)* (1958) began as a radio program entitled *Onomatopea nel linguaggio poetico* (onomatopoeia in poetic language) that he had planned with the writer Umberto Eco. The radio program was never completed, but this piece, which focussed on the "Sirens" chapter of James Joyce's *Ulysses*, is a classic of electronic music. In *Thema*, Berio remains true to Joyce's text. He records Cathy Berberian's reading of the poem and then,

> extracted from that mosaic purely musical elements, and used them to explore the borderline where sound as the bearer of linguistic sense dissolves into sound as the bearer of musical meaning: a territory that over the next decade he was to make very much his own.[7]

After creating a texture of impossible vocalism with the dissected text, Berio can juxtapose the comprehensible (text) with the incomprehensible (music) and focus on the borderline that separates the two.

In their next electronic collaboration, *Visage* (1961) Berio and virtuoso soprano, Cathy Berberian, abandoned words altogether, except for one word, "parole" ("word" in Italian) which enters twice at the end. Berberian "improvised a series of monologues,

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[6] Joel Chadabe, *Electric Sound: The Past and Promise of Electronic Music* (Upper Saddle River, NJ: Prentice Hall, Inc, 1997), 39.

[7] David Osmond-Smith, *Berio,* (Oxford: Oxford University Press, 1991), 62.

each based on a repertoire of vocal gesture and phonetic material suggested by a given linguistic model, but in fact using no words from that language."[8] Berio uses electronic sounds to extend Berberian's voice into a further dimension and create a psychological drama that was banned from the air waves as obscene. In the program notes, Berio describes *Visage*:

> We understand that language is made not only from words and concepts, but rather a system of arbitrary symbols through which we give a certain form to our way of being in the world. Music, likewise, is made not only of notes and established forms of relations, but rather is the way that we are able to select, shape and relate certain aspects of the sound continuum [a term that Stockhausen also used]. The main subject of *Visage* is language. When composing it I was attracted, as always, to a musical search that tends to open or enlarge the possibilities of convergence of musical and acoustical processes and to finding a musical equivalent to linguistic articulations.[9]

Berberian's flexibility in this piece demonstrates how important imagination and inventiveness are when a performer is conceiving new music.

In 1965, avant-garde composer, Steve Reich created one of the first pieces of "process music" by looping the recorded speech of a fire-and-brimstone preacher saying "it's gonna rain." Reich used two tape recorders to "loop" (repeat) two copies of the same recording at two slightly different speeds, allowing the speech loops to come into and out of phase with each other. This type of "phasing" music falls in the category of process music because the event of the tapes and text combining to create music is the significant experience in itself. Reich used vocal phase shifting again in *Come Out* (1966).

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[8] Osmond-Smith, 63.

[9] Luciano Berio, *Many More Voices*; Cathy Berberian, mezzo-soprano; digital disc (BMG Classics, 09026-68302-2, 1998).

In 1969, pioneering composer, Alvin Lucier devoted both sides of a record album to a process piece that consisted of a few lines of text that described the process in detail:

> I am sitting in a room different from the one you are in now.
>
> I am recording the sound of my speaking voice and am going to play it back into the room again and again until the resonant frequencies of the room reinforce themselves so that any semblance of my speech, with perhaps the exception of rhythm, is destroyed.
>
> What you will hear, then, are the natural resonant frequencies of the room articulated by speech.
>
> I regard this activity not so much as a demonstration of a physical fact, but more as a way to smooth out any irregularities my speech might have.[10]

Each performance of this becomes at once a repeated act and a new interpretation. A different reader can record in a different room and get a very different piece. However, it is also repeatable because the electronic tape medium saves all of the recordings, at which point a composer or engineer just has to splice all of the recordings together in the order they were played.

Technology has also contributed to vocal science and pedagogy. In 1948, Bell Labs built the Voice Operated Recorder (Vocoder) which was capable of both analyzing and synthesizing speech. By the late 1950's, computer music researchers at Bell Labs had created several speech synthesis systems that were capable of singing. This trend has continued into the present day. In 1993, Ingo Titze co-created a super-computer tenor called "Pavarobotti" that would sing duets with Titze. It is "used for studying many

[10] Alvin Lucier, *Reflections: Interviews, Scores, Writings* (Köln: MusikTexte, 1995), 322.

aspects of the voice, including advanced physical models of normal and pathological vocal folds."[11]

Many of the techniques that are being taught in today's voice studios have been informed by the discoveries of vocal science. William Vennard, notable voice teacher and pedagogue, relied heavily on the discoveries of voice scientists in his revised edition of *Singing: the Mechanism and the Technic*[12] in 1967. Spectrograms (visual renderings of a sound's frequency spectrum) and diagrams of the jaw, larynx, torso, etc, were used to explain the connection between body and sound. Johan Sundberg (author of *The Science of the Singing Voice*[13], 1987, and others) and his associates at the Speech Transmission Laboratory (STL) of the Royal Institute of Technology (KTH) in Stockholm, have created the MUSSE DIG (MUsic and Singing Synthesis Equipment, DIGital version) synthesizer, which has been used in singing synthesis and as a means for studying "performance-by-rule." The KTH has published many articles on speech, and has contributed substantially to research on singing.[14]

In the voice studio, some vocal pedagogues, like Richard Miller employ speech technology to assist in teaching the voice student. He believes that, "through visual and audio feedback, the singer's awareness of the quality of the sound can be heightened."[15] He uses many pieces of speech analysis equipment in his laboratory at Oberlin College, including the Kay Elemetrics Computerized Speech Laboratory (CSL) and a spectrum

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[11] Perry Cook, "Singing Voice Synthesis: History, Current Work, and Future Directions," *Computer Music Journal* 20 no. 3 (1996): 40.

[12] William Vennard, *Singing: the Mechanism and the Technic* (New York: Carl Fischer, 1967).

[13] Johan Sundberg, *The Science of the Singing Voice* (Dekalb, IL: Northern Illinois University Press, 1987).

[14] Cook, 41.

[15] Richard Miller, *On the Art of Singing* (New York: Oxford University Press, 1996), 304.

analyzer (to create spectrograms). He also uses video and audio recording and playback systems so that singers can monitor those aspects of their performance as well.

Vocal Extensions

Composers and performers have been creating new sounds for instruments like the flute, clarinet, and piano since the 1930's and 1940's. However, it was not until the 1950's and 1960's that they delved into the possibilities that the extended voice could offer. The potential of the voice was seemingly infinite when compared to the limits of acoustic instruments.

> In most Western music the involvement of the voice has meant also the involvement of words, with the almost inevitable result of an antagonism between music and text, both battling for the centre of attention; works such as Delibes' *Lakmé* or Debussy's *Sirènes* provide rare examples of textless singing, or vocalise, used for special dramatic or poetic effect.[16]

Composers like György Ligeti, John Cage, and George Crumb began to explore the voice as the key to revealing the state of mind of the protagonist and the subconscious mind.

In *Aria* (1958), Cage used different colors to represent different singing styles, and he incorporated the element of chance by letting the performer make decisions about how the piece should be interpreted and which sounds would be used. Ligeti chose to use non-textual sounds like clicking, laughing, humming, whispering, and dislocated consonants in his chamber work *Aventures* (1962) and *Nouvelles Aventures* (1965). He wrote his "own" IPA chart for the nonsense words. George Crumb's music is known for its eclectic instruments, timbres, and scales, and his vocal writing is not different. Whispers, shouts speech, clicks, phonemes, etc. allow the voice to move freely through

[16] Paul Griffiths, *A Guide to Electronic Music* (Bath, UK: Thames and Hudson, 1979), 36.

the colors of expression that are inherent in the text (which was usually written by Federico García Lorca).

Of course, singers have also contributed greatly to the development of extended vocal techniques. Cathy Berberian, Jan DeGaetani, and Joan La Barbara have collaborated with Berio, Crumb, Cage, and others to create classic works of modern vocal music that incorporate extended vocal techniques. Other singers, like Meredith Monk and Laurie Anderson, have created multi-media performances that incorporate the extended voice as an important component. The creative input of these performers has led to a library of extended techniques that continues to be used and expanded.

Cathy Berberian was one of the earliest modern singers to experiment extensively with non-traditional vocalisms. In addition to being an agile and innovative singer, she had training in dance and acting, all of which contributed to her development as a performer. Her propensity for vocal and dramatic experimentation, and her ability to meet the challenges of contemporary composers like Berio and Cage made her work a catalyst for vocal experimentation by subsequent performers and composers. Many early works for modern voice were written for her, including solo voice pieces like *Sequenza III* and *Recital I* (1971) by Berio (most of his vocal works were written for her), *Aria* by Cage, and *Phonèmes pour Cathy* by Henri Pousseur. Berberian's voice is also the sound source for many of Berio's electronic pieces, but electronics rarely played a part in her live performances, most of which were theatrical works for solo voice or with chamber ensemble.

Several singers were exploring the possibilities of the extended voice in the 1960's and 1970's. Meredith Monk is an award-winning filmmaker, composer, performer, and choreographer. Her compositional output includes music for instruments and voices alone, but she is probably best known for her avant-garde multimedia

productions. Monk began reading music and playing piano at age 3. Her singing background was in opera and Hebrew chant, and she studied dance, film, and theater as a teenager. By the mid-1960's she had a three octave range and could perform extensive wordless improvisations.[17]

Her works are often narrative, with a story or sequence of emotions being expressed nonverbally by the singer/s. In her 1976 opera *Quarry* in which the text is spoken while the sung voice uses extended techniques to express the feeling, texture and color of the language. She also employs extended instrumental techniques and electronics in many of her works, but she has chosen to focus primarily on the power of the voice. She uses glottal stops, non-western sounds, nasal singing, nonsense syllables, "baby" syllables, etc. She feels "the voice has a much more intrinsic emotional quality than instruments. It can really get to the emotions we don't have words for, because it gets in between the cracks of the emotions we do have words for."[18]

Joan La Barbara approached extended vocal techniques with a more innovative approach than many of her predecessors. She was still interested in the theatrical possibilities of vocal music, but she was also "fascinated with the ways instrumentalists were extending their sounds, stretching the boundaries of what was the established technique."[19] She began by improvising with jazz musicians and working to vocally emulate their sounds. In 1971 she began working with Steve Reich as the "marimba player" in his ensemble (she imitated the sound of a marimba with her voice) and then with Philip Glass' ensemble for 3-4 years as the "trumpet player" (again imitating it with

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[17] Mark Prendergast, *The Ambient Century: From Mahler to Trance – The Evolution of Sound in the Electronic Age* (London: Bloomsbury Publishing, 2000), 175.

[18] John Schaefer, *New Sounds: A Listener's Guide to New Music* (New York: Harper & Row Publishers, 1987), 222.

[19] La Barbara, 36.

her voice). Her list of collaborators is a virtual who's who of avant-garde composition: John Cage, Alvin Lucier, Morton Feldman, Charles Dodge, Robert Ashley, Morton Subotnick, Roger Reynolds, Larry Austin, Earle Brown, and James Tenney.

La Barbara is also a composer. She has written experimental opera and music theater, film music, and electronic music. Some of her early works in the mid-70's were influenced by conceptual and performance art (*Hear What I Feel* and *Performance Piece)*. In her vocal music, she continued to improvise and search for new sounds. In 1977, she began to compose "sound paintings" by layering her extended vocal material to create a texture, in much the same way that an orchestra is the layering of several different instruments to create a complex texture.[20]

Modern music has focussed upon the individuality of a singer's voice and her ability to effectively interpret the modern ideas that are being expressed by the text and music. In her article "Extensions of Mind and Voice," Karen Jensen observed that "emancipation from the compulsion to treat a text literally (whether fragmented or semantic) can mean the beginning of a real and growing personal relationship to song and to one's own voice."[21] This focus on the individual voice also reflects an aspect of vocalization that is unconventional. This modern voice is able to draw from any type of expression, including folk, pop, world music, dramatic, ritualistic, or subconscious utterances.

Many works for voice and tape are written for extended vocal techniques (e.g., *Jacob's Room* by Morton Subotnick and Jon Christopher Nelson's *They Wash Their Ambassadors with Citrus and Fennel*), but many are not. Milton Babbitt's voice and tape

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[20] La Barbara, 35-48.

[21] Karen Jensen, "Technical advances and the modern composer: Extensions of Mind and Voice," *Composer* 66 (1979), 16.

works, *Phonemena, Philomel,* and *Vision and Prayer*, use speech and sung tone; *Recitative and Aria* by Paul Johnson and *Elpoem* by Günter Marx use conventional notation and vocal production; and *Two Stevens Songs* by John Melby does not require any extended vocal techniques. These works look no different from a score for voice and piano except that the tape notation is often a mixture of graphic and conventional notation. Some pieces fall into a place between the two extremes where simpler and more common extended techniques are used (i.e., tongue clicks, whispering, humming, hissing, speaking, etc.). Risset's pieces fall into this category, as do Olly Wilson's *Sometimes* and David Berlin's *Articulations for Soprano and Tape.*

This document will not list and discuss extended performance technique – that is a book in itself. Sharon Mabry has written a book that provides information for singers who are interested in learning modern music[22]. Mabry covers nearly everything that the singer would need, including practical information about "vocal colorations" (i.e., singing with or without vibrato), nontraditional notation, extended vocal techniques, exercises for learning these new techniques, and a list of twentieth-century repertoire. Additional repertoire can be found in Jane Manning's books about modern vocal repertoire – *New Vocal Repertory: an Introduction* (1994) and *New Vocal Repertory 2* (1998).

For those singers who are adventurous and would like to incorporate extended vocal techniques into their singing style, Joan La Barbara suggests vocal improvisation.

> I had heard recordings of Cathy Berberian, of course, and also listened to jazz scat singing. But I wanted to discover for myself what my voice could do, so I started improvising, alone and with other musicians.[23]

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[22] Sharon Mabry, *Exploring Twentieth-Century Vocal Music* (New York: Oxford University Press, 2002).
[23] La Barbara, 36.

When experimenting with the voice, maintaining healthy phonation is important. If a noise is painful to make, it should be discontinued immediately and, just as with traditional singing, the extreme ranges of the voice should not be overused. For electronic pieces where the singer is using a microphone, it will help to rehearse with one because certain techniques, like singing harmonics and multiphonics, are greatly assisted and altered by amplification.

