MIDI GESAMTKUNSTWERK
AND A
SCHEMA FOR CREATIVE DESIGN

by

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Abstract

"MIDI Gesamtkunstwerk and a Schema for Creative Design" formulates a model for creative thought and examines its impact when applied to the making of art. Use of the Schema as a system of design has propelled my work from sculpture to multimedia performance, specifically under computer control. MIDI (Musical Instrument Digital Interface) is proposed as a solution to multimedia performance as Gesamtkunstwerk, with examples from my own experience and research.

The Schema for Creative Design derives from and cross-pollinates three systems: 1) William Glasser's theories of perception; 2) semiotic theory as formulated by Umberto Eco and others; and 3) Lowry Burgess' "Tools for Thought." The model makes conscious use of subconscious processes to exploit them in stimulating expanded and unique creative thought.

The use of MIDI to create a unique interaction between media is postulated as modern "Gesamtkunstwerk." Gesamtkunstwerk is a term associated with composer Richard Wagner's music-dramas of the 19th century. It characterized not only a performance mode, but also a philosophical orientation. This thesis considers a contemporary version of this philosophy as influenced by the changes in available media and methods of interaction.

Because MIDI can interface physical objects, electronics, lighting, sound and special effects into a single score, composition and orchestration elements can be conveniently recorded, replayed, rehearsed and refined. The data from a MIDI light board, MIDI mix board, and MIDI synthesizer are interchangeable. The artist has immediate access to sound, light, and video image. Specific intermedia control is a unique development which allows exact timing to program convincing intermedia gesture. Computer-control over the various media enables the artist to perfect performance similar to the way film is edited for maximum effect, and brings the ideal Gesamtkunstwerk - all the artforms working together toward a common expression - closer to realization.

A MIDI Gesamtkunstwerk was attempted in the performance the "midicube." The MIDI-ized media performers are members of the evolving "MIDI Robot Orchestra," hybrid objects developed from preexisting items, such as toys and tools, that usually produce sounds. The sounds are underscored by hybrid digital samples. The Macintosh computer records and plays back the code to form a precise musical ensemble.

MIDI Gesamtkunstwerk considers practical aspects of scored multimedia performance, proposes a computer-controlled intermedia studio and discusses the advantages and limitations of a MIDI modified system. Concepts of deconstructed forms, reconstruction via permutation and the conflicted tension of the hybrid object also figure into the realization of MIDI Gesamtkunstwerk.

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Chapter 1

INTRODUCTION

1.1 Introduction: A Schema for Creative Design and MIDI Gesamtkunstwerk

I have evolved a Schema for Creative Design as a model of mental processes which, by making unconscious processes conscious and thereby revealing the system to itself, opens new options in creativity. The Schema helps one become aware of one's preconceptions, idiosyncrasies and tendencies - a personal template - and artificially stimulates choices outside of a more unconscious orientation.

The Schema for Creative Design is a system for practical use by artists and designers. It provides tools and a map for use in the creative progress from problem to solution. It brings three systems together. The first system traces the path of thought from perception to response, from outer world to inner world and back to outer world. The second system uses semiotic theory to analyze and deconstruct personal and cultural perceptions of an object or idea. The third system provides tools or aids for the deconstructive process and suggests options for reconstructing a creative solution.

Unique contributions to creative design can result from using the Schema. The Schema is similar to a map for the creative endeavor. Routes that may or may not have been stumbled upon in the autonomous journey can be seen, selected or rejected from the map. New pathways may be consciously forged, in the same way one might choose to segue two unconnected routes. Without the map, these routes may never have been connected. In the same way, an artist may segue two ideas revealed by the Schema. The connecting route represents a new idea.

The most important function of the Schema is based on the cybernetic tenet that a successful system takes into account its own operation, i.e., a system that is aware of itself. The following drawing represents this relationship.

INPUT ——— | SYSTEM'S INTERNAL STATE / e.g., anti-aircraft guidance systems; / lawn mowers; human beings, etc. | ——— OUTPUT

(+,-)
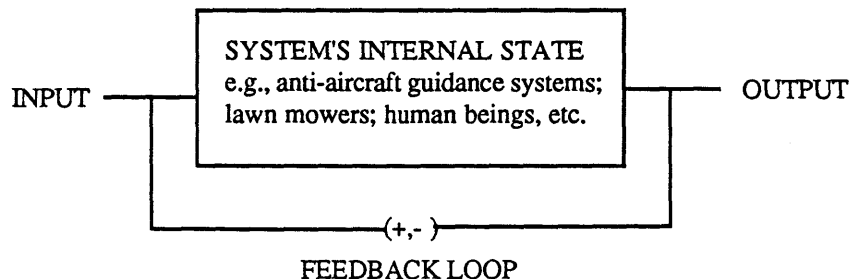
FEEDBACK LOOP

Fig. 1.1 Schematic of a cybernetic system.

The plus or minus axis represents a feedback loop which regulates the output. This allows the system to take into consideration changes in the input environment, or to correct itself to achieve its aim.

Cybernetics was developed by the late Norbert Weiner at MIT and was used extensively in World War II to aim anti-aircraft weapons. A non-cybernetic system would simply take the coordinates of the target plane and direct the aim of the gun toward these coordinates. Unless the plane stopped midair, the shot would miss. A cybernetic system adds the calculation of the movement of the plane through the air to predict the position of the plane when the projectile would reach it. Because it calculates the time for the projectile to travel from gun to plane, it is a 'self-governing' system.

The Schema for Creative Design is meant for practical application. The forum for examining it has been my own work, beginning with the sculpture of hybrid objects/sounds and culminating with multimedia, MIDI-controlled performance, called 'MIDI Gesamtkunstwerk'. I have utilized and tested the Schema throughout.

For example, one specific aspect of the Schema has paralleled the evolution of my work toward Gesamtkunstwerk. The mental model formulated by psychiatrist William Glasser[1] describes ten levels of perception, from the most simple, rudimentary perceptions like 'shape' to complex perceptions like 'morals and values'. The development from two-dimensional design, painting and sculpture to multimedia performance reflects the passage through this hierarchy of perceptions from basic 'shape', to incorporate 'relationship' and 'control of sequence'. Multimedia performance accesses diverse perceptions one at a time or all together as a comprehensive perceptual experience. The artist can use media that appeals to all the senses: music, sound, language, visual elements, movement. I believe my artwork can be more powerful if it stimulates more of the perceptual faculties.

Gesamtkunstwerk - literally in German, the 'together' (gesamt) 'artwork' (Kunstwerk), loosely translated as the whole or all-inclusive artwork - provides a historical context for my intentions with multimedia performance. Gesamtkunstwerk, as I am using it, describes the collaboration of many media emanating from a central impulse, be it one artist or a MIDI score, in which no one media is the dominant carrier of content. To me, Gesamtkunstwerk also implies a direct stimulation of the senses to convey meaning experientially. It implies a unified experience in which all the perceptual faculties are focused together in the performance to encourage a strong identification for the audience. In an ideal sense, performance events would not only be perceived or witnessed, but would simulate a surrogate experience by the audience. I want to demonstrate the reasons why a completely controlled environment in which all the perceptual faculties are stimulated can give a new synthetic experience. The system I am evolving to carry

this out uses MIDI to coordinate the media. Contemporary developments in the film, video and performance art in general can be considered movement towards Gesamtkunstwerk, but the interaction of different media in non-computer controlled performance art cannot be closely enough synchronized or rehearsed and developed to achieve the precision needed for an ideal Gesamtkunstwerk. MIDI opens new possibilities in its realization.

1.2 Schema for Creative Design

I have formulated the Schema for Creative Design from approaches to creative design from three orientations: psychological theory, semiotic analysis and artistic speculation. Combining and cross-referencing these systems of perception has significantly molded and shaped my artwork. It is a way of analyzing and stimulating the creative impulse, which makes the Schema a valuable tool for other artists.

The first system, formulated by psychiatrist Dr. William Glasser, models thought. His system posits that the thought process is better understood by juxtaposing two worlds: an Internal World in one's head and an External World outside, as opposed to the usual belief that one's internal world represents 'reality'. When information travelling via the Perceptual System from the External World does not correspond to information in the Internal World, an Error Signal is generated. Most thoughts are functional Error Signals. Memory and knowledge are tapped in an effort to resolve the Error Signal. It is either a Transient Error (absorbed as new information); Controllable Error (redirected information); or an Uncontrollable Error (requires internal reorganization).

If the Internal World cannot handle - control - the information from the External World with available systems, it goes out of control and the information goes to the subconscious. This could be the point of 'giving up' and no longer trying to solve the problem. The Signal is at the Reorganization Center and seemingly random solutions begin to occur via the subconscious. Eventually one of the random thoughts may provide a solution. Here is a rich field for creativity. I believe that the Reorganization Center can be reached to artificially stimulate many creative solutions or ideas that might otherwise remain hidden.

The second system of the Schema for Creative Design is semiotic theory. It is a three-part theory incorporating sign, syntax and semantics. 'Sign' is the culturally agreed upon archetype of a word/object/icon, for example, the word 'chair'. 'Syntax' describes the rules governing the physical parameters of a *specific* chair. 'Semantics' describes an individual's perceptions and preconceptions about the specific chair.

Considering objects and ideas with these semiotic separations is a way of becoming aware of one's own perception of an object. The analysis clarifies in what proportion one is seeing an object in the most general terms (sign) or as a specific physical rendition of its type (syntax) or as a function of personal criteria in perceiving it (semantics). Once the semiotic analysis is made, the qualities of each category are known and can be manipulated to create unique permutations on the object. Semiotics helps deconstruct preconceptions in one's perception of the environment, which is quite helpful for the inserting of new ideas into it.

The third system is the "Tools for Thought," a list compiled by Massachusetts College of Art Professor/artist Lowry Burgess, which describes options for transformation. This is most easily understood when applied to objects, although it also applies to thought. The Tools help unravel the way an object is perceived - in the deconstructive sense by asking, what is it? - and in the reconstructive phase by asking, how could it be different. With the tools in mind it is possible to consciously access multiple permutations.

Within the Schema memories are stored like branches of a tree. The initiation of a new thought is like grafting a new branch. I have combined the systems of the Schema to examine how choices are made in the course of mental decision, hence a new branch's development. With this model consciously in mind, one could choose to fuse branches or cut codes into subcodes and perceive an entirely unconventional idea: what I call the 'hybrid thought'. The idea of the hybrid in developing new objects, sculptures and sounds is fundamental to my work.

This tree model also correlates with Glasser's Levels of Perception. The foundations - roots, trunk, branches - are the most basic perceptions; the outer regions - twigs, leaves - are the most refined, complex layers of thought. It is interesting to start with outer manifestations (the complex layer) and trace them down to their roots, to discover the founding principles on which they are based, which is the process the semiotic analysis and Tools for Thought applications of the Schema assist in.

1.3   MIDI Gesamtkunstwerk

Elements of the Schema for Creative Design express underlying themes in my work. For example, in deconstructive analysis, a change in one aspect or node of perception, affects all the other nodes. Changing elements of the Syntax, affects Sign and Semantics, both in quality and proportion. If greater emphasis is shifted to Syntax, then Sign and/or Semantics are correspondingly de-emphasized. These aspects are tied together by an invisible link. This is the same way I think about multimedia performance: a work in which all the elements or media are tied together by an invisible, but essential link.

Relationships between media are similarly interdependent. Combining music and image projections, for example, is different from having music alone. The perceptual space is like a given quantity. If music is the only medium, it fills the entire perceptual space. If another medium is added, each must become diminished or simplified in some sense in order to share the perceptual space. This is a mistake often made in visualizations of preexisting musical scores. The music alone is perceptually satisfying. The visualizations added on are often irrelevant and actually tend to invade the viewer's own imaginative associations inspired by listening. When the music and image are evolved concurrently, each accommodates and leaves room for the other. Film scores demonstrate this principle, rarely working as well on their own as within the context of the film.

Another aspect of the Schema is the relationship of resynthesis and permutation. The original thought or object is reconstructed by a series of permutations, which are reinterpretations, possibly even intentional misunderstanding of the object's qualities and/or function. The result can be considered a hybrid. It is this thinking that directly results in the hybrid sounds and objects which populate my multimedia performances.

MIDI Gesamtkunstwerk is a multimedia performance whose orchestration and gestural timing sequence may include light and sound as well as special effects, motors, film and other automated devices controlled by a computer. The computer makes accessible, repeatable automation possible.