The Electric Performer

The electric singer is an extension of the modern singer. In early electronic works, the singer's voice was electronically manipulated to allow her already virtuosic vocalizations to be re-shaped into an otherwise impossible-to-obtain texture. From a musical standpoint, electronic music

> can resolve, as no work for conventional forces can, the antagonism between music and text, since the words themselves can become purely musical material. Techniques of distortion when applied to sung or spoken language, can place the meaning in doubt, so that the sound of the words is made more important than their sense; moreover, the all-encompassing freedom of the electronic medium gives the composer scope to make smooth connections between vocal and non-vocal material, abolishing the dichotomy between voice and accompaniment.[24]

This ability to fuse the voice and accompaniment into a cohesive unit that flows freely from one to the other is a very important aspect of music for voice and electronics.

In addition to the obvious sonic possibilities, the voice has great expressive capabilities in regard to language and other non-musical factors.

[24] Griffiths, 36.

> The voice and fundamental factors of the oral medium itself are subject to exploration – in particular, the limitations and ranges of expression of the voice, the conceptions of voice in communication and ritual, and also the transient psychic quality of voice and the concept of oral interaction as a living counterpart to the objectified mode of written expression.[25]

The use of voice in electronic music brings the human element to a genre of music that is too often looked upon as mechanical and inhuman, even though electronic music is composed by humans, and therefore a human creation in its own right. The electric singer is capable of a new type of dramatic expression, as the interaction of performer vs. machine or the performer vs. herself (or her psyche) is impossible in any other genre.

The electronic medium also offers a unique opportunity for the singer who is interested in working collaboratively with a composer. Unlike a traditional piece for voice that may be written for a particular singer, electronic works that use a singer's voice as source material will forever be linked to that performer. In addition, in works for live singer and electronics, the creative possibilities increase exponentially. The electronic voice is able to perform impossible feats and the live singer can interact with her otherworldly self or her voice can be electronically transformed during the performance.

The disembodied voice is another new aesthetic that is created by electronic music. Projecting the voice of a singer through loudspeakers "breaks all the rules of vocal behaviour – in disintegrating its text, sounding from more than one place at once and rapidly shifting position – and so takes on a quite unaccustomed power as pure song."[26] The disembodied voice is not associated with a physical singer – it is an entity upon itself. In the case of solo tape pieces, the disembodied voice is perhaps less

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[25] John MacKay, "The Orality Perspective: The oral mode in contemporary art and culture –- Voice and Performance" *Perspectives of New Music*, 20 (1981): 70.

[26] Griffiths, 38.

disturbing to today's listeners, because the projection of a recorded voice is not rare. Any restaurant or store that plays recorded vocal music over a speaker system is projecting the disembodied voice. However, in a concert hall it retains its effect, and when the live singer is joined by the disembodied singer, the artistic possibilities are endless.

A unique issue that arises when a singer is working closely with a composer in the creation of a new piece is that of authorship. If the final product is a solo electronic piece and the voice is present only as source material, should the singer receive recognition? In many cases, the singer's own improvisations are recorded and used by a composer to build a piece, much like a jazz performer's improvisations become part of the work of the composer. Who is the author then? It is interesting to note that Berio didn't mention Berberian in the credits of *Thema* even though recordings of her voice were the only sounds used in the entire piece.[27] While today's performers are usually credited by composers for their performances, there are still no firmly established guidelines for citing source material or samples in an electronic piece.

Voice and Tape

There are several ways that a live singer can be incorporated into an electronic work. Singing with a pre-made electronic accompaniment is perhaps the easiest way. This outgrowth of the solo tape tradition combines the fascinating aesthetics of electro-acoustic music (music that combines electronic and acoustic sound sources) with the virtuosity and interplay of trained performers. Composer Jean Eichelberger Ivey has written for voice and electronics several times. She is drawn to the challenge it offers:

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[27] Hannah Bosma, "The Death of the Singer: Authorship and Female Voices in Electronic Music," *eContact! 1.3* 10 (1998) <http://cec.concordia.ca/econtact/voice/bosma.html>.

> In some ways, writing for live performers plus tape seems to me the most difficult of all types of composition. It combines all the problems of composing for live performers and the problems of pure tape composition, with some special problems caused by their interaction. The challenge of coping with all these problems simultaneously may be one of its principal attractions for the composer.[28]

In this performance dynamic, the tape part is treated as an ensemble of limitless size and possibilities. The voice may be included on the tape, functioning as the alter ego of the performer or as another performer. Or the tape can be devoid of the voice entirely and simply provide an atmosphere for the singer to perform in.

Works for voice and tape resemble traditional concert works for soloist and accompaniment. These inherently dramatic works make the audience "conscious, as never before, of the performer as human being and the dramatic implications of the human confronting an unknown force."[29] Often simple staging is used, as in Tom Lopez' *Hollow Ground II* which calls for simple movement by a seated singer or *Sometimes* by Olly Wilson, which has the singer move to three different stage positions during the piece. Actors heighten the drama in *A floresta e joven e cheia de vida (1966),* a composition that Luigi Nono dedicated to the Vietnamese National Liberation Front; Mark Bunce uses puppets in *Death, the Imaginable Mystery*; and special lighting is used in several of Alcides Lanza's works, including *Penetrations IV*.

The biggest disadvantage of the tape medium is its indifference. Unlike a pianist who can "follow" the fluctuations in a singer's performance, the tape cannot make adjustments during a performance. However, this does not have to be seen as a disadvantage. The predictability of a tape allows the performer to stretch within the

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[28] Elliot Schwartz, *Electronic Music: A Listener's Guide* (New York: Praeger Publishers, 1975), 231.

[29] Schwartz, 106.

space provided. Since there is no limit to the amount of rehearsal time that the singer has with the tape, she can work with it until she learns how her part interacts with the tape. Once a singer becomes comfortable working in this way she will find that preparing a work for voice and tape is no more difficult than preparing a piece for voice and piano.

In some pieces, the tape is optional. It can be added to enhance the performance or it could replace another instrument. In Milton Babbitt's *Phonemena*, the tape part is interchangeable with a part for piano. "[Babbitt] customarily scores even his synthesizer work in traditional notation, and he had already prepared a kind of vocal score for study purposes."[30] Bethany Beardslee, for whom the piece was written, learned the piece in the traditional notation and has performed it in both formats. John Cage's *Aria* can be performed with or without *Fontana Mix*, a tape work that was intended to be paired with other instruments in addition to being a solo tape piece.[31] Jean-Claude Risset's *Mokee* for bass or soprano voice and piano has an optional tape part that can be added to the performance.

For voice and tape works that don't use traditional notation and time signatures, another method of coordination is necessary. Noticeable events in the tape part cue the singer and a timeline places vocal gestures temporally. Sometimes a stopwatch is used to assist the performer in rehearsal and/or performance (e.g., Daniel Pinkham's *Safe in their Alabaster Chambers* and Ton Bruynèl's *Denk mal das Denkmal*). Many compositions merge voice and electronics in this way, including Richard Karpen's *Il Nome*, Ronald Perera's *Dove Sta Amore*, Charles Dodge's *The Waves*, and all three of Jean-Claude Risset's voice and tape pieces (*Inharmonique, L'Autre Face*, and *Invisible*).

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[30] Milton Babbitt, *Philomel*, Bethany Beardslee, soprano, et al; digital disc (New Records, 80466-2, 1995).

[31] Thomas Holmes, *Electronic and Experimental Music* (New York: Charles Scribner's Sons, 1985), 128.

In some pieces, the tape does not run throughout the work (Bernard Rands' *Ballad 3*, Richard Felciano's *Glossalalia*, and Olly Wilson's *Sometimes*). The performer may begin in silence and be joined by the tape at some point in the piece, or perhaps the tape only participates in certain parts of the piece. This relieves some of the rigidity of the tape medium and allows the singer ample time and space for expression during the parts where the tape is not playing. While starting and stopping the tape during the piece can disrupt the performance, this disturbance has been remedied in recent years by quieter equipment. If a DAT (digital audio tape) is being used, the audience may still hear the tape click as it starts or stops, but a compact disc is nearly sound free. Of course, both of these options are much less obtrusive than the original clattering and clicking of a reel-to-reel tape recorder.

As with most developments in electronic music, the combination of voice and tape also expanded to include other types of manipulation, like live vocal processing, electronic instruments, and interactive technology. Some examples include: James Fulkerson's *The Archaeology of Silence* for mezzo, tape, and live electronics; Jason Bolte's *Darkness Comes to the Woods* for soprano, tape, and optional interactive electronics; and João Pedro Oliveira's *Visão* for soprano, orchestra, tape and live electronics.

Some composers have chosen to write chamber works that use voice and tape in the instrumentation. Conventional notation is used almost exclusively and in many pieces, the tape is not integrated into the ensemble, but rather remains on the periphery to provide an atmosphere for the instrumental ensemble to perform in. The catalog at the end of this document includes some of these works, but only those with a small chamber group (four or fewer players).

In terms of technology, a voice and tape piece requires the least equipment and technical assistance. Generally, all that is needed is an audio playback machine, an amplification system, and someone to run the tape and mixing board. Most electronic composers store their "tape parts" (the electronic portion of the piece) on either compact disc (CD) or digital audio tape (DAT), so the playback machine will obviously be relative to the type of media that the tape part is saved on. (As an aside, the performer will most likely want a CD copy of the tape part to rehearse with, since most people don't own a DAT player.) The simplest amplification system will consist of a microphone (assuming the voice part is amplified), a mixing board (can be a small one with as few as three inputs), an amplifier, and two speakers. This set-up can certainly vary, but this is the basic system (alternative formats are discussed in the "Technology" section of this document).

One technical assistant will be needed for the performance. This person does not have to be a sound engineer, per se, but she will have to know how to set up and run the system. Often, someone else will set up the system and the assistant will just run it for the rehearsals and performances. If that is the case, the assistant just needs a good ear and a basic understanding of how the playback equipment and mixing board work (of course, more experience is better). When the composer is in attendance, she will often run the mixing board and an assistant will not be necessary. In more complex systems where sound is being "diffused" through many speakers in the hall or room, the mixing board operator must know how to move the sound through the space and mix the voice into the electronic world so that everything blends as an ensemble. Needless to say, the board operator has a lot to do with the successful performance of the piece.

There are some works which require the singer to make her own tape. Paul Mefano's *They* for voice and tape provides the singer with twelve vocal lines, eleven are

overdubbed (recorded one-by-one) onto a multi-track machine and the singer performs the other line live (he decides which one). Elizabeth Vercoe's *Nine Epigrams from Poor Richard* provides the performer with instructions on how to create the tape part for herself.

Voice and Live Electronics

Many composers choose to incorporate electronics into the performance as the piece happens (in real time). There are three primary ways that live electronics can be incorporated into a composition: an effects processor can be used to alter the sound of the voice during the performance; part of the performance can be recorded and looped to create a rhythm and/or texture that gets repeated and changed at different points in the piece; or interactive computer technology can be used to respond to the singer's pitches, amplitude (loudness), etc. Live electronics appealed to those who preferred the unpredictable nature of live performance to the indifference of tape accompaniments.

The term "live electronics" usually refers to works that fall into the first two categories listed above (voice processing or looping). This type of voice and electronic work provides a little more of a challenge to the performer, because specialized equipment is required and some training is necessary for its operation (or an assistant is needed to operate the equipment). Fortunately, hardware that performs simpler processing like reverb (adding reverberant space to the sound), filtering (changing the frequency spectrum of the sound), delay (delaying what is sung by a certain number of seconds), and chorus (clustering the vocal sounds so it sounds as if several are singing) are plentiful. And although these machines are continually updated, these building blocks of sound processing are usually included.

Priscilla McLean's *In the Beginning* uses live electronics like delay, pitch shifting, and filters in addition to a stereo tape part. In *Vocal Extensions* for voice and live electronics, Joan La Barbara talks about how she used the electronics:

> [This] was my first exploration into the realm of live electronics, utilizing commercially available devices designed for electric guitar players (phase shifter, frequency analyzer…and echo/reverb unit) to further expand and extend my vocalizations. Abruptly changing the settings, I used the equipment as a source of surprise, working with the resulting sounds as an improviser reacts to other musicians.[32]

Brigid Burke uses common effects like reverb and pitch shifting in *Laughing Blossoms* for voice, live and pre-recorded electronics. Simon Emmerson's *Sentences* uses a plethora of effects including flange, chorus, reverb, filters, feedback, and pitch shifting.

If tape loops are used, they must be practiced with in order to make successful repetitions (assuming that is the goal). With today's technology, looping can be done with small effects devices, often packaged as foot pedals that can be easily turned on and off by the performer. These machines operate by sampling (recording) a portion of music and then repeating it to create the familiar repetitive rhythm that the reel-to-reel tape loop made. In a "sonic environment" for soprano, flute, violin, percussion, and live electronics, Richard Felciano's *The Angels of Turtle Island* loops all of the performers in order to create a trance-like texture.

Works for live electronics also include pieces that use electronic instruments that are played in real time by a performer. These may or may not use live effects as well. An early example of one of these pieces is John Eaton's *Songs for R.P.B.* (1965) for soprano, two pianists (prepared piano), and synket synthesizer. Joanne Carey has written

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[32] Joan La Barbara, *Voice is the Original Instrument: Early Works*, Joan La Barbara, soprano; digital disc (Lovely Music, LCD 3003, 2003).

a more recent piece, *Three Spanish Songs* (1993) for voice and radio-baton in which the singer performs with an electronic instrumentalist. This approach is no different than performing with a pianist. The radio-baton can control numerous synthesized sounds and pitches. In this case, it is often used to emulate instrumental sounds.

The label, "interactive music" applies to pieces in the third category - those in which the voice triggers compositional responses by the computer software. In one sense, interactive music is the most difficult for a singer to work with and in another, it is the easiest. An assistant is needed to control the computer realization, so interactive music requires more formal rehearsal time. However, the singer does not have to try to coordinate with the electronics, as they do with tape accompaniments.

Due to the nature of interactive works, singers who perform them are often privy to work with the composer directly. Contemporary composers who use interactive electronics are very often working directly with a performer in the conception and creation of the work. In some cases, the composer is the only person who can run the interactive portion of a performance because they have invented and/or built some or all of the equipment.