MIDI Gesamtkunstwerk also includes the idea that a composer and/or artist interacts with controls that can record the interaction and play it back exactly. Access to the recording via a computer-generated score allows the artist/composer to do fine edits, down to the millisecond, on the event much the way film and video is polished by taking a frame out here or putting a sound effect there. When the media are MIDI controlled it is like multi-track recording with an infinite amount of tracks. Even if the sound track is complete, lights and other effects can be added to the score. Slide projectors, 16 mm film, and videodisc are controlled by one program. The information is also interchangeable so that a drum attack can become a luminance level, for example.

The content of my MIDI Gesamtkunstwerk relies on a semiotic base of creative design while technically using MIDI as a common language between devices. Gesamtkunstwerk, a term associated with 19th century composer Richard Wagner, refers to the total work, the multimedia presentation combined to achieve one overall or overwhelming effect. Originally, MIT Professor Otto Piene pointed out to me the term Gesamtkunstwerk as a term which seemed to describe my goals in performance and installation art. MIT Professor in Film and German Language, Michael Geisler, a reader on this thesis also suggested I

study it. Dana Friis-Hansen, curator at the List Visual Art Center at MIT, in *Art New England*,[2] used this term in reference to Ralph Paquin and Ann Stoddard's multimedia, MIDI-controlled performance, "...r-e-m-o-t-e...," for which I used MIDI to program mechanical movement, lighting, film, and sound.

Wagner's idea of a Gesamtkunstwerk being centrally focussed is realizable as MIDI Gesamtkunstwerk. The works may not require the grandiose scale that Wagner believed in; in fact, the use of the PC as the central controller suggests a more personal scale to production, in which the individual creates a world of their own through animated devices and sound. However, the interdisciplinary aspect of Gesamtkunstwerk remains intact as MIDI controls image, sound and machine and the artist has a centralized access to each medium.

I am exploring the use of both high and low technology to deal with multimedia performance/installation as a composition which is centrally located in a MIDI score. In this case the score is contained on the computer and disseminated through MIDI. A low tech element, such as tools and toys are used because they can be mentally and emotionally identified with by the viewer. They are the members of the "MIDI Robot Orchestra." The high technology element is used to animate them.

1.4   Personal Artwork

The description of personal artwork that expresses the idea of the hybrid - both sculpture and sound - will include objects such as "Bird Call," "Bear-i-Phone" and members of the "MIDI Robot Orchestra," which are MIDI-ized hybrid objects.

Non-MIDI multimedia performance is represented by such pieces as "Reflection on Protections" and "The Folie Pit." MIDI multimedia performance is described in the "midicube" section.

Issues such as the use of functional objects, robots and toys, anthropomorphization through movement and gestural relationship pertain to both sculptures and multimedia events. While a painter by painting a teacup elevates a mundane object to art, the gestural aspects of MIDI-ized multimedia performance elevate inanimate objects to 'life', in the sense that the viewers see them mimicing beings with consciousness. A teacup in a painting is described by qualities such as brush stroke, color, texture and proportion. The MIDI-ized objects are imbued with illusions of being momentarily alive and described by qualities of gesture, movement, personality and intention.

The difference between creating illusions of causality, synchronicity, mechanical repetition and organic response times is often a matter of split-second timing. This is especially the case when working outside

of the narrative context. Story line gives viewers a context in which to evaluate special effects. If the timing is slightly off in a sequence, the continuity of the story compensates for it. Without the story line, the timing becomes crucial in achieving the illusion.

1.5 Precedents

1.5.1 Art Historical Context

The roots of performance art are traceable to the Futurists and Dadaists. Performance which is not theater, not sculpture, dance or music, but which utilizes these, and other, forms in a personally expressive manner emerged as a recognized art form with John Cage's happenings at Black Mountain and others in the 1960s . My work has an affinity to many of the intentions, images and sounds generated by the Futurist and Dadaist movements. I believe that the creative intention of all performance art involving multimedia is toward Gesamtkunstwerk.

1.5.2 Artists Who Have Influenced Me

Two kinds of artists have influenced me: those who make pieces that involve extensive technical hardware to achieve a discreet and specific phenomena; that is, they have created a mechanism so that the physical syntax becomes part of the semantics of the piece. It might be considered the opposite of underscoring in film. Those artists include Rebecca Horn, Jean Tinguely, Robert Wilson, John Cage, David Weiss, Peter Fischli, and Rube Goldberg. The other artists (Marcel Duchamp for example) interest me for their philosophical point of view as a backup or counterpoint to my ideas, particularly in regard to the 'ready mades'.

1.5.3 Film as Gesamtkunstwerk

Aspects of my work with multimedia and MIDI have been influenced by cinema, specifically the use of sound and sound track, Foley, special effects used in the realization of animated mechanical beings and industrial environments, and the sequencing of discretely interdependent events. I have conscious intent and fascination with ways in which a scene, camera movement, narrative and/or conceptual design in films, primarily the aesthetic and least of all the narrative, are formally reflected by my work. Michael Geisler believes that film is the most successful form of contemporary Gesamtkunstwerk and that this accounts for its popularity. Film and especially video editors use an unseen code to assemble a work, e.g. frame numbers and SMPTE time code, to integrate the aesthetic codes of the visual and aural. MIDI is a useful tool for doing this kind of integration with the many codes of multimedia, such as image, sound and text. MIDI to SMPTE devices are available for a locked synchronization.

Chapter 2

SCHEMA FOR CREATIVE DESIGN

2.1 Schema for Creative Design

From a model of the way we perceive to an architecture of creative thought, it is possible to understand where our creativity comes from. There is a bank of information we draw upon, often without even knowing it, when we create.

Dr. Max Luescher, inventor of the Luescher Color Test, and William Glasser agree that there are primary perceptions stored subconsciously in the memory. Luescher posits that we have a combination of experiential and genetically-encoded associations with colors. He has worked out a very simple and effective form of psychological analysis using a color test.

In the book, THE LUESCHER COLOR TEST[3], the personality test is administrated by viewing eight colors: red, yellow, blue, green, gray, black, purple and brown and selecting those the subject feels most sympathetic to emotionally. The color cards are flipped over to reveal numbers on the back and placed in a row. The numbers are tabulated according to a formula that generates a series of personality analyses.

I have seen the test diagnose the physical symptoms of someone with nervous prostration, a physical ailment based on nervous tension. This type of in-depth analysis is more common in Luescher's larger test which has 96 colors and is unavailable to the general public. It has been used to diagnose heart disease and cancer. The success of the test provides strong evidence that there are psychological and physical associations which can be accessed by color.

'Access' is the key word here. The Luescher Color Test is an example of starting with a surface-level perception - the perception of color - and tracing its meaning along a path to understand deeper-level, more obscure roots within the human mind and physiology. William Glasser's theory denoting ten levels of perception, links simple perceptions such as intensity, shape and color on a continuum with more complex perceptions such as values, morals, and culminating in perception of self, which he calls meditation. The use of Glasser's hierarchical model of the mind can provide access to subtle, subconscious realms of thought. The artist can access these realms to find alternative areas of creativity within themselves. Glasser's model helps provide the map.

Physically, the brain has been found to be organized somewhat like a tree, as are the systems of nerves and veins. If we accept this model of thought, then innovative design can result from new algorithms of

mental branching. The creation of the 'hybrid' originates from grafting different branches of thought. A thought can be seen to develop like a branch with choices at branch points influencing its development. The hybrid solution results from conscious merging of discreet thoughts: creating a connection where there was not one previously.

My Schema for Creative Design combines William Glasser's model of thought with semiotic theory and a "Tools for Thought" list to equip the artist to proceed along the creative path in an informed way. In a self-reflexive manner the artists are informed about their own creative processing. Within each area - the mental model; the semiotic triad; the tools for thought - possibilities for informed choice and maneuverability are increased.

2.2 William Glasser's Mental Model
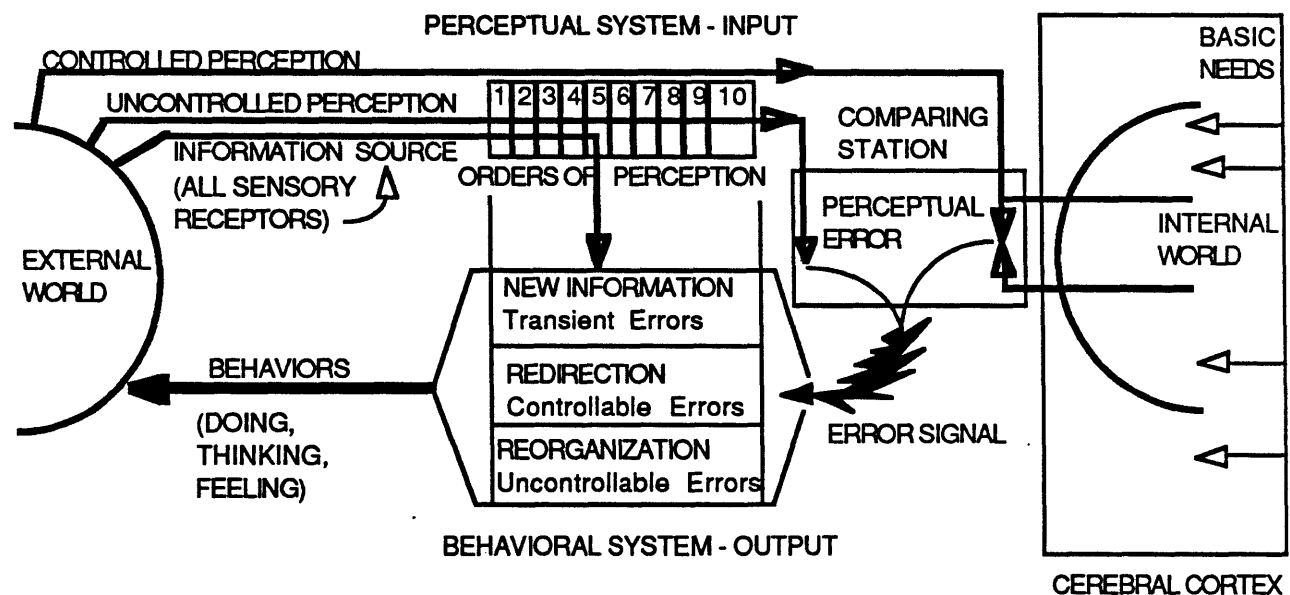
Fig. 2.1 William Glasser, diagram, "Behavior: The Control of Perception Psychology (BCP)."

2.2.1 Glasser's Model

William Glasser develops a form of behavioral psychology that differs from the standard 'stimulus - response' type of behavioral psychology in that behavior is motivated internally, from the inside out, rather than from the outside in.

He postulates that a complex inner world exists, comprised of expressions of our basic needs which go beyond physical survival to include the need to belong, to be worthy, to be free, to be happy and so forth. Individuals construct a unique inner world fulfilling these needs and their behavior is dictated by their attempts to make the outer world conform to this ideal/idea.

The diagram above (2.2.1) depicts the flow of perceptual information from the outer world into the brain where it meets the internally-motivated inner need system. The perceptual information is compared to the inner world and the attempt is made to control the information so that it conforms to inner needs. When the inner and outer pictures don't match, an error signal is generated. There are Transient Errors (absorption of *new information* resulting in the creation of a new system or area), Controllable Errors (information is *redirected* to an appropriate response system), and Uncontrollable Errors (*reorganization* must occur - the solution is not consciously apparent and the subconscious generates possible responses spontaneously until one is feasible). These responses determine behavior in the outer world.

2.2.2   The Orders of Perception

Several areas of this model are of interest to the artist. Glasser classifies methods for sorting incoming information into ten Orders of Perception. These categories can be studied by artists to understand which areas their artwork is stimulating. In my own work I have addressed increasingly complex layers of perception, consciously moving toward the higher levels by working with multimedia, which incorporates transitions, sequence, relationship and programs.

Gesamtkunstwerk in the ideal sense, expresses the highest level of perception, oneness, discussed fully in Section 4.8.2.

The Orders of Perception

First	Intensity
Second	Sensation
Third	Configuration or Shape
Fourth	Control of Transitions
Fifth	Control of Sequence
Sixth	Control of Relationships
Seventh	Programs
Eighth	Control of Principles
Ninth	Systems of Values
Tenth	Universal Oneness, Meditation

Fig. 2.2 William Glasser, The Orders of Perception.