Many composers believe that interactive music is the perfect vehicle for a truly integrated music. As Guy Garnett so eloquently put it,

> Just as opera around 1600 was a response to the reawakening of interest in the philosophy and art of the ancient world, a response favorably disposed toward the growing secularization of the arts and sciences while reacting against the reconfining of expression brought about by the counter-reformation, interactive computer music takes the fullest advantage of the ideas and technologies of today and unites them with a vision of what they could be.[33]

[33] Guy E. Garnett, "The Aesthetic of Interactive Computer Music" *Contemporary Music Journal* 25 (2001): 31.

The marriage of performer and composer can be seen quite literally in the case of Joan La Barbara and Morton Subotnick, who have been married almost as long as they have been creating music together. In order to achieve real time interaction between La Barbara and an electronic score, Subotnick worked with software developer Mark Coniglio to create a program ("Interactor") that would run the interactive component of one of his best-known interactive works, *Jacob's Room* (1986). Interactor allows the composer to program events and musical responses that will be triggered by the singer (or instrumentalist) during a performance.

Many of today's interactive works are being written with the assistance of a software package called MAX/MSP. "MAX" named for pioneer Max Mathews, was created at IRCAM (Institut de Recherche et Coordination Acoustique/Musique) by Miller Puckette in the 1980's. It has been thoroughly developed and is now possibly the most popular interactive software in use. MSP stands for Max Signal Processing and is the software that can run adjacent to MAX. As the name suggests, it functions as a signal processor – much like the ones being used by live electronics composers. When the two programs are paired, they become the ultimate interactive tool. MAX can receive data from a multiple of things, including: the performer, a video camera, and any number of sensors (e.g., pressure sensor, light sensor, etc.). It can also control multi-media aspects of the performance, such as lighting or video. MAX/MSP has a relatively intuitive user interface and very helpful tutorials (for learning how to use the software), therefore it is one of the most accessible and flexible software options for interactive music today.

Interactive music of this type can also contribute greatly to the theatrical possibilities of a piece. The chamber opera *Jacob's Room*, is an excellent example of a music drama where images and lights, as well as the music, are under the control of the computer.

> The imagery and its real time choreographic animation represent a kind of dream or memory language. Over and over again, certain images return in various forms and collide with verbal and musical images to complement the narrative of hidden memories.[34]

Joseph "Butch" Rovan has also created a mono-drama called *Vis-à-Vis* which uses MAX/MSP to create the music, special lighting, and video cues to re-conceptualize Rilke's text.

Choosing Repertoire

The electronic music repertoire for voice is extremely varied. When choosing works, the singer can remain within her comfort zone, venture to the periphery, or step outside of it entirely. Extended vocal techniques and graphic notation can be sought-out or avoided. Equipment can be as familiar as a compact disc player or as complex as an interactive real time computer system. The media and "instrumentation" are seemingly limitless. A singer can perform with electronic tape, electronic instruments, acoustic instruments, live electronics, or interactive electronics – or some combination thereof.

Those who are most familiar with traditional repertoire may feel conflicted about singing in a more avant-garde style, but preparing any piece of music requires an approach that is appropriate to the style – one would prepare a nineteenth century aria and a seventeenth century cantata very differently. Modern composers are often looking for a "new" voice because they are expressing new ideas, whether psychological, aesthetic, political, societal, etc. Of course, there are still plenty of twentieth century works that are written in a traditional singing style, so vocal acrobatics are not necessary for the singer who is interested in performing new music.

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[34] Morton Subotnick, "The Use of Computer Technology in an Interactive or 'Real Time' Performance Environment," *Contemporary Music Review* 3 (1999): 116.

Modern music is often the answer for those who do not fall within the confines of traditional operatic style, or those who are disenchanted with it. Joan La Barbara chose modern music because she "was becoming somewhat disenchanted with the opera world and its approach to singing, learning to do roles as they had been done for years, becoming part of the tradition."[35] Contemporary music offers great variety and welcomes unique vocal qualities. Some pieces require a more classical approach, while others infuse popular, folk, or world music influences. Trevor Wishart, a composer, singer, and researcher who has devoted a significant portion of his career to vocal music (and particularly extended vocal techniques) explains the differences between these approaches:

> in the classical tradition the singer strives toward the perfection of a particular kind of voice which is a social convention and is felt to be transferable from one work or one expressive context to another (liturgical, concert, etc.), popular music projects the idiosyncratic features of the individual singer's voice.
>
> The audience is assumed to be more interested in music as a personal utterance rather than as a socially conventionalised utterance.[36]

There are some logistical issues that the electronic singer must consider. Most importantly, it is not always easy to find and acquire the materials for these works. Due to budget cuts, avant-garde works are rarely available from large, well-known publishing companies – from a marketing standpoint, it is much safer to offer standard repertoire that is guaranteed to sell. Therefore, the singer must often contact the composer directly in order to obtain performance materials. While this method is a bit more involved than the traditional practice of buying sheet music at a music store (as one would for

[35] La Barbara, 36.

[36] Trevor Wishart, *On Sonic Art* (Amsterdam: Harwood Academic Publishers, 1996), 258-9.

traditional repertoire), it offers a unique opportunity for the performer to initiate a dialog with the composer.

Until now, these works have often only received one or two performances. Consequently, there is little for the performer to glean from someone else's performance. This lack of "history" requires the singer to be imaginative in order to realize a personal interpretation for the work. Once again, a unique voice and fresh viewpoint are highly desirable in this music.

Another consideration for the electronic singer is his predilection for the unknown when in performance. When using live electronics, it is unrealistic to believe that everything will work perfectly for every performance. That is an inherent frustration with this medium – particularly with interactive computer music. Be aware that a performer with a no-nonsense temperament is often not the best match for an interactive work. Of course, as the technology continues to improve, these problems occur frequently. However, to be on the safe side, if a smooth performance is desired, voice and tape is the most reliable format. If any problem should arise, a back-up compact disc or DAT and a back-up player can remedy just about anything that might arise.

This final concern must seem obvious, but the performer must choose a piece that he likes. Electronics will be a new medium and some listening may be required to become familiar with it, but a piece should still speak to the performer in a way that makes him want to take chances. The wall between performer and audience has to be lowered so that the dramatic intention can come out. The dramatic style is often more akin to theater than opera. Sharon Mabry characterizes the modern music singer,

The highly skilled interpreter has the ability to magically transport the audience to an imagined place without the aid of paraphernalia such as sets, costumes, props, or special lighting.[37]

[37] Mabry, 25.

SECTION II: TECHNOLOGY BASICS

The short history of electronic music has an incredibly large junk yard of tools that have been made obsolete within years of being invented. Staying up-to-date with these changes is a full-time job in itself, and even singer-composers like Joan La Barbara, Meredith Monk, and Laurie Anderson do not stay current with all the latest trends. They learn how to use the technology that will serve their vision and then add on to those tools as necessary. Many electronic composers utilize technology in a similar manner, only keeping up-to-date with the equipment that they need.

Frankly, it is virtually impossible to know everything about audio technology and this document will not attempt a detailed discussion. The most common tools and concepts will be defined and categorized in a way that makes the information useful to the performer. Equipment and software concerns will be limited primarily to those that are used for the pieces included in the final section of this document. The majority of this information is not required for the performer and this section has been designed to be somewhat peripheral. For greater insight into electronic music technology, refer to one of the many books on electronic music listed in the bibliography. Some good choices for beginners are: *An Introduction to the Creation of Electronic Music* by Samuel Pellman, *Electronic and Computer Music* by Peter Manning, and *Electric Sound* by Joel Chadabe.[38], [39], [40]

[38] Samuel Pellman, *An Introduction to the Creation of Electroacoustic Music* (Belmont, CA: Wadsworth Publishing Company, 1994).
[39] Manning.
[40] Chadabe.

THE ELECTRONIC "ACCOMPANIST"

In nearly all cases, an audio engineer will be needed to assist the singer during her performance. For pieces and audio set-ups that are less technologically demanding, the person running audio does not have to be a professional engineer. A fellow musician with some basic audio knowledge and a good ear can run the mixing board for a voice and tape piece. For more complicated pieces, such as those that require sound diffusion/projection, live electronics, and interactive computer technology, a sound engineer with more experience will be needed.

Obviously, working with the composer or a trained engineer is the ideal situation since, as with all performance situations, the singer's success relies greatly on the quality of her accompanist (in this case, the engineer). Works for live electronics will most often require an assistant who has experience with processors and samplers. If an engineer is not available, perhaps a musician friend who plays rock-and-roll music could assist the singer in these works. Rock music uses live electronics frequently (e.g.,, guitar effects pedals and vocal processors), so many of these tools, such as live effects, sampling, and looping, are very familiar to them. This also provides an opportunity for some possible audience cross-over. Electronic sound is prevalent in popular music, from the classics like the Beatles and the Grateful Dead to today's techno, trance, and new age genres. Piquing the interest of one rock musician may inspire others to become interested and perhaps the concert halls would start to be filled with new listeners.

For interactive pieces, the performer will often be working directly with the composer, who will satisfy the role of engineer and "accompanist." It is rare for a singer to undertake a work like this without the assistance of the composer due to the complexity of many of these systems. However, if the singer is unable to work with the composer she will have to find an assistant who knows the software and hardware that

are required for the piece. Audio engineers are not necessarily trained to work with interactive computer technology, so it may be necessary to be more imaginative when looking for an assistant. Fortunately, people in many different fields (e.g.,, composers, videographers, choreographers, computer scientists, engineers, and architects) have undertaken the study of interactive computer music, so it may be easier to find an assistant than one might think.

Obtaining equipment for the performance is another concern for the electronic performer. In many cases, the audio assistant will have access to equipment or will know where equipment can be obtained. If this is not the case, there are several other options to consider. For performances that are taking place in an academic setting it is usually possible to arrange an equipment loan from the theater, electronic studio (if applicable), or recording studio. At the very least, someone from one of these departments will probably know where the equipment can be procured. If performing in a professional theater, the audio department will set up the system per the instructions of the singer. If the venue is less conventional, one may have to be more imaginative in obtaining equipment—or it may already be in place. For example, many clubs and small theaters have the tools necessary to support a voice and tape piece.

THE ELECTRONIC EVOLUTION: A CHRONOLOGY

1876: Thomas Edison invents the "phonograph" by storing sound on a brass cylinder

1887: Emile Berliner introduces disc recording (the "gramophone")

1895: Guglielmo Marconi transmits first radio signals

1898: Valdemar Poulsen builds the first magnetic recorder using steel piano wire

1906: Thaddeus Cahill demonstrates his telharmonium (an early keyboard synthesizer);

Lee De Forest invents the triode vacuum tube amplifier (could control electrical current precisely)

1917: AM radio stations begins to appear

1927: Theremin introduced in Europe and the United States (invented in 1920 in Russia)

1928: Ondes martenot debuts in Paris

1929: Laurens Hammond builds the first electronic organ (the Hammond organ)

1931: Electromagnetic pickups applied to traditional instruments (i.e., electric guitar)

1935: Tape recording is invented (used plastic tape coated with iron particles)

1948: High-quality magnetic tape recorders become widely available;
Bell Labs invents the Vocoder, which is capable of speech analysis and synthesis

1953: First-generation computer marketed by IBM (used a vacuum tube)

1955: Olson-Belar sound synthesizer introduced – became known as RCA Mark I

1957: First important work composed by computer (*Illiac Suite* by Hiller and Isaacson);
Max Mathews creates computer-generated sound for the first time

1958: Integrated circuit invented (a.k.a. the "chip")

1959: Columbia-Princeton Electronic Music Center installs RCA Mark II synthesizer;
Second-generation computer marketed by IBM (used transistors)

1960: First minicomputer becomes available (PDP-1)

1962: The audio cassette is invented

1965: The first Moog synthesizer becomes commercially available

1965: Third-generation computer (integrated circuit-based) released (IBM System 360)

1966: Buchla analog synthesizer invented

1971: Arp 2600 portable synthesizer introduced;
Floppy disc invented

1972: Intel manufactures the first microprocessor

1974: An early sampler is built (Mellotron)

1975: First all-digital synthesizers for commercial market introduced (i.e., Synclavier)

1976: First consumer computers available (i.e., Apple II, Commodore, and TRS-80)

1980: Casio introduces its first portable electronic instrument for the consumer market

1981: IBM markets the PC;

MS-DOS operating system invented

1982: Audio CD's introduced

1984: MIDI interface invented

1985: Interactor developed for interactive computer music performance

1986: CSound computer music language released by Barry Vercoe;

MAX program written by Miller Puckette at IRCAM

1987: First consumer DAT (Digital Audio Tape) decks available

1989: Apple introduces the Macintosh Portable (precursor to the Powerbook)

1991: Alesis ADAT invented (allows eight-track digital recording)

1992: Multi-media CD-ROM released;

Sony invents the MiniDisc

1993: Pentium processor invented

1994: Macintosh PowerPC now available (Mac considered the "musician's computer")

1997: DVD-Audio standard develops;

Mac G3 introduced (built on Power PC technology)

2003: Mac G5 introduced

TECHNO-TERMINOLOGY AND BASIC ELECTRONIC MUSIC CONCEPTS

Algorithm: A computer program designed to perform a specific task. In the context of electronic music, algorithms usually describe software building blocks that are designed to create specific effects. All digital effects are based on algorithms.

Amplifier: A device that increases the sound level of an electrical signal. It is required in order to hear electronic sound.

Amplitude: Refers to the sound pressure of a waveform, or the peak voltage in an electrical signal (often used to describe a sound's volume level).

Analog: An electronic signal that varies continuously. The origin of the term is that the signal can be thought of as being 'analogous' to the original sound.

Audio interface: Hardware that connects a sound source with a computer. It is primarily used in interactive electronic works where a computer program like MAX/MSP receives and processes sound from the performer. It is also known as an I/O box (input/output) or a Breakout Box.

Balance: Used to describe the relative levels of the various instruments and voices within a mix (i.e., the loudness of the voice in relation to the loudness of the tape). The term "balance" can also refer to the balance between the right and left channels of a stereo rendering, although the term panning is more appropriate when talking about electronic music.

Capacitor mike: A microphone that uses a small electrical voltage to receive and transmit a signal. They are a bit more expensive and fragile than dynamic microphones, but their delicate circuitry is able to deliver a very high-quality signal that is perfect for the voice and electronic medium. They are also known as condenser microphones.