2.2.3   Artificially Stimulating the Reorganization Center

The artist can also benefit from manipulating the behavioral system output. When a perceptual error signal occurs, the mind normally offers a solution. If there is no acceptable solution that closes the error between the internal and external worlds, the mind can eventually shift to the "Reorganization Center." The attempt to find a solution goes 'underground' in a sense. The subconscious begins to cycle through possibilities with a much greater range than the conscious mind might logically or safely pursue.

Consider working on a musical score and having conceived of a sequence of notes to be played live on command and faster than it is humanly possible to play. The Error Signal occurs when it is realized that the notes need go faster than it is physically possible. From the memory and knowledge several solutions occur. One might be to use the 'Step Record' option in "Performer"[4] and record one note at a time choosing duration by number. Another possibility would be to play and record a sequence and speed up the tempo, again with the Performer program. These solutions are rejected because the intention is to play the sequences live and not pre-record them and the sequences must be available spontaneously and instantly.

At this point the Reorganization Center might be triggered. While no longer consciously working on the problem, the subconscious offers the option - 'give up'. Meanwhile the subconscious has been stimulated into offering extensive, seemingly random,even outlandish solutions. Examples might be, 'get 50 live musicians waiting for a light to turn on to play'; 'have a pile of rocks held at different heights which land on instruments and play sequences'; 'do it mechanically by making an instrument with levers, pulleys, 'put a computer between the keyboard and the instrument, etc. Many of the solutions seem absurd, but the subconscious mind is not necessarily making logical distinctions. However, at least one solution is reasonable and the conscious mind recognizes this. 'Put a computer between the keyboard and the instrument' closes the error and fulfills the solution that hypothetically becomes the design basis for a Hyperinstrument.[5]

Because this 'artificial' stimulating of a primary psychological process directly broadens creativity, the experimental artist might intentionally trigger the Reorganization Center and, at the very least, become aware of 'random' solutions that might result in more tangents of work. If a logical solution which is acceptable to the Internal World is resisted - following a conscious decision to not accept the initial solutions - the problem will be sent to the Reorganization Center. As more solutions are rejected, the harder the Reorganization Center will come up with possibilities, remote and potentially interesting.

The real task, then, in creative work and design is to be able to trick the subconscious and accept mental friction as a component of problem solving. The more solutions that are compiled and are not accepted, 'closure' of the issue is delayed, and the more the subconscious will be stimulated to output random ideas.

This process is part of the 'deconstructive' formula in which the artist separates from the semantic norm and reconsiders the mental landscape in an effort to broaden creative output; again, the self-aware system monitoring and evolving its performance.

To elaborate, for a moment, on the above example, the creation of a Hyperinstrument was a solution to a sophisticated and highly specialized design problem. Many of these solutions trickle down into a generated usage to become the accepted as the norm. Hyperinstruments can be seen in a diluted form in the MEP4 (MIDI effects processor, a Yamaha consumer product that modifies or maps data between the MIDI input and its destined output device).

The same can be said of 'high art' solutions and creative ideas. They become the basis for our everyday thinking and utilitarian design. The Bauhaus school is an example where this was an overt process, with artists turning their skills to practical design. This process happens in more subtle and esoteric ways as well. An impulse of pure aesthetics and artistic endeavor can capture a popular or mass ideology ahead of its manifestation. The Russian avant-garde made a conscious effort to create art that changed the thinking and perceptions of the so-called masses, considering cubism, for example, a socialist statement (breaking the whole into many mutually-supportive parts).

I often look at everyday objects using semiotic deconstruction and trace their lineage backwards to discover the 'design problem' from which they emerged. The orders of perception and branching system of thought help support investigation in that direction: from the simple manifestation through the continuum to the complex idea. Glasser's defined levels of perception, starting with 'intensity' and going on up through 'color', 'movement', etc. are, to me, accessible in much the same way as thought tree branches, which I hypothesize as analogous to the organic structure of the Kabbalistic tree of life, in which there are different archetypal parts of one's personality mapped out in a tree formation. This brings us back to Max Luescher and his color theory for accessing the subtle, illusive inner landscape via basic cues, or to Glasser's 'lower level perceptions'.

2.3 Semiotics

> ...since this book is concerned not only with verbal signs but also with objects, images or behavior intended as signs, these phenomena must be expressed through verbal expressions: in order to distinguish, for instance, the object automobile from the word automobile, the former is written between double slashes and italic. Therefore //automobile// is the object corresponding to the verbal expression /automobile/, and both refer to the content unit lautomobilel.[6]

2.3.1   Semiotic Theory

Semiotics evolved as a highly specialized theory concerned with the structure and meaning of language and communication, i.e., the semifore. The above quote from Umberto Eco prefaces his book, A Theory of Semiotics, and reveals that he will include "objects, images and behavior" in his semiotic consideration, he postulates that these categories have codes that can be independently pursued for meaning. Perhaps, as a logical extension of semiotics, the things being named, objects, gestures, etc. consist of a language in their own way that can be decoded.

Victor Burgin, artist and theorist, clarifies current usage of semiotics:

> By the early-1970s semiology had undergone a radical transformation from within, in the course of which the linguistic model became displaced within a broader complex of methodologies - most notably those of Freudian and Lacanian psychoanalysis. Within the area of theory today the term 'semiology' is most commonly used to refer to the early approach, with its almost exclusive emphasis on ... linguistics; the word 'semiotics' is now most usual to designate the ever-changing field of cross-disciplinary studies whose common focus is on the general phenomenon of meaning in society. (Other, more or less equivalent, expressions for its current forms include: 'textual semiotics', 'deconstructive analysis', and 'post-structuralist criticism'.)[7]

These statements justify the use of semiotic structures for deconstructive analysis in artwork and artistic creation.

The semiotic construct divides our knowledge of the object, word or idea to be decoded into three parts designated by sign, syntax and semantics. Sign is the unspecified connotation/denotation of the perceived object/word/idea: crudely put 'the cultural meaning' . For example, the word 'chair' cues a certain gestalt, yet nothing about any specific chair. Sign refers to symbols and cultural archetypes and to a certain extent, schema that denotes general content. A continuum can be imagined from literal signage 'stop', 'yield', etc. to the sign value of the color clothing people wear.

Syntax describes the rules that govern the definition of a specific object/idea/word. If I point at a specific chair and say, "that chair," it deals with the articulation of form, whereas sign deals with a culturally agreed-upon template or icon. The word, chair, is an icon for a concept that is held about a certain object.

Semantics are the subjective position. All the meaning that someone associates with a particular chair constitute their semantics. Semantics are the subjective perception of and reaction to an object/word/idea.

Sign, syntax and semantics form a conceptual triangle. Semiotic deconstructive analysis attempts to separate perceiver, perception, and perceived into three, acknowledged and distinct elements. Ultimately this separation is impossible because they are inseparably tied together through subjectivity but in making the attempt, one can get a clearer idea.

SYNTAX

SIGN   SEMANTICS
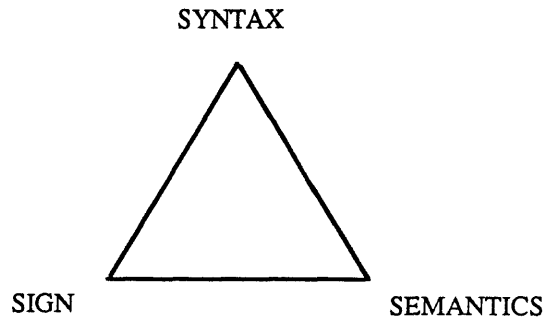
Fig. 2.2 The semiotic triad.

ART

VIEWER   ARTIST
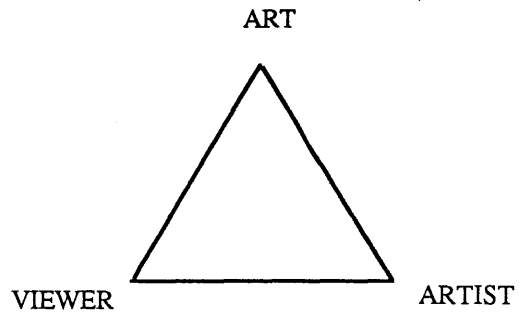
Fig. 2.3 Analogy of art to semiotic triad as seen at the Chicago Art Institute, Dominic Bosco.[8]

For the creator, the emphasis within the semiotic triad is likely to be on the semantic node, because the artist is creating within his or her own subjective sphere. The artwork, however, is going to be perceived with more weight on the sign and syntax nodes, fulfilling (1) a general perception (sign): what is it? a work of art, a chair, a pile of wood, etc.; and (2) the specific rules of its articulated form (syntax): it is green, small, wooden, etc. The artist can take care not to allow other nodes of the triangle to become weak, unless it is intentional.

For example, there may be an object which has lots of articulation and is very beautiful within the area of syntax - rules of form. But it may be weak on the conceptual, meaning, semantic level. On the other hand, if an object is weak in the area of sign, it would be very idiosyncratic, an object that people don't have access to in a culturally identifiable sense. An interesting example of semantic discrepancy might occur in the area of meaning. It is often the case that the meaning the artist is trying to convey, which has been the inspiration and guiding force behind the artwork, has very little to do with the meaning that the viewer perceives because of the different semantic contexts in operation. This is, of course, not a weakness in the artwork, which can thrive on stimulating individual semantic responses. It also explains why in the case of literal interpretation there is not necessarily a 'universal statement'.

When one node of the semiotic triad is changed, all other nodes are affected. One area cannot be emphasized, without ramifications of the other nodes being changed. The following diagram expresses the 'Sphere of Content' as a small black sphere that rests close to one or the other nodes of the semiotic triangle.

THE CONTEXT OF SYNTAX

SPHERE OF
CONTENT

THE CONTEXT OF SIGN   THE CONTEXT OF SEMANTICS

THE CONTEXT OF SYNTAX

SPHERE OF
CONTENT

THE CONTEXT OF SIGN   THE CONTEXT OF SEMANTICS

THE CONTEXT OF SYNTAX

SPHERE OF
CONTENT

THE CONTEXT OF SIGN   THE CONTEXT OF SEMANTICS
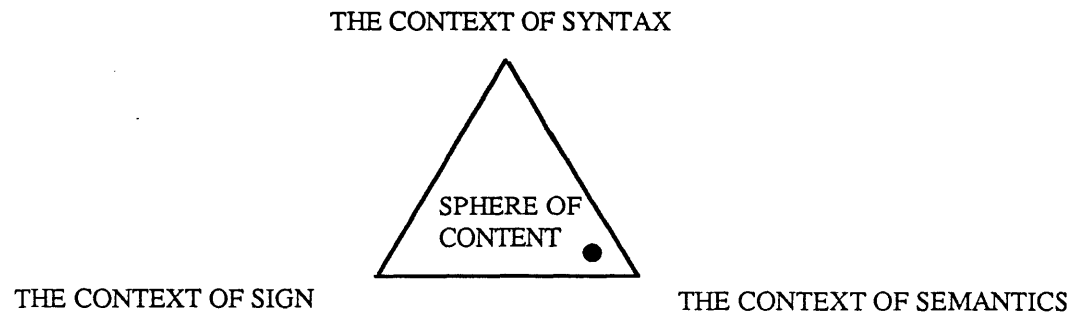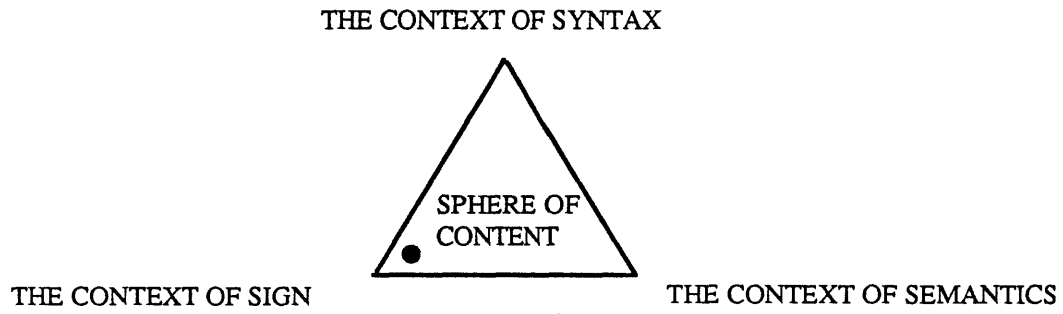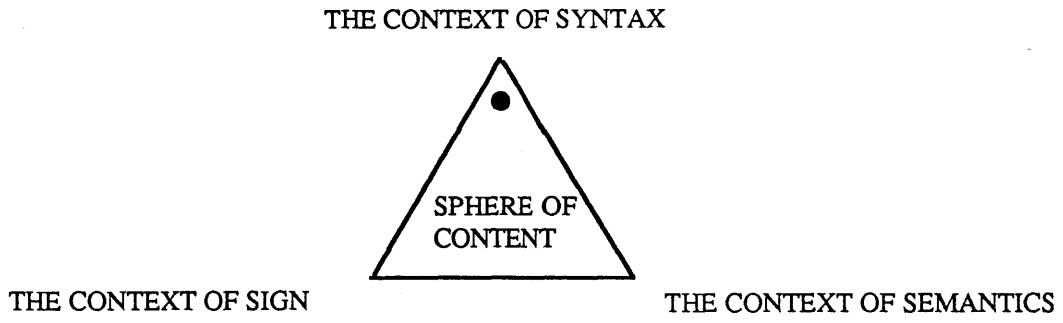
Fig. 2.3 The sphere of content shifts position within the semiotic triad, D. Atherton.