Cardioid pattern: Literally means "heart-shaped." It describes a microphone that is most responsive to sounds coming from one particular direction (a.k.a. unidirectional microphone). A cardioid pattern is the first choice for amplifying individual instruments, like the voice.

Channel: A single strip of controls on a mixing board. In a voice and tape piece, the singer's microphone will be plugged into one channel and the tape part will be plugged into two channels (one for the right speaker and one for the left).

Chorus: An effect created by doubling a signal and adding a little delay and pitch modulation so as to create the illusion of multiple singers.

Click track: A metronome pulse that a performer may use when a piece requires strict synchronization with a tape.

Clipping: A severe form of distortion that occurs when a signal starts to become too loud for the equipment it is being played through (when the signal is too "hot").

dB: Decibel. The unit used to express the intensity of a sound (i.e., when addressing the sound level in a performance space). This is not the same as "amplitude," which expresses loudness.

Diffusion: The practice of taking a two-channel stereo piece (in most cases) and playing it back on more than two speakers. Its practitioners consider it a performance art because the mixing board operator manipulates the spatial distribution of the sound in real time. Some composers, go so far as to create a musical score for the diffusion of their piece. This score is followed during the performance, just as a musician would follow a score.

Digital: An electronic system that represents data and signals in the form of codes which are comprised of 0's and 1's (binary).

Digital delay: A digital processor for creating delay and echo effects.

Driver: A piece of software that handles communications between the main program and a hardware peripheral (i.e., audio interface).

DSP: Digital signal processor. A microchip is used to process digital signals.

Dynamic mike: A type of microphone that works on the electric generator principle, where a diaphragm moves a coil of wire within a magnetic field. Dynamic microphones do not respond as smoothly as their condenser counterparts, however they are rugged and reliable (preferred for guitar amplifiers and drums).

Enhancer: A device designed to brighten the timbre of audio material.

Envelope: The way in which the level of a sound varies over time.

Envelope generator: A circuit capable of generating a control signal that represents the envelope of the sound that is wanted. The most common of these is the ADSR generator with attack, sustain, decay, and release parameters.

Equalizer: Device for selectively increasing or reducing selected parts of the audio spectrum.

Event: In this case, an event is a single unit of MIDI data, such as a note being turned on or off, etc.

Fader: Sliding controller that is used in mixers and other processors.

Filter: An electronic circuit designed to emphasize or attenuate a specific range of frequencies. For example, a high-pass filter suppresses frequencies that are below a certain frequency level. A bandpass filter removes or suppresses frequencies that are above and below the frequency at which it is set, while frequencies within the band are emphasized.

Flanging: A modulated delay effect that uses feedback to create a dramatic, sweeping sound.

Formant: A frequency component of an instrumental or vocal sound that doesn't change with the pitch of the note being made.

Frequency: The number of cycles of vibration that occur in one second (i.e., A440 is the result of a vibration that cycles 440 times per second).

Frequency response: A measurement of the frequency range that can be handled by a specific piece of electrical equipment or loudspeaker.

Gain: The amount of amplification (another way to refer to volume).

Hardware: Refers to the electronic equipment that forms a computer system.

I/O: The part of a system that handles inputs and outputs, both digital and analog.

Line level: The nominal signal level for semi-professional and professional equipment (i.e., a sound that is already amplified sufficiently).

Microphone level: The low-level signal generated by a microphone. This signal must be amplified many times in order to increase it to line level. Often a separate pre-amplifier is used to boost the microphone level.

MIDI: Musical Instrument Digital Interface. It is a digital language and hardware specification that allows multiple electronic instruments, performance controllers, and computers to communicate with each other over an interconnected network. It is particularly significant because any piece of equipment that has a MIDI port can be connected to any other, regardless of the manufacturer.

Mixer: Device for combining two or more audio signals. It can also be referred to as a mixing console or mixing board.

Monitor: This term has multiple meanings, but for the performer, a monitor is a reference loudspeaker. It enables the singer to hear the electronic accompaniment (and herself, if desired) during the performance.

Multi-track: A recording device capable of recording several parallel parts or tracks which may then be mixed or re-recorded independently.

Operating system: The basic software that enables a computer to load and run other programs.

Oscillator: A circuit designed to generate a periodic electrical waveform (i.e., sine, square, sawtooth, and triangle waves).

Overdub: To add another part to a multitrack recording or to replace one of the existing parts.

Parameter: A variable value that affects some aspect of a device's performance.

Patch: Refers to a single programmed sound within a synthesizer that can be called up using program change commands (a.k.a. “program”). MIDI effects units and samplers also have patches. Some examples of sampler patches would be: “piano,” “guitar,” “rain,” etc.

Phantom power: A 48V DC supply for capacitor microphones that need power (some use a battery instead). It is transmitted along the signal cores of a balanced microphone cable. Most mixers come with phantom power and have a switch that can turn it on and off.

Phaser: A signal processor that combines a signal with a phase-shifted version of itself to produce creative filtering effects.

Pitch shifter: A device for changing the pitch of an audio signal without changing its duration.

Polar pattern: The directional sensitivity of a microphone. Also referred to as a “field pattern.”

Port: A connection for the input or output of data.

Preset: Effects processor or synthesizer patch that cannot be altered by the user (i.e., factory-installed).

Processor: Device designed to treat an audio signal by changing its dynamics or frequency content (e.g., phaser, chorus, flange, etc.)

Real time: An audio process that can be carried out as the signal is being recorded or played back.

Resolution: The accuracy with which an analog signal is represented by a digitizing system. Higher resolution results in a more accurate

representation of the sound. The most commonly used resolutions are 16 bit, 20 bit, and 24 bit.

Reverb: A signal processor for simulating reverberation. These settings are variable depending upon the "space" that is desired. Some common reverb settings are: large hall, small room, and arena.

Ribbon mike: A microphone where the sound capturing element is a thin metal ribbon suspended in a magnetic field. When sound causes the ribbon to vibrate, a small electrical current is generated within the ribbon. The ribbon microphone is prized for its warm, smooth tone quality.

Sample: A digitized sound used as a musical source in a sampler or additive synthesizer. Sampling also refers to the process of converting an analog signal into a digital one. For example, a compact disc has a sample rate of 44.1kHz, which means a measurement of the waveform is taken 44,100 times per second. Sampling is much like connecting the dots. A greater number of dots creates a more accurate picture of the original.

Sawtooth wave: This waveform contains only even harmonics. It is called "sawtooth" because the wave resembles the teeth of a saw.

Sequencer: Device for recording and replaying MIDI data, usually in a multitrack format, allowing complex compositions to be built up a part at a time.

Signal: Electrical representation of input, such as sound.

Signal chain: Route taken by a signal from the input of a system to the output.

Sine wave: The waveform of a pure tone with no harmonics.

Software: Refers to all computer programs. It is considered "soft" because once the program is loaded onto the computer there is nothing tangible, unlike hardware that encompasses all of the actual boxes and devices that are used as part of a computer.

Square wave: A symmetrical rectangular waveform. Square waves contain a series of odd harmonics.

Standard MIDI file: A standard file format that allows MIDI to be transferred between different sequencers and MIDI file players.

Stereo: Two-channel system feeding left and right loudspeakers.

Subtractive synthesis: The process of creating a new sound by filtering and shaping a raw, harmonically complex waveform – much like the sculptor who chisels away at a slab of stone to reveal the sculpture within.

Synthesizer: Electronic musical instrument designed to create a wide range of sounds, both imitative and abstract.

Test tone: A steady, fixed-level tone recorded onto a multitrack or stereo recording to act as a reference when matching levels.

Tracking: A system in which one device follows another. In interactive music, tracking enables a computer to "listen" to the pitches sung by the vocalist. The composer programs the computer to respond to various pitches, volumes, etc. in a compositionally relevant way.

Transducer: A device for converting one form of energy to another. A microphone is a classic example of a transducer as it converts mechanical energy into electrical energy.

Triangle wave: Symmetrical triangular-shaped wave containing odd harmonics only, but with a lower harmonic content than the square wave (less complex timbre).

Vocoder: Signal processor that imposes a changing spectral filter on a sound based on the frequency characteristics of a second sound. By taking the spectral content of a human voice and imposing it on a musical instrument, talking instrument effects can be created.

Voice: In this case, "voice" refers to the capacity of a synthesizer to play a single musical note. An instrument capable of playing 16 simultaneous notes is said to be a 16-voice instrument.

Waveform: A graphic representation of the way in which a sound wave or electrical wave varies with time.

White noise: A random signal with an energy distribution that produces the same amount of noise power per Hz. All the harmonics are present in white noise, therefore it is an excellent source for subtractive synthesis (the idea of chiseling away at the waveform).

XLR: Type of connector commonly used to carry balanced audio signals including the feeds from microphones.

THE SOUND SYSTEM

Concert hall preparation is another unique aspect of electronic music. Instead of rolling a piano onto the middle of the stage and assembling the requisite chairs and stands, a sound system is assembled. A condenser microphone is placed on the stage for the singer. In the center of the hall, a mixing station with all of the necessary equipment is set up so that the sound engineer can hear the balance perfectly and make adjustments as needed (something that would be difficult to do if mixing from a separate sound booth). The balanced output from the mixer is sent to an amplifier and played through loudspeakers.

Sound can be projected into a performance space in several ways. The simplest of these is the stereo approach. Two loudspeakers are placed on stage with the singer. They should be narrowly spaced rather than far apart since most composers do not want the amplification of the voice to change its origination and orientation. If the singer is using a microphone (which is nearly always the case), the loudspeakers should be in a forward position from the singer rather than behind her in order to avoid a very loud and obnoxious noise called “feedback.” A smaller loudspeaker called a “monitor” can be placed on the floor in front of the singer and directed toward her so that she can hear the electronic accompaniment. A unidirectional capacitor microphone should be used for maximum clarity and to avoid feedback.

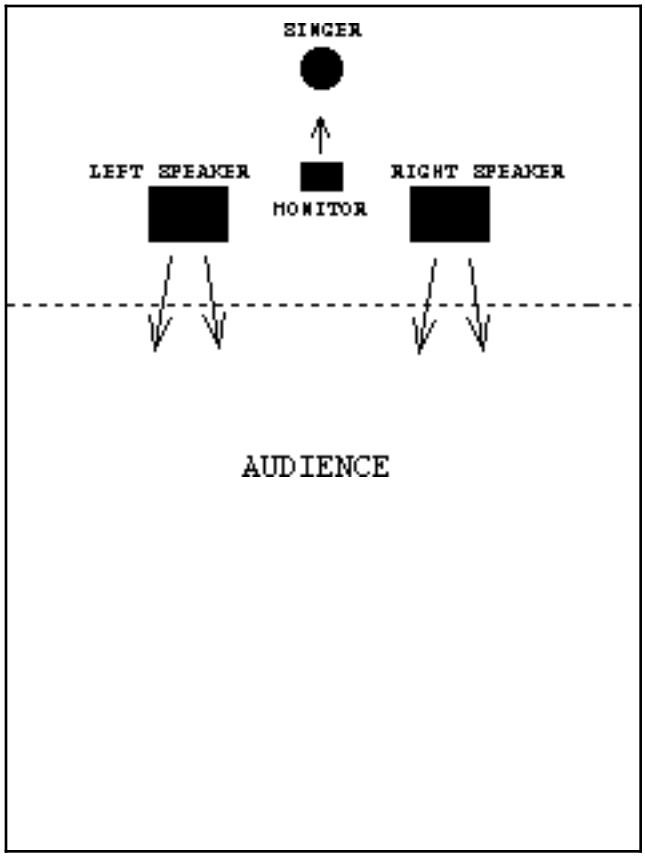

Figure 1: Stereo configuration for a voice and tape piece.

Another approach to sound projection and speaker placement involves the use of many speakers placed throughout the room. This idea of sound projection as an element of performance was perhaps best demonstrated in *Poème Électronique* (1958). Varèse distributed the music to 425 loudspeakers of all shapes and sizes that were located throughout the Philips Pavilion and for the first time, he heard his music "literally projected into space."[41]

In a concert setting, the projection of sound through space is most commonly accomplished with eight speakers, although any number of speakers can be used. There are several possibilities for speaker placement in an eight-speaker system, and in many cases, personal preference governs their positioning.

With the assistance of a mixing board operator, any eight-speaker configuration can create the illusion of sound moving through space. When a piece for live voice and tape is "diffused" in this manner, the amplified voice will take on the role of a disembodied voice if it is not emanating from the two speakers on stage with her. Some composers are interested in that effect as a theatrical tool, but in most cases, the psychoacoustic confusion will detract from the performance. Often composers will include a diagram of how the sound system should be set up.

[41] Chadabe, 61.

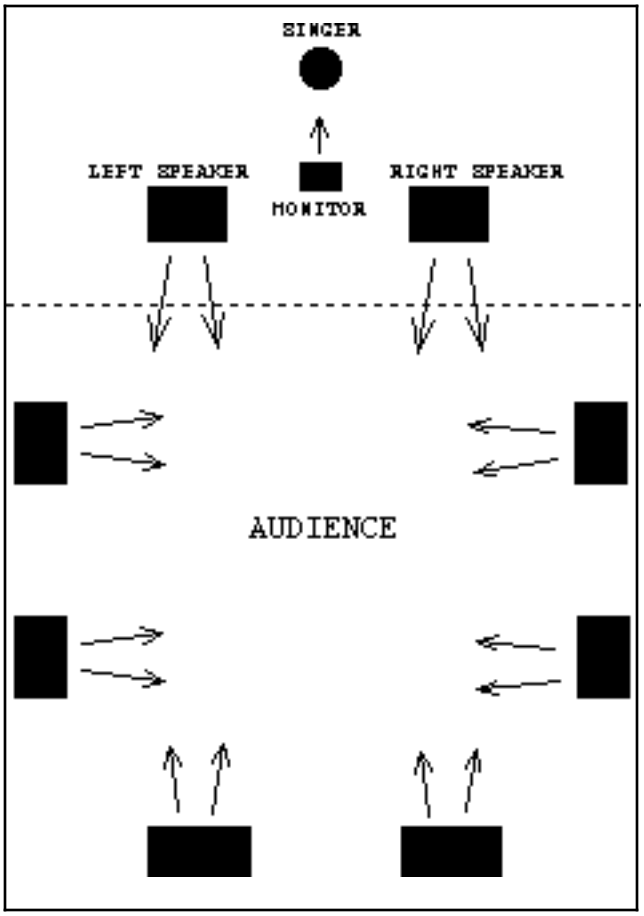

Figure 2: Example of eight-speaker sound diffusion system with singer.

SECTION III: LIST OF WORKS

Instrumentation — This is a little more varied than traditional "instrumentation" category. It includes "tape," "electronics," acoustic instruments, electronic instruments, lighting, actors, puppets, etc.

EVT's — This stands for "extended vocal techniques." A piece may have none, or it may require extensive skill, vocal freedom and expertise.

Equipment — A list of the equipment that is needed for performance. Often the model or brand of machine will have to be substituted due to obsolescence or lack of availability.

For the voice and tape pieces, equipment will only be listed if it is unusual, otherwise assume it only requires CD/DAT playback and an amplification system (microphone, mixer, amplifier, and at least two speakers for stereo sound).

Contact — Provides information about where to find the performance materials for the piece. In most cases, this will be the composer herself, in some cases it is a publishing company.

Recording — If a recording of the performance exists, the company and serial number will be listed.

Duration — This is obvious. Improvisations that have no definite length will be listed as "variable."

Notes — Most often, these will be notes from the composer. Sometimes these will be notes from other sources.

Voice and Tape Works

Composer	Babbitt, Milton (b. 1916)
Title	Philomel (1964)
Instrumentation	live voice, recorded vocal material, and synthesized sound
Text	poem by John Hollander, based on Ovid's *Metamorphoses*
EVT's	basic
Score Notation	traditional
Contact	Contact G. Schirmer/AMP (www.schirmer.com/composers.html)
Recording	New World Records CD 80466-2
Duration	ca. 19 minutes
Notes	from composer

> *Philomel* was commissioned by the Ford Foundation as part of a program enabling solo performers to request pieces from composers of their choice. In this case, the performer was soprano Bethany Beardslee, who since 1950 had been the leading exponent of Babbitt's…[42]
>
> The text is a scenario describing the metamorphosis of the tongueless Philomel into a nightingale. Such an effect demanded a conscious interplay between the natural and electronic elements, the latter being employed to produce a rich polyphonic texture suggesting the atmosphere of the forest in which the event takes place.[43]

[42] Milton Babbitt, *Philomel*, Bethany Beardslee, soprano; digital disc (New Records, 80466-2, 1995).
[43] Manning, P., 176-7.

Composer	Babbitt, Milton
Title	Phonemena (1969/1975)
Instrumentation	voice and tape or voice and piano (study score)
Text	phonemes
Equipment	tape playback (reel-to-reel?)
Score Notation	traditional (piano score)
Contact	C.F. Peters Corp. No. 66641 (out of print)
	Tape part may not be available anymore.
Recording	New World Records CD 80466-2[44], Neuma CD 450-74[45]
Duration	ca. 4 minutes
Notes	from composer

> *Phonemena* was composed, for soprano and piano, 1969; the version for soprano and synthesized tape was realized in 1975. As the title suggests, the vocal "text" consists of English language phonemes, chosen for such acoustical properties as formant frequencies, envelopes, and duration, and compounded and concatenated in the use of the voice as a structured timbral ensemble with the total musical ensemble which it creates with the synthesized sound.[46]

Composer	Babbitt, Milton
Title	Vision and Prayer (1961)
Instrumentation	soprano and synthesized accompaniment
Text	*Vision and Prayer* by Dylan Thomas

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[44] Milton Babbitt, "Phonemena," *Philomel*, Bethany Lynne Webber, soprano; digital disc (New Records, 80466-2, 1995).

[45] Milton Babbitt, et al, *Electro-Acoustic Music: Classics*, Judith Bettina, soprano, et al; digital disc (Neuma, 450-74, 1990).

[46] Babbitt, *Electro-Acoustic Music: Classics.*

EVT's	basic (speech)
Score Notation	conventional
Contact	Contact G. Schirmer/AMP (www.schirmer.com/composers.html)
Recording	CRI CD 521[47]
Duration	ca. 15 minutes
Notes	from Mimmi Fulmer

> Thomas' poetry speaks eloquently of fear of dying, search for and struggle against God, and human attempts to deny the inevitable through sheer force of will. It is a vision of the birth, resurrection, and second coming of Christ, and a prayer against redemption. Christ is entreated to "let the dead lie" for "we have come to know all places, ways, mazes, passages, quarters and graves of the endless fall." It is a prayer "never to awake and arise, for the country of death is the heart's size, and the star of the lost shape of the eyes." This plea to remain damned goes unheeded: the relentless blessing of Christ burns itself even on the unwilling.[48]

Composer	Berlin, David N.
Title	Articulations (1973)
Instrumentation	soprano and tape
Text	phonemes
Score Notation	The tape part is either playing or not (no cues or graphic notation).
Contact	www.davidberlin.com
Duration	5 minutes, 12 seconds

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[47] Milton Babbitt, *Vision and Prayer*, Bethany Beardslee, soprano; digital disc (CRI, 521, 1988).
[48] Milton Babbitt, et al, *20th Century American Vocal Music*, Judith Bettina, soprano; digital disc (Centaur, CRC 2510, 2001).

Composer	Bodin, Lars-Gunnar (b. 1935)
Title	Anima (1984)
Instrumentation	soprano/alto flute and tape
Text	none
EVT's	basic
Score Notation	conventional
Contact	Edition Suecia; Stockholm, Sweden
Recording	Wergo; WER 2027-2
Duration	7 minutes, 21 seconds
Notes	from composer

> I got the initial idea for this piece while reading the Swedish author Sven Fagerberg's essay collection "The Bronze Horses." A central theme in Fagerberg's book is the struggle within a human being to come to a reconciliation with his/her "anima." My composition is highly symbolic, describing this process in musical terms. In the first two thirds of the piece on the three-tone motif of F1, B1, and F2 symbolize the anima which always appears on the tape.
>
> Man is always represented by the live voice. The tone B1 is the "inner core" of the anima and the whole piece aims towards a merge between the live voice and the tape voice on this particular note, which happens eventually in the very end of the piece. The live voice makes repeated "attacks" to penetrate the anima, but has to go through a kind of purgatoric process symbolized by a dense and complex polyphonic choirpart, until the unification takes place. [49]

[49] Lars-Gunnar Bodin, et al, "Anima," *Il nome*, Kersten Ståhl, mezzo-soprano; digital disc (Wergo, WER 2027-2, 1990).

Composer	Bruynèl, Ton (b. 1934)
Title	Denk mal das Denkmal (1984)
Instrumentation	bass baritone and soundtracks
Text	John Paagiviströmn
Score Notation	traditional notation but format a little difficult to read (no text underlay)
Contact	Donemus Amsterdam (www.muziekgroep.nl)
Recording	Bvhaast; CD 9214[50]
Duration	7 minutes, 24 seconds
Notes	from composer

> Certain hopes are more vain than others. The hope behind *Denk mal das Denkmal* was to compose something to play during a lunch-break concert at a disarmament conference. A Utopian dream of demonstrating the vanity of building memorials to the war dead! Sounds, text and visualization of the score are all integral parts of the story.
>
> The electronic sounds create a brooding atmosphere, recalling times "when hats were high and wages low." In the hope that the realization may grow that what history teaches us is that it fails to teach us anything, I dedicate this unsettling message to those "die es nicht gewusst haben."[51]

Composer	Chasalow, Eric (b. 1955)
Title	The Furies (1984)
Instrumentation	soprano and electronic sounds
Text	four poems by Anne Sexton
EVT's	basic

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[50] Ton Bruynèl, *Looking Ears 1*, Lieuwe Visser, bass-baritone; digital disc (Bvhaast, CD9214, 1994).

[51] Ton Bruynèl, *Denk mal das Denkmal.* (Amsterdam: Donemus, 1984).

Score Notation	conventional; precise synchronization is critical
Contact	chasalow@brandeis.edu
Duration	14 minutes
Notes	from composer

> I chose these poems because of their intensely personal expression and highly charged emotional atmospheres. These qualities are heightened by the electronic tape, which not only serves as an accompaniment, but actually melds with the voice at times. The four songs…span a range of emotions from sardonic to tragic, but I have tried not to forget that humor and wit are important musical qualities as well.[52]

Composer	Cage, John (1912-1992)
Title	Aria (with Fontana Mix) (1958)
Instrumentation	voice and tape
Text	indeterminate arrangements of phonemes from five languages
EVT's	advanced
Score Notation	graphic; challenging
Contact	www.edition-peters.com
Recording	Time Records, 58003 (LP) (out of print)
Duration	ca. 10 minutes
Notes	from composer

> *Fontana Mix* and *Aria* are two separate pieces, although capable of being performed simultaneously, which has been done and recorded here. *Fontana Mix* (1958) consists of several tapes which can be played simultaneously over different loudspeakers and, regarding its composition, it consists of several

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[52] Eric Chasalow *The Furies*, (self-published, 1984).

transparencies which may be placed upon each other in any way and can be read as indications for the production of such tapes. [53]

Composer	Dodge, Charles (b. 1942)
Title	The Waves (1984)
Instrumentation	voice and tape
Text	from Virginia Woolf's, *The Waves*
Score Notation	quite traditional, but some specialized notation is necessary
Contact	Charles.M.Dodge@dartmouth.edu
Recording	New Albion; NA043[54]
Duration	12 minutes, 30 seconds

Composer	Dusman, Linda (b. 1956)
Title	Dindirindin (1989)
Instrumentation	soprano and tape
Text	anonymous Spanish Renaissance text
Score Notation	conventional
Contact	dusman@umbc.edu
Recording	Neuma; 450-87
Duration	8 minutes, 31 seconds
Notes	from composer

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[53] John Cage, et al, *Aria (with Fontana Mix)*, Cathy Beberian, voice; phonograph disc (Time Records, 58003, year uncertain).

[54] Charles Dodge, *Any Resemblance is Purely Coincidental*, Joan La Barbara, mezzo soprano; digital disc (New Albion, NA043, 1992).

In this piece I have combined a phonemic treatment of the text with the timbres developed using FM synthesis to create an essentially monophonic line. The two elements of that line, the voice and the tape, can be heard as both reflections and developments of one another. Another conceptual catalyst for the creation of *Dindirindin* is the very idea of taking an old song and re-using it. On one hand, I have treated it as an organic substance that can grow and develop, and on the other hand as an organic substance that has died and is in a state of decay.[55]

Composer	Emmerson, Simon (b. 1950)
Title	Sentences (1991)
Instrumentation	soprano and live electronics
Text	Whitman, Thoreau, and Shakespeare
EVT's	expert
Equipment	Quadraverb (or similar reverb); Yamaha SPX90 (or similar processor); microphone; pedal controller (for engineer); mixing board; sound system (sound projection)
Score Notation	modern; score for engineer as well
Contact	www.bmic.co.uk for downloadable scores S.Emmerson@city.ac.uk for tape part
Recording	with score
Duration	12 minutes, 40 seconds
Notes	from composer

The work seems to mediate several 'poles': the obvious onomatopoeia linked to word association – 'mimesis' – with the more abstract demands of electroacoustic sounds and their combination. So the cycle moves from the declamation of the Whitman – an influence of the Futurists and hence the lettriste tradition –through

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[55] Linda Dusman, et al, *Electro Acoustic Music III*; digital disc (Neuma, 450-87, 1994).

the symbolic impressionism of the Thoreau to the increasingly fragmented 'deconstruction' of the Shakespeare, in which single words conjure up whole images, to the final dissolution into 'semantic noise' (Berio's phrase).

The work was written specifically for the idiosyncrasies of two well-known sound processors of the 1980's (the Alesis *Quadraverb* and Yamaha's ubiquitous *SPX90*) though future versions will be made as new equipment becomes available.[56]

Composer	Emmerson, Simon
Title	Time Past IV (1984)
Instrumentation	soprano and tape
Text	William Shakespeare
EVT's	advanced
Score Notation	traditional staff notation; time governed by timeline
Contact	www.bmic.co.uk for downloadable scores
	S.Emmerson@city.ac.uk for tape part
Recording	Continuum; CCD 1056
Duration	12 minutes, 22 seconds
Notes	from liner notes

Time Past IV…was a commission from Jane Manning with funds made available by the Arts Council of Great Britain. It won first prize in the Bourges International Electroacoustic Awards 1985. Short vowels and consonants were fed into a Fairlight Computer Music Instrument. These were manipulated into echoes, drones, and textures…This work is in the form of a melancholic reverie, and is based on two transpositions of a single hexachord each retuned (on the

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[56] Simon Emmerson, *Sentences* (self-published, 1991).

tape) to lie on the harmonic series of low fundamentals of B flat and F…The text is from Shakespeare's *Sonnet XXX*.[57]

Composer	Felciano, Richard (b. 1930)
Title	Glossolalia (1967)
Instrumentation	electronic tape, percussion, baritone (or dramatic tenor), and organ
Text	Psalm 150
EVT's	advanced
Score Notation	somewhat traditional; cues marked
Contact	composer (felciano@cnmat.berkeley.edu)
Recording	Cambridge Records, 78-750049 (out of print)
Duration	11 minutes, 19 seconds
Notes	from composer

Glossolalia was commissioned by Robert Snow for the dedication of a new organ in St. John Fisher Church, Pittsburgh, Pennsylvania. The Latin text is exploited for its phonic qualities as well as its literal meaning, and the effect of glossolalia (speaking with tongues) is often the result. The work is a ritual in that the central instrument, the organ, is invoked from the outset by the others; the organ takes aural shape only gradually, the sound of its bellows being heard before the sounds of its pipes, attaining full definition only at the end.

Since its premiere in 1967, *Glossolalia* has become a kind of classic of American organ literature, having influenced a number of other works and signaled the beginning of a rich period of collaboration between composers in electronic media and American organists.[58]

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[57] Simon Emmerson, *The Music of Simon Emmerson*, Jane Manning, soprano; digital disc (Continuum, CCD 1056, 1993).

[58] Richard Felciano, et al *Glossolalia*, Marvin Klebe, baritone; phonograph disc (Cambridge Records, 78-750049, 1978).