Analyzing art from the semiotic viewpoint can instigate unusual perceptions. For example, two photographs which are generally seen in an art historical context can be compared according to one node of the semiotic triad. Fig. 2.4 and 2.5 show puppets and a costume. Both share characteristics of specific geometric shape which make them look as if they were made on a lathe. Of course, the costume was not lathed, although the puppet's bodies and limbs certainly were.
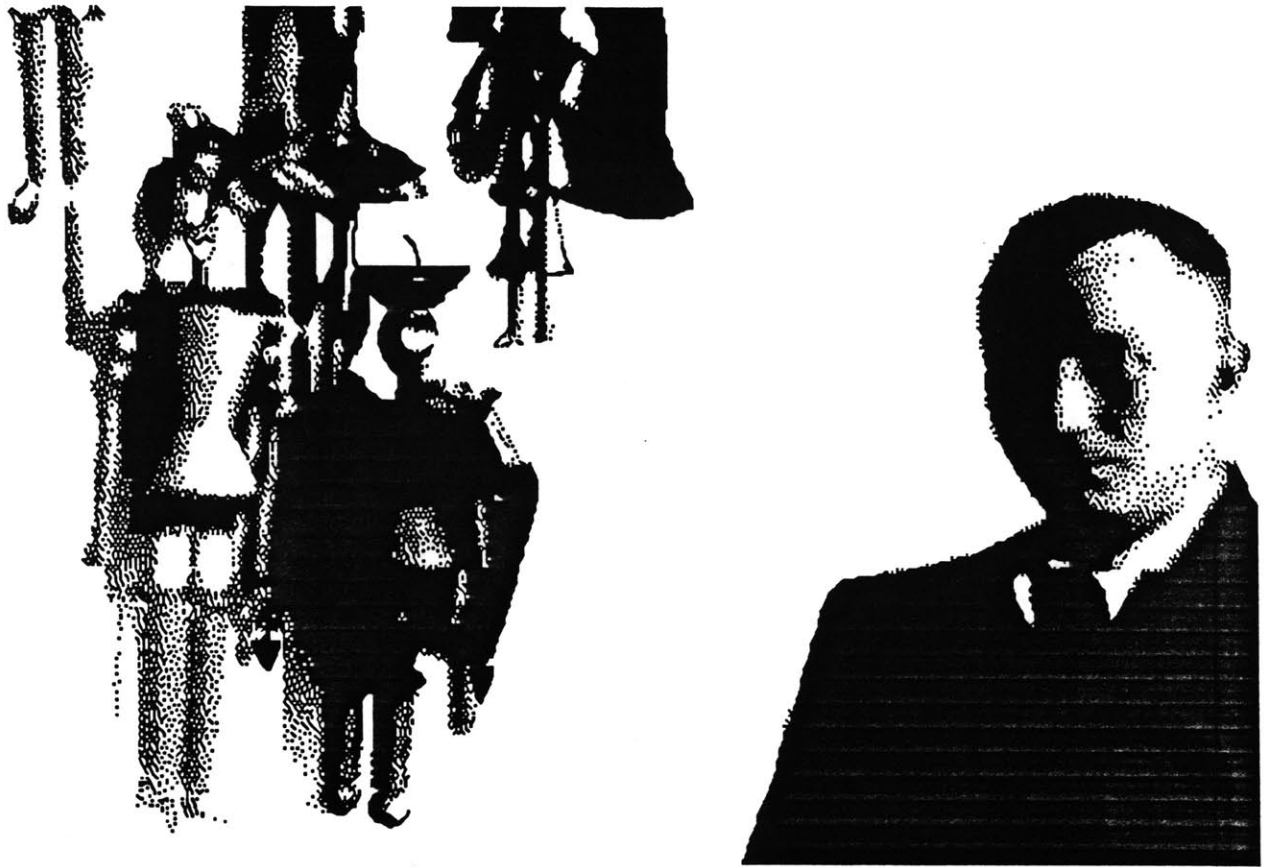
Fig. 2.4 Jean Arp with puppets made by Sophia Taeuber used in various performances, 1918.

Fig. 2.5 Oskar Schlemmer as the 'Turk' in his Triadic Ballet,1922.

This could imply that the costume sensibilities refer to the aesthetic parameters of machining. The costume is from the Bauhaus, an art institute historically renowned for its dialogue with industry. The code of form has revealed content. If asked about the costume someone could use semiotics to deconstruct the image and deduce an informed guess as to the origin of it.

2.3.2 Patanjali Yoga Sutras

Every made object, including architecture, falls within these formal constraints. In the Yoga Sutras of Patanjali, believed to have been written from oral tradition as early as the fourth century B.C., a passage occurs that relates to the problem with semiotics which is that ultimately these three things - sign, syntax and semantics cannot be separated. The attempt to do it gives a clearer view of what is going on, but ultimately those things are so woven together they are impossible to separate. In the Yoga Sutras of Patanjali there are statements about separating perceptions of the object from the object itself and from the way society views it, so in that sense it could be called ancient semiotics. This is a mental practice that was done in order to gain so-called clear vision or clear insight.