Composer	García, Orlando Jacinto (b. 1954)
Title	Sitio sin nombre (1990)
Instrumentation	soprano and tape
Text	by composer (in Spanish)
EVT's	expert
Score Notation	timing cues and written cues
Contact	garciao@fiu.edu
Recording	O.O. Discs, inc.; #6
Duration	22 minutes, 31 seconds
Notes	from composer

> All of the electro-acoustic works employ a certain amount of performer improvisation primarily with respect to the choice of rhythms. In the case of the work for Joan La Barbara the sound source was Ms. La Barbara's voice which was sampled and then manipulated by computer.[59]

Composer	Ivey, Jean Eichelberger (b. 1923)
Title	Terminus (1970)
Instrumentation	mezzo soprano voice and two-channel tape
Text	Ralph Waldo Emerson
EVT's	basic
Equipment	probably reel-to-reel
Score Notation	combines a timeline with fairly traditional notation
Contact	Carl Fischer, Inc., www.carlfischer.com
Recording	Folkways Records; FTS 33439 (LP) (out of print)

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[59] Orlando Jacinto Garcia, *La Belleza del Silencio*, Joan La Barbara, soprano; digital disc (O.O.Discs, 6, 1991).

Duration	10 minutes
Notes	from composer

> The tape runs continuously and can, if necessary, be operated by the performer, who needs only to start it running. But this practical advantage means that the performer is collaborating throughout with a partner that will neither hurry nor delay, stop nor give visual cues! The close coordination which, I hope, emerges, demands from the performer careful attention to timing and to the notation of tape cues in the score. However, I find it advisable to aim at precise synchronization only at certain points, granting some leeway at others, so as to give the performer some scope for spontaneity in the tempo and spacing of the part.[60]

Composer	Karpen, Richard (b. 1957)
Title	Il Nome (1987)
Instrumentation	soprano and tape
Text	*Il nome di Maria Fresu*, by the Italian poet Andrea Zanzotto
EVT's	basic
Score Notation	traditional vocal score; graphic tape score
Contact	Semar, (www.semarweb.com)
Recording	Wergo, WER 2027-2
Duration	14 minutes, 45 seconds
Notes	from composer

> Maria Fresu was one of the 84 people killed in the August 2, 1980 bombing of the train station in Bologna, Italy (attributed to the neo-fascist group "Avanguardia Nazionale"). She was blown-up beyond any identification. The names of those killed in this bombing form a memorial on a wall of the reconstructed train station. Along with Zanzotto's poem, the text for Il Nome includes a short

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[60] Ivey, Jean Eichelberger, *Music by Jean Eichelberger Ivey, Elaine Bonazzi, mezzo soprano; phonograph disc (Folkways, FTS 33439, 1973).*

passage from the libretto of Monteverdi's "L'Orfeo." The Zanzotto text appears in fragments, not always in the correct order, until near the end of the piece when the poem is sung through from beginning to end.

Il Nome was composed for the soprano Judith Bettina whose voice is also the basis for much of the tape part. All of the vocal sounds on the tape (including the "non-western" chant-like singing) were derived from recordings of Ms. Bettina's voice. I also used recordings of breaking glass, a single note played on a violin and a tomtom.[61]

Composer	Lillios, Elainie (1968)
Title	Earth Ascending (2000)
Instrumentation	female voice, electroacoustic music and video
Text	Jeni Couzyn, Jehanne Mehta, and Cynthia Fuller
EVT's	advanced
Equipment	CD/DAT playback, sound diffusion system, microphone, video projector and screen, video in Digital Beta, Beta SP, S-VHS, and regular VHS formats.
Score Notation	modern notation; timeline and graphic tape score
Contact	composer (lillios@bgnet.bgsu.edu)
Recording	SEAMUS; volume 11[62]
Duration	ca. 16 minutes
Notes	from composer

Earth Ascending is a three-movement work for female voice, electroacoustic music, and video based on the poetry of three contemporary women poets. Each

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[61] Richard Karpen, et al, *Il nome*, Judith Bettina, soprano; digital disc (Wergo, WER 2027-2, 1990).
[62] Elainie Lillios, et al, *Music from SEAMUS, volume 11*, Deborah Norin-Kuehn, soprano; digital disc (SEAMUS, EAM-2002, 2002).

text presents a unique journey or experience, yet their combination creates a structure unified by interwoven themes and images.

This piece was commissioned by ASCAP and SEAMUS through the ASCAP/SEAMUS Student Commission Competition. [63]

Composer	Link, Stan
Title	Groundswell (2002)
Instrumentation	soprano, recitation and computer-generated accompaniment
Text	Mark Jarman
EVT's	basic
Equipment	note: a second microphone will be needed for the actor
Score Notation	vocal fairly traditional; tape graphic; timeline and temporal cues
Contact	composer (stan.b.link@vanderbilt.edu)
Recording	with score[64]
Duration	19 minutes

Composer	Lopez, Tom (b. 1965)
Title	Hollow Ground II (1996)
Instrumentation	voice and tape (also exists for tape alone)
Text	none
EVT's	basic
Score Notation	traditional
Contact	composer (www.firstwavemusic.com)

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[63] Elainie Lillios, *Earth Ascending* (self-published, 2000).

[64] Stan Link, *Groundswell* (self-published, 2002).

Recording	SEAMUS; EAM-9801
Duration	10 minutes, 40 seconds
Notes	from composer

> there are no subjects – this is us
> there are no nouns – this, is the place
> there are no verbs – it is movement
> there are no words – this, is a story[65]

Composer	Marx, Günter (b. 1943)
Title	Elpoem (1993-95)
Instrumentation	mezzo soprano and electroacoustic tape
Text	Eduard Mörike
Score Notation	vocal score, traditional; tape score, graphic
Contact	composer (guenter-marx@gmx.de)
Duration	16 minutes, 20 seconds
Notes	from composer

> *Elpoem* is inspired by and written for Ursula Wick. The five poems of very different character illustrate very diverse aspects of love. Heterogeneous is also the choice of sounds. Different from most suchlike pieces in *Elpoem* no transformed voice materials are used for the accompaniment, but mostly synthetic sounds from various synthesizers and samplers. Similar to the traditional song with piano, where the timbres of a violin or flute would not be found, the more percussive piano is used.[66]

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[65] Tom Lopez, et al, *Music from SEAMUS, volume 7*, Larisa Montanaro, soprano; digital disc (SEAMUS, EAM-9801, 1998).

[66] Günter Marx, *Elpoem* (self-published, 1996).

Composer	McLean, Priscilla (b. 1942)
Title	In the Beginning (2001)
Instrumentation	soprano voice, delay and digital processors, live mixing, and tape
Text	collage of ancient myths (Babylonia, Greece, Hindu, Zuni, etc.)
EVT's	expert
Equipment	Yamaha SPX-1000 (or similar); mixing board, CD/DAT playback, microphone, stereo playback system; Videonics mixer and video projector optional
Score Notation	modern (graphic); timeline; separate score for SPX
Contact	composer (McLMIX@aol.com)
Recording	Capstone; CPS-8663 CD
Duration	15 minutes, 24 seconds
Notes	from composer

> *In the Beginning* is a tour de force for a brave soprano! These electronics are basically settings for the Yamaha SPX 1000 effects processor, which is probably not available anymore, which means that the settings would have to be adjusted for any similar processor.
>
> *In the Beginning* is also a live video piece, where the soprano's face is projected onto a video screen showing an art video of the ocean, and her image is altered through a Videonics video mixer, performed by the same person who is adjusting the effects processors.[67]
>
> "In the beginning there is no sun, no moon, no stars. All was dark, and everywhere there was only water." (ancient Maidu belief). Created by Priscilla McLean for the McLean Mix…[it uses] the composer's voice for all but one or two taped sounds…her voice is stretched over several octaves, and ranges from

[67] Priscilla McLean, personal email correspondence, 2004.

choir singing to percussive and extended vocal effects, while the live voice, processed by echo and delays, creates a virtuosic display of its own.[68]

Composer	Mefano, Paul (b. 1937)
Title	They (1974)
Instrumentation	Voice and tape (self-made tape)
Text	composer
EVT's	advanced
Equipment	multi-track recorder (12 tracks) and a recording assistant
Score Notation	traditional
Contact	Editions Salabert, (www.salabert.fr)
Duration	variable
Notes	from composer

The crowd is suggested by a splintered mirror multiplying the image of Narcissus, a single singer superposes twelve vocal actions without any manipulation. For the concert, he sings one of the voices (whichever he likes), the other eleven being diffused by loudspeakers at the same sound level. If the hall is equipped with a 12-track tape, ideally the public should be surrounded by twelve sources (at the least, a stereo recording can be diffused). [69]

Composer	Melby, John (b. 1941)
Title	Two Stevens Songs (1975)
Instrumentation	soprano and computer-synthesized tape
Text	Wallace Stevens

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[68] Priscilla McLean, *Fantasies for Adults and other Children*, Priscilla McLean, voice; digital disc (Capstone, CPS-8663, 1999).

[69] Paul Mefano, *They* (Paris: Editions Salabert, 1985).

Score Notation	traditional
Contact	G. Schirmer, Inc. (www.schirmer.com) or (www.johmelby.com)
Recording	Composers Recordings, Inc., CRI SD 364 (LP) (out of print)
Duration	9 minutes
Notes	from composer

> The poetry of Wallace Stevens lends itself particularly well to musical settings… The reason for the great degree of compatibility between Stevens' poetry and music may have something to do with the ambiguity present in most of his poems, many of which can be interpreted in rather fundamentally different ways, all of which may be reasonable and equally valid approaches. This aspect of Stevens' work has attracted me for a number of years. [70]

Composer	Miller, Scott L. (1966)
Title	Low Hangs the Moon (2001)
Instrumentation	soprano, piano, and CD
Text	Walt Whitman
Score Notation	traditional
Contact	composer (slmiller@stcloudstate.edu)
Duration	7 minutes, 3 seconds
Notes	from composer

> *Low Hangs the Moon* is a setting of a portion of text from Walt Whitman's *Sea-drift: Out of the Cradle Endlessly Rocking.* In this poem, Whitman transcribes the song of a solitary bird nesting by the sea whose mate did not return to the nest one day, apparently having met with tragedy.

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[70] John Melby, et al, *International Electronic Music*, Phyllis Bryn-Julson, soprano; phonograph disc (Composers Recordings, Inc., 1976).

For this version, occasional estimations of time are provided in the score, however, it is not intended that there be a rigid synchronization of events between the voice, piano, and/or electroacoustic part. It is often left for the performers to choose the most aesthetically pleasing coordination of events, and liberal margins for interpretation have been composed into the work. The performance should be fluid and gentle, never mechanistic nor rushed.[71]

Composer	Montanaro, Larisa (b. (1972)
Title	Moon (1996)
Instrumentation	voice and tape
Text	Frances Horovitz
EVT's	basic
Score Notation	traditional; graphic notation in tape part
Contact	composer (www.larisamontanaro.com)
Recording	with score
Duration	5 minutes, 40 seconds
Notes	from composer

In *Moon*, the tape serves to illuminate the text that the voice is presenting. At some points, the voice sings a duet with the recorded singer, while at others the tape provides the space in which the singer performs. The wonderfully descriptive poetry of Frances Horovitz inspired this piece.

Composer	Morrill, Dexter (b. 1938)
Title	Six Dark Questions
Instrumentation	soprano and computer-generated tape

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[71] Scott L. Miller, *Low Hangs the Moon* (self-published, 2001).

Text	George Hudson
EVT's	advanced
Equipment	designed for soprano and a single electronic speaker (do not use more traditional stereo set-up)
Score Notation	some traditional; some shape notation; some graphic
Contact	Chenango Valley Music Press (penntech-records.com/cvmp)
Recording	Redwood Records, ES 13[72] (out of print)
Duration	14 minutes
Notes	from composer

> This "computer chamber music" is meant to have smaller volume of sound, and a reasonable balance of activity between the solo voice and the loudspeaker. The idea of a loudspeaker drama suggested using only one speaker on center stage, which would tend to give the music a strong focus. George Hudson collaborated closely with me on much of the detail of the musical gestures and the shape of the movements. Most of the compositional ideas grew directly out of the text, and Neva Pilgrim also contributed ideas as the work progressed in late 1978. The idea of the loudspeaker as a narrator, and as a potential partner in duet, is initially stated in very simple terms, by rhythmic means, or in a "give and take" texture resembling a conversation. As the movements progress the interaction is more subtle and less obvious, so that some of the loudspeakers words are stated in musical terms…The work is essentially tonal in design, with a few microtonal passages which are meant to accent the depth and descending quality found in the bridge scene (III)…Except for Neva Pilgrim's voice on tape, all of the loudspeaker sounds are synthetic.[73]

[72] Dexter Morrill, et al, *Computer Music from Colgate, volume 1*, (California: Redwood Records, 1979).

[73] Dexter Morrill, *Six Dark Questions* (Hamilton, NY: Chenango Valley Music Press, 1979).

Composer	Nelson, Jon Christopher (b. 1960)
Title	They Wash Their Ambassadors in Citrus and Fennel (1994)
Instrumentation	mezzo soprano and tape
Text	Robert Gregory
EVT's	expert
Score Notation	traditional and graphic notation
Contact	composer (www.music.unt.edu/comp/faculty/jnelson.html)
Recording	Society for Electro-Acoustic Music in the U.S., EAM-9801[74]
Duration	12 minutes, 40 seconds
Notes	from score (self-published)

> Dedicated to Joan La Barbara, who commissioned the work. The composition's incorporation of a variety of extended vocal techniques is inspired by La Barbara's use of the voice. Its formal structure is greatly influenced by both the larger design and internal form of Gregory's poem. This poem is of special interest to me because of its many internal cross-references.[75]

Composer	Nono, Luigi (b. 1924-1990)
Title	La Fabbrica Illuminata (1964)
Instrumentation	soprano and electronic tape for four channels
Text	Cesare Pavese
EVT's	advanced
Equipment	four-channel player, four-channel speaker system
Score Notation	timing cues and written cues; handwritten score

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[74] Jon Christopher Nelson, et al, *Music from SEAMUS, Volume 7*, Heidi Dietrich Klein, mezzo soprano; digital disc (SEAMUS, EAM-9801, 1998).

[75] Jon Christopher Nelson, *They Wash Their Ambassadors in Citrus and Fennel* (self-published, 1994).

Contact	Ricordi (www.ricordi.co.uk)
Recording	Wergo, WER 6038-2[76] (CD)
Duration	16 minutes, 36 seconds
Notes	from Peter Manning

> *La fabbrica illuminata*…is an aggressive commentary on the plight of the industrial worker, constructed from electronically treated recordings of factory sounds and choral singing. Over this scenario the soprano sings an impassioned protest against the tyranny of human exploitation.[77]

Composer	Olan, David (b. 1948)
Title	After Great Pain (1982)
Instrumentation	soprano and electronic sounds
Text	five poems of Emily Dickinson
Score Notation	traditional
Contact	composer (dolan@gc.cuny.edu)
Recording	Composers Recordings Inc, CD 565
Duration	9 minutes, 43 seconds
Notes	from composer

> Here the starting point was less the desire to exploit relationships between the live and electronic media than to evoke the profound but austerely concentrated emotion of the text. The piece was written for Judith Bettina, who gave its premiere in November 1982. Her distinctive sound and musicality strongly influenced the electronic sounds I chose to use.
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> The range of relationships between voice and tape is a response to the varying intensities of the text. The emotional foci of the work are in the second and fourth

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[76] Luigi Nono, *La Fabbrica Illuminata*, Barbara Miller, soprano; digital disc (Wergo, WER 6038-2, 1992).
[77] Manning, 159.

poems where Dickinson projects an almost incandescent absorption in the experience of loneliness and pain. There the tape tends to be most concentrated and integrated with the voice. The other three poems are more outward-looking, offering some promise of release; their settings encompass a wider range of tape gestures and greater independence between voice and tape.[78]

Composer	Pape, Gerard (b. 1955)
Title	The Sorrows of the Moon (La Tristesse de la Luna) (1986)
Instrumentation	baritone and tape
Text	Charles Baudelaire
EVT's	basic (sprechstimme)
Score Notation	traditional; silences separate phrases
Contact	composer (100422.1771@compuserve.com)
Recording	Mode, 26
Duration	11 minutes, 35 seconds
Notes	from composer

This is a work for live baritone voice, taped soprano voice, and electronic tape. It is a setting of Baudelaire's poem *The Sorrows of the Moon*. The work conveys the erotic, dream-like atmosphere of the poem through chromatic melody and thick, slow moving harmonies that create the experience of suspended time. The baritone voice is meant to be the voice of the poet in duet with his muse, represented by the taped soprano voice. In performance, the baritone wears a cape or some other costume to convey the "dandy" aspect of Baudelaire. The poem is first sung in French and then in English. Various electronic sounds were used, including samplers and synthesizers, and the live and taped voices were

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[78] David Olan, et al, *After Great Pain*, Judith Bettina, soprano; digital disc (Composers Recordings, Inc., CRC 565, 1988).

digitally reverberated to create the special poetic “space” from which the work emerges.[79]

Composer	Pape, Gerard (b. 1955)
Title	Two Electro-Acoustic Songs (1993)
Instrumentation	soprano, flute and tape
Text	Dahlia Ravikovitch
EVT’s	expert
Equipment	charts provided in score for sound projection system
Score Notation	modern
Contact	composer (100422.1771@compuserve.com)
Recording	Mode; Mode 67
Duration	23 minutes, 20 seconds
Notes	from liner notes

Two Electro-Acoustic Songs was commissioned by Leonore Gerstein of Ann Arbor, Michigan and is dedicated to her. The two songs use the original Hebrew texts of two poems by the Israeli poetess, Dahlia Ravikovitch, *Time Caught in a Net* and *On the Road at Night*.[80]

Composer	Rees, Michael
Title	Mantis (1995)
Instrumentation	soprano chanteuse and taped electronic sounds
Text	Suzanne Greathouse

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[79] Gerard Pape, *Sorrows of the Moon*, et al, Thomas Buckner, baritone; digital disc (Mode, 26, 1991).
[80] Gerard Pape, *Electroacoustic Chamber Works*, Janet Pape, soprano, Cécile Daroux, flute; digital disc (Mode, 67, 1998).

Score Notation	traditional
Contact	composer (null@localnet.com)
Duration	8 minutes, 42 seconds
Notes	from composer

> The composition grew from the intersections of the poem's formal and dramatic structures, and extracts from sets of data generated by a self-similar process… Eventually, the thing took shape as a composition for a soprano accompanied by some sort of surreal string ensemble. It all hinges on the interactions between the poem and the algorithmically generated music events, which were reconciled with the shapes and structures of the poem.[81]

Composer	Reynolds, Roger (b. 1935)
Title	The Palace (Voicespace IV) (1980)
Instrumentation	baritone voice and computer-generated tape
Text	Jorge Luis Borges
EVT's	advanced
Equipment	Quadraphonic amplification system
Score Notation	traditional and graphic notation
Contact	C.F. Peters Corp. (www.edition-peters.de)
Recording	Lovely Music, LCD 1801[82] (out of print)
Duration	16 minutes, 30 seconds
Notes	from composer

> *The Palace* combines the computer-processed speaking voice of singer Philip Larson with a live vocal line that alternates between the lyrical countertenor register and that of a dramatic baritone. Based upon the singular poem of the

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[81] Michael Rees, *Mantis* (self-published, 1995).

[82] Roger Reynolds, *Voicespace*, Philip Larson, baritone; digital disc (Lovely Music, LCD 1801, 1992).

same title by Jorge Luis Borges, the work explores different aspects of, different perspectives upon his words. In particular, two ideals guided the vocal approach to the original reading of the text for recording, its processing on the computer system, and the live lyrical lines: *active authority* and *reflective authority*…By the close of the piece, the vocalist's utterances, at first unintelligible, though structured, become explicit: "I know that I am not dead."[83]

The reader [of the recorded poem], Philip Larson, a singer highly experienced in experimental vocal music, has an extraordinary voice with a four octave range. For *The Palace,* Larsen recorded Tibetan Chant drone tones with reinforced harmonics, in addition to various speaking voices. The computer processing of the recorded voice consisted primarily of filtering, exaggerated reverb, spatial location, and the processed voice in choruses.[84]

Composer	Risset, Jean-Claude (b. 1938)
Title	Inharmonique
Instrumentation	soprano and tape
Text	sounds, vowels, and other effects
EVT's	advanced
Score Notation	traditional and graphic notation with timeline and cues in tape parts
Contact	composer (jcrisset@lma.cnrs-mrs.fr)
Recording	INA.GRM, INA C 1003[85]
Duration	14 minutes, 40 seconds
Notes	from composer

Inharmonique combines the voice of the soprano with a tape of computer-synthesized sounds. During most of the piece, the tape sounds are made up of

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[83] Roger Reynolds, *The Palace* (New York: Edition Peters, 1981).

[84] Charles Dodge and Thomas A. Jerse, *Computer Music: Synthesis, Composition, and Performance* (New York: Schirmer Books, 1997), 332-4.

[85] Jean-Claude Risset, *Inharmonique*, Irène Jarsky, soprano; digital disc (INA.GRM, INA C 1003, 1987).

"inharmonic" components, whose frequencies do not relate to each other as the numbers 1, 2, 3, 4 ... Such configurations are rarely found in instrumental and vocal sounds. The internal structure of the sounds brings out different relations between them.

The piece opens with noise bands in motion. Pure sounds then emerge and gather in increasingly rich layers. The voice first appears in the background, then it eventually breaks through the curtain of artificial sounds. It elaborates on the note A, whose harmonics are taken up by the tape. The pitch intervals broaden. The tape introduces imaginary bells, composed like chords, which then break up into fluid textures (this is obtained by transforming the temporal profile of its components without modifying their frequencies). The voice's intrusions become sparse but increasingly dramatic. The tape distantly echoes the voice (recorded and modified by computer). The singer's breath is submerged in surging bands of noise.

The tape was synthesized by computer at IRCAM. *Inharmonique* is dedicated to Irène Jarsky who inspired it and who enriched the vocal portions.[86]

Composer	Risset, Jean-Claude (b. 1938)
Title	Invisible (1996)
Instrumentation	soprano and tape
Text	Tchouang-Tseu, Wang Wei, Lao Tseu, Dante, Basho, Heine, Goethe, Longfellow, Leopardi, and Italo Calvino.
EVT's	advanced
Score Notation	traditional and graphic notation with timeline and cues in tape part
Contact	composer (jcrisset@lma.cnrs-mrs.fr)
Recording	G.M.E.M., EI 06[87]

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[86] Jean-Claude Risset, *Inharmonique* (self-published, 1977).

[87] Jean-Claude Risset, *Invisible*, Irène Jarsky, soprano; digital disc (Mnémosyne Musique Média, LDC 278 067, 1999).

Duration	19 minutes, 25 seconds
Notes	from composer

Many of the sounds which dialogue with the voice do not come either from a physical world that can be seen and touched. Sonic transformations bring the voice in a fictitious, virtual acoustics, which is not the audible trace of mechanical vibrations in a material world. Resorting to digital synthesis and processing permits to implement immaterial processes, to produce illusory bells, gongs and voices, to set the sounds in imagined spaces similar to Calvino's invisible cities - even though Calvino's imagination is more agile and varied than the sound simulacra we are able to produce. As stated by the Chinese poet and painter Wang Wei, things must be both present and absent.

Without trying to translate into music the many themes found in the works of Tchouang-tseu and the mythical cities described by Calvino, the metaphorical suggestions of *Invisible* attempts to evoke through sound images some haunting schemes of these texts.[88]

Composer	Risset, Jean-Claude
Title	L'Autre Face (1983)
Instrumentation	soprano and tape
Text	Roger Kowalski
EVT's	expert
Score Notation	non-traditional notation with timeline; cues in tape part
Contact	composer (jcrisset@lma.cnrs-mrs.fr)
Recording	Wergo, WER 2027-2[89]
Duration	11 minutes, 15 seconds
Notes	from composer

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[88] Jean-Claude Risset, *Invisible* (self-published, 1996).

[89] Jean-Claude Risset, et al *L'Autre Face*, Irène Jarsky, soprano; digital disc (Wergo, WER 2027-2, 1990).

In this piece, the soprano dialogues with a tape generated by computer. The form of the piece was influenced by a poem…even though I only discovered when the tape was already begun: the text elements and their relationships struck me as related to those on which I was working.

The poem is sung in a lyrical and expressionist style, calling for non-conventional singing techniques: high pitches, inhaled sounds, voice split into multiphonics, vocal harmonics. In counterpoint with the voice, the tape exposes motives and textures synthesized or processed with the MUSIC V program. I used only a few instrumental tones processed by computer: Most of the tape sounds are synthetic, for instance sustained tones are "animated" by proper beats, trills undergoing gradual changes, pseudo-drums scanning time. I also resorted to the computer to generate serial developments and harmonic clouds emanating from specified chords. Quasi-vocal syntheses - uttered by no one's voice - are like virtual counterparts of the soprano live on stage. At the end, the soprano's part is entangled with sinuous melodic lines traveling in space and dwindling in the treble.

The piece is dedicated to Irène Jarsky, whose vocal invention enriched the vocal part.[90]

Composer	Risset, Jean-Claude
Title	Mokee (1996)
Instrumentation	bass voice and piano with optional tape; also a version for soprano
Text	Joseph Shepperd
EVT's	basic
Score Notation	traditional
Contact	composer (jcrisset@lma.cnrs-mrs.fr)
Recording	with score
Duration	ca. 10 minutes

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[90] Jean-Claude Risset, *L'Autre Face* (self-published, 1983).

Notes from composer

Mokee was commissioned by the Groupe de Musique Electroacoustique d'Albi for the duet Jacques Bona, bass voice, and Martine Joste, piano. An optional magnetic tape realized by computer intervenes three times.

"Mokee" means "death" in the Hopi language. The work evokes the extinction of five hundred Indian tribes since the arrival of Columbus in America: it took inspiration from a poem by Joseph Shepperd, "Quincentenary of extinction," which lists the names of these extinct tribes - the feeling of dwindling and loss is reinforced by the gradation of the successive names - shorter and shorter - and by the "decrescendo" typography. The text for *Mokee* comprises about fifty names of extinct tribes.

The magnetic tape begins, reminding of gongs and drums. The singing evokes the tribes through verses which get shorter and shorter, accompanied by a piano part of decreasing density. The piano mingles with a tape episode which remembers the beginning, the voice vocalizes, then the singing, the piano and the tape return to silence.[91]

Composer	Rubin, Anna (b. 1946)
Title	Remembering (1989, revised 1993)
Instrumentation	soprano (mezzo), piano and tape
Text	from Hebrew Kaddish
EVT's	basic
Score Notation	traditional
Contact	composer (airubin@umbc.edu)
Recording	SEAMUS; EAM-9301
Duration	14 minutes, 44 seconds
Notes	from composer

[91] Jean-Claude Risset, *Mokee* (self-published, 1996).

Remembering…is a memorial to victims of the Holocaust. The first part includes names of World War II sites, the second is a wordless cantilena and the last part includes portions of the text of the Hebrew Kaddish, prayer for the dead.[92]

Composer	Rudow, Vivian Adelberg (b. 1936)
Title	Portrait of a Friend, a mono opera (1986)
Instrumentation	tenor and prepared tape
Text	Grace Cavalieri
EVT's	basic
Score Notation	conventional
Contact	vivian@peabody.jhu.edu
Recording	Hollins & Park[93]
Duration	21 minutes
Notes	from composer

The work was composed as an audio portrait of a friend who was going through a very difficult time in his life. The composer interviewed him once a week for six months, recording his "stream of consciousness." She guided him to speak about his feelings and emotions which he kept trying to hide.

The result of dialogue used in this work was a few of his thoughts painstakingly rearranged and edited. The composer then composed and added the music.[94]

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[92] Anna Rubin, *Music from SEAMUS, volume 1*, Judith Kellock, soprano; digital disc (SEAMUS, EAM-9301, 1993).

[93] Vivian Adelberg Rudow, *Electronic Sunshine*, Howard Carr, tenor; digital disc (Hollins & Park, 1990's).

[94] Vivian Adelberg Rudow, *Portrait of a Friend* (self-published, 1986).

Composer	Vercoe, Elizabeth (b. 1941)
Title	Nine Epigrams from Poor Richard (1987)
Instrumentation	voice and tape
Text	Benjamin Franklin
EVT's	expert
Equipment	two microphones used for spatialization during performance
Score Notation	graphic and traditional notation; tape cues provided
Contact	composer (evercoe@aol.com)
Duration	ca. 7 minutes, 30 seconds
Notes	from composer

> *Nine Epigrams* was written for Joan La Barbara during a residency at the Cummington Community of the Arts in the summer of 1986. The texts are humorous proverbs from Benjamin Franklin's *Poor Richard Almanac*. Each proverb is sung, whispered or spoken, usually on tape, while the live voice makes commentary with sweeps of reinforced harmonics, glottal or yodel flutters, voiced whistles, tongue clicks and other traditional and non-traditional vocalizations that are part of La Barbara's vocal repertoire.[95]

Composer	Wilson, Olly (b. 1937)
Title	Sometimes (1976)
Instrumentation	tenor and tape
Text	from *Sometimes I feel like a Motherless Child* (trad. Spiritual)
EVT's	advanced
Score Notation	traditional and graphic; timeline and cues on the tape)
Contact	G. Schirmer (www.schirmer.com)

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[95] Elizabeth Vercoe, *Nine Epigrams from Poor Richard* (self-published, 1987).

Recording	Composers Recordings, Inc., CRI CD 370 (out of print)
Duration	17 minutes, 20 seconds
Notes	from composer

> *Sometimes* was composed especially for William Brown and is based on a contemporary interpretation of the Black spiritual "Sometimes I Feel Like a Motherless Child." In this work, I attempted to recreate within my own music language, not only the profound expression of human hopelessness and desolation that characterizes the traditional spiritual, but simultaneously on another level, a reaction to that desolation which transcends hopelessness.
>
> The relationship between the tenor soloist and the electronic tape also reflects a multitude of shifting roles. They frequently exchange solo and complementary functions in varying degrees at different times in the course of the piece…The composition closes with a "moan-like" postlude.[96]

Voice and Live Electronics

Composer	Bolte, Jason L.
Title	Darkness Comes to the Woods (2000)
Instrumentation	for soprano, tape and live electronics (optional version for soprano, tape and interactive electronics)
Text	Norbert Krapf
Equipment	stereo playback system, stage monitors (if needed), signal processor, microphone, CD player
Equipment (alternate)	stereo playback system, stage monitors (if needed), Kyma (v. 5.0 or higher)/Capybara 320 system with at least 12 DSP processors,

[96] Olly Wilson, *Other Voices,* William A. Brown, tenor; phonograph disc (Composers Recordings, Inc, CRI SD 370, 1977).

	Macintosh with Kyma installed, MIDI fader controller with eight faders (CM's Motor Mix), microphone for amplification of voice and input into Kyma/Capybara, small mixer with at least six channels and two prefader auxiliary sends
Score Notation	traditional (voice) combined with graphic notation and timeline layout in tape and electronics parts.
Contact	composer (jl_bolte@yahoo.com)
Duration	6 minutes, 45 seconds
Notes	from composer

Darkness Comes to the Woods is an electro-acoustic composition that integrates live acoustical performance with tape and interactive electronics.

In the poem, Krapf uses the symbol of water to describe the darkness that is overtaking the woods. This symbol is carried into the tape part by using easily identifiable sounds such as running water and thunder. These sounds, along with others, are used to create a dark and menacing texture, which complements and exaggerates the text and vocal line.[97]

Composer	Carey, Joanne D.
Title	Three Spanish Songs (1992-94)
Instrumentation	soprano and radio-baton
Text	Pablo Neruda
Equipment	radio-baton set-up (CPU, radio-batons, receiver); Yamaha SY77 synthesizer, PC with radio-baton software and prepared MIDI-baton scores loaded and ready to go

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[97] Jason L. Bolte, *Darkness Comes to the Woods* (self-published, 2000).

Score Notation	traditional
Contact	composer (jdcarey@sbcglobal.net); information about radio batons included with score
Recording	comes with score
Duration	17 minutes, 21 seconds
Notes	from composer

> [These songs] were inspired and influenced by Spanish Flamenco and indigenous South American music, as well as poetry of Chilean poet Pablo Neruda. In the process of blending his poetry with the rhythms, flourishes and instrumental sound of these Spanish and South American Musical traditions, I drew freely from strains of solitary meditation and deep sorrow buoyed by irrepressible exuberance and hope.
>
> [These] are lyrical pieces, tuneful but not simple. They are vocally demanding; their range is broad with coloratura passages and much mellismatic writing in each of the songs. An agile voice that is not too thick is most suitable for these songs.[98]

Composer	Felciano, Richard
Title	The Angels of Turtle Island
Instrumentation	soprano, flute, violin, percussion, and live electronics
Text	phonemes and vocal sounds
EVT's	basic
Equipment	5 or more highly directional microphones; 4 microphone pre-amps; 1 four-channel envelope generator with looping capabilities; 1

[98] Joanne D. Carey, *Three Spanish Songs* (self-published, 1994).

	quad mixer; 2 quad tape decks using a tape delay; 1 four-channel amplifier; 4 speakers [this should be revised/updated if performed]
Score Notation	traditional vocal notation; uses timeline and cues
Contact	composer (felciano@cnmat.berkeley.edu)
Recording	Grenadilla; GS 1063[99] (out of print)
Duration	ca. 13 minutes
Notes	from composer

> Essentially the piece is gentle, repetitive, non-exertive, trance-like. Within that framework, its purpose is to explore a variety of sounds of constantly shifting timbre and the vistas of beauty which can develop in the minute spaces between adjacent tones. It is not a vehicle for virtuosity, except that virtuosity of musicality which is required to play or sing back at the tape – to adjust dynamic, timbre, and choice of material (cueing) to the sounds emerging from the tape. There is no composite score and no conductor. The work is self-generating in that the performers cue each other to move to new material. The placement of cues is often up to the performer, affording an opportunity to respond to the tape sensitively and to determine at which point new material should be inserted into the texture.[100]

Composer	Felciano, Richard
Title	Responsory (1991)
Instrumentation	solo male voice and live electronics
Text	plainsong Gradual for the Mass of Christmas Day
EVT's	none (chant)

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[99] Richard Felciano, et al, *The San Francisco Contemporary Music Players*; phonograph disc (Grenadilla, GS 1063, 1982).

[100] Richard Felciano, *The Angels of Turtle Island* (Boston: E.C. Schirmer Music Company, 1984).

Equipment	stereo amplification system; microphone; mixing board; two signal processors
Score Notation	neumatic notation; tape cues and temporal cues in electronic part
Contact	composer (felciano@cnmat.berkeley.edu)
Duration	ca. 7 minutes
Notes	from composer

> *Responsory* is set up in such a way that the singer sings only the original chant. While there are no new pitches, individual contours are isolated through pauses and sometimes repetitions, in order to form the appropriate "contrapuntal" interaction with the processed sound, which is itself derived solely from the singer's voice. The composition of the work consisted in designing processes whose character would evolve to a conclusive end, not simply a momentary interaction with each plainsong gesture.[101]

Composer	Lanza, Alcides (b. 1929)
Title	Trilogy: Ekphonesis V (1979), Penetrations VII (1988), and Ekphonesis VI (1972)
Instrumentation	actress-singer, lights, electronics (tape), and electronic extensions
Text	composer
EVT's	expert
Equipment	voice processor (Digitech, Roland VP70, or similar); wireless microphone (with transmitter); Lexicon LXP15 (or similar) digital delay; mixer; sound system; special lighting requirements
Score Notation	modern, free, graphic
Contact	Shelan Publications (alcides@mausic.mcgill.ca)[102]

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[101] Richard Felciano, *Responsory* (self-published, 1991).

[102] Alcides Lanza, *Trilogy* (Montreal: Shelan, 1979/1988/1972).

Recording	Shelan; eSp-9201-CD
Duration	56 minutes, 30 seconds total (I. 15:31; II. 15:42; III. 25:23)
Notes	from composer

> Trilogy is an evening of music theatre for actress-singer, electronic sounds and electronic extensions with digital synthesizers and lighting effects. Trilogy is an autobiographical cycle of songs evoking the composer's youth, growing political awareness and mature reflections. the piece makes extensive use of multilingual texts - freely moving from English, to French, to Spanish, as well as invented languages. This song cycle represents ongoing research by the composer in the area of new approaches in writing for voice and electronic media.[103]

Composer	Lanza, Alcides
Title	Vôo (1992)
Instrumentation	acting voice, electroacoustic music, and digital signal processors
Text	composer (inspired by Gil Nuno Vaz)
EVT's	expert
Equipment	wireless microphone (with transmitter); vocal harmony processor
Score Notation	modern, free, graphic
Contact	Shelan Publications (alcides@mausic.mcgill.ca)
Recording	Shelan, eSp-9601-CD[104]
Duration	12 minutes, 41 seconds
Notes	from composer

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[103] Alcides Lanza, *Trilogy*, Meg Sheppard, singer-actress; digital disc (Shelan, eSp-9201-CD, 1992).
[104] Alcides Lanza, et al, *New Musicfrom the Americas, 3*, Meg Sheppard, singer-actress; digital disc (Shelan, eSp-9601-CD, 1996).

The text was created by Alcides Lanza based on the poems which appear in *No Olvido do Tempo*, a remarkable book of poetry by the Brazilian poet and composer Gil Nuno Vaz.

Vôo is dedicated to the "nautas cósmicos, acuáticos e intellectuales" (to the cosmic, aquatic and intellectual 'travelers'); that is, to the discoverers and explorers of the universe, of the seas or of the mind, to the men and women like da Vinci, Columbus, Curie, Bartolomeo de Gusmão and so many others.[105]

Composer	Nicoli, Andrea (b. 1960)
Title	distrazione (frammenti 1) (1999)
Instrumentation	voice and live electronics
Text	composer
EVT's	expert
Equipment	microphone, audio interface, MAX/MSP, Mac (G3 or better)
Score Notation	modern notation; fragments, non-linear
Contact	composer (nicoli@tirrenoit.com)
Recording	with score
Duration	15 minutes, 7 seconds

Composer	Rovan, Joseph W.
Title	Vis-à-Vis: a monodrama for voice and interactive computer music
Instrumentation	soprano, interactive electronics, and interactive video
Text	Rainer Maria Rilke (in German)
EVT's	advanced

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[105] Alcides Lanza, *Vôo* (Montreal: Shelan, 1992).

Equipment	Mac G3 computer; MAX/MSP; headset microphone; mixing board; sound system (stereo minimum, four channel preferred)
Score Notation	traditional vocal score; graphic notation in electronic part
Contact	composer (rovan@music.unt.edu)
Recording	with score
Duration	26 minutes, 44 seconds
Notes	from composer

> *Vis-à-vis* is based on a short prose piece, a meditation on the nature of faces ("Gesichter"), drawn from Rilke's *Notebooks of Malte Laurids Brigge*. Beginning with an unprepared question – "Have I said it before?" – the text takes an even more surprising turn as Rilke muses on his chance encounter with a homeless woman, an encounter that ultimately forces him, and his readers, to confront the horrible facelessness of the poor. This dramatic setting for soprano and interactive electronics explores the exaggerated polyphony of Rilke's text, at turns philosophical and poetic and humorous, weaving together its separate strands in an interactive sonic environment that responds to the gestures of the singing voice.[106]

Composer	Subotnick, Morton (b. 1933)
Title	Jacob's Room (1986)
Instrumentation	amplified voice, cello, and YCAMS (Yamaha Computer-Assisted Music System)
Text	Virginia Woolf
EVT's	expert
Equipment	microphone, cello amplification, YCAMS system (out of date, has probably been updated with Interactor), computer

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[106] Joseph W. Rovan, *Vis-à-vis* (self-published, year unknown).

Contact	composer (www.mortonsubotnick.com); this work may not be available anymore
Recording	Wergo; WER 2014-50
Duration	ca. 25 minutes
Notes	from composer

> *Jacob's Room* is a continuation of my dramatic efforts started with *The Double Life of Amphibians.* It is a monodrama in three parts and is based on a passage from the novel *Jacob's Room* by Virginia Woolf. The particular passage starts in the British Museum, seen as housing "an enormous brain" within which live the great intellectual achievements of western civilization. And Jacob, in his room, reads Plato's *Phaedrus* barely aware of the world outside of his window. Not until the very end does he rise to see "for the first time clearly" that there is life out there.[107]

Composer	Wilson, Paul
Title	Spiritus (2000?)
Instrumentation	soprano, tape, and live electronics
Text	syllables, words, and sounds
EVT's	advanced
Equipment	microphone; effects processor; CD/DAT playback; stereo amplification system; mixing board
Score Notation	fairly traditional; live electronics score included
Contact	composer (paul@wilson2546.fsnet.co.uk) can preview score at www.timbralmusic.com/Spiritus.html

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[107] Morton Subotnick, *Jacob's Room*, Joan La Barbara, soprano; digital disc (Wergo, WER 2014-50, 1989).

Recording	Fondazione Russolo-Pratella; ef.er.P ’02; can preview piece at www.radioart.sk/hyspace/radiopage.php?id=81
Duration	12 minutes, 19 seconds
Notes	from composer

When writing this piece I recalled a photograph of a strange apparition that was purportedly captured on film at Raynham Hall in England in 1936. The Hall is supposed to be haunted by Dorothy Walpole, the sister of the 18th century English Prime Minister Robert Walpole. Dorothy’s husband imprisoned her at Raynham hall for committing adultery. She remained there until her death from smallpox in 1726.

The themes and history behind the spectre inspired many gestural and theatrical ideas that could be worked musically. The work does not carry a narrative text, rather the syllables, and in some cases words, function to shape the sounds that are being produced by the soprano. The work travels through several highly charged emotional states, each of which explores different timbral nuances of the voice. Some of these emotional and timbral ideas are interlinked to invoke images of pain and create quite a disturbed atmosphere. I use exaggerated breathing, moans, groans and growls, all of which have strong associations with the imagery of extra-musical occurrences.[108]

[108] Paul Wilson, et al, *XXIV Concorso Internazionale “Luigi Russolo” Di Musica Elettroacoustica*; digital disc (Fondazione Russolo-Pratella, ef.er.P ’02, 2002).

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