43. When the mind achieves identity with a gross object of concentration, unmixed with awareness of name, quality and knowledge, so that the object alone remains, this is called nirvitarka samadhi.

[Commentary:]
All our ordinary awareness is compounded, as Patanjali says, of "name," "quality," and "knowledge." For example, when we look at a desk, we are aware (1) of the name of the object ("desk"), (2) of the quality of the object (its size, shape, color, woodenness, etc.), and (3) of our own knowledge of the object (the fact that it is we ourselves who are perceiving it). Through intense concentration we may become identified with the desk and yet still retain a mixture of "name," "quality" and "knowledge" in the mind. This is the lowest kind of samadhi, known as *savitarka,* which means "with deliberation." The term savitarka is only applied when the object of concentration belongs to the order of the gross elements, the most external order of phenomena.[9]

2.3.3 Design Problem Using Semiotic Theory

An example of deconstructive analysis and resynthesis through semiotic theory was posed to three artists to demonstrate and test a practical application of the theory. The object under consideration was a chair in the restaurant near MIT called Au Bon Pain. The idea was to analyze the chair according to sign, syntax and semantics and try changing the elements within one of the categories to discover the effect of this deconstructive analysis and observe some possibilities of reconstruction - the design of another chair. This is a template for a design theory: feed in the design problem and carry it through various steps to come up with one or many solutions. Someone designing a restaurant chair, for example, might find it useful to go through the steps in the following example.

Object/word/idea under consideration: chair

Deconstruction:
basic analysis of object according to sign, syntax and semantics.

Sign:
(What is the gestalt or template cued, culturally, by the word (idea) 'chair'?)
In its simplest, non-specific form, a chair is an object made to sit on.

Syntax:
(What are the rules that dictate the form of this specific chair?)
This chair is wooden, painted red, has four legs, round seat, curved back, no arms, and is small, light-weight, and mass-produced.

Semantics:
(What are your personal associations with this specific chair?)

Designer 1: The chair is a restaurant chair. The red color makes me think of the restaurant, Au Bon Pain, because that is their color. Red is visually stimulating and perhaps they think it will make you want to eat at their restaurant. Perhaps the restaurant thinks it creates a pleasant atmosphere, but I find it disturbing.

Designer 2:

Associates chair with Au Bon Pain restaurant; red paint suggests selling; red is the first thing you notice; red is the 'emergency' color; the chair isn't comfortable; likes them because they are functional; has a neutral emotional response to the chair.

Designer 3:

Associates the chair with traditional Viennese cafe chairs; vaguely European, supporting Au Bon Pain image; red color seems wrong - they should be white; pleasant; they are fine to sit in and carry around; the curved back is comfortable.

Reconstruction:

Change the chair, redesign it or design a new chair, by changing characteristics of sign, syntax or semantics. Approach from only one category at a time, realizing that change in one node of the semiotic triangle affects and changes all the other nodes.

Sign:

Change the sign, the general, cultural template that the chair is, "an object made to sit on."
Decide that it will be instead, "something to burn."

The change in sign automatically implies a change in function. Can the object still be called a 'chair' or should it now be called 'firewood'? There are degrees of change: the object can be changed so much that it acquires a completely new sign identity. If it is no longer at all recognizable as a chair, it may be only firewood. If it looks like a broken up chair, it could be seen as both a chair and as firewood simultaneously.

Semantics also plays a role, because from the point of view of the person who decided to turn the chair into firewood, the object may remain recognizable as the 'chair', even though at a keratin point no one else could see that. The greater the change to sign, the smaller the cultural context of those who recognize the previous sign. Perhaps specialists or those with shared, specific knowledge for example, those who frequent the Au Bon Pain restaurants, would recognize the object's previous incarnation as a chair.

Sign is a culturally-based template. If someone from a culture that did not use this kind of chairs saw the object, it could be an undefinable, unrecognizable object until they saw it used by someone that knew it as a something to sit on.

Syntax:

Change the rules that govern physical manifestations of the specific chair, i.e., a change in its specific characteristics.

The syntax of the chair implies it could be changed so it was <u>not</u> wooden, not painted red, did not have four legs, did not have a round seat or curved back, had arms, and was not small, light-weight, or mass-produced.

The designer decided to change the chair by making it out of paper instead of wood. This change affects the sign and semantics, of course. The chair may still be perceived as an 'object to sit on' but the conflicting understanding that it will not support human weight may engage the perception that it is perhaps an 'artwork', a chair that can be mentally sat on but cannot be physically sat on. Artwork often describes a category of objects with conflicting sign values in some way or other.

Changing these qualities makes you realize that the new chair may no longer be useful to Au Bon Pain clientele. Changing the syntax of the chair has affected its function. For the designer it is useful to delineate function to understand the rules of syntax. The chair in question fulfills the syntax of a restaurant chair for a certain type of restaurant.

Syntax (rules governing the physical characteristics of) a chain-restaurant chair:
1. cleanable
2. stackable
3. mass-produced
4. inexpensive
5. made to sit up in (not slouch) in order to eat
6. light, easy to move
7. strong, durable.

If the designer wanted to make a living room chair, for example, the syntax would differ.
Syntax (rules governing the physical characteristics of) a living room chair:
1. should be comfortable
2. made for individual taste (not necessarily mass-produced)
3. made to sit low in - slouch, relax
4. soft
5. can be expensive
6. cleaning not a priority.

It becomes obvious that semantics plays a larger role in the design of a living room chair, made to suit an individual's home environment and taste, than in the design of a chair for a chain of inexpensive restaurants, where consistency and familiarity is important to the transient public and establishing the restaurant's image. The conceptual emphasis in the semiotic triad has shifted toward the semantic node.

Usually the syntax is dictated by the function of an object. A designer can design a chair following the list of rules governing that particular object, as in the restaurant chair above. An artist might try to create a object without defining the function beforehand, but by subjectively changing the syntax. Idiosyncratic changes in the syntax could result in an object whose function is questionable. Again, however, these changes in syntax begin shifting the emphasis in the semiotic triad toward the semantic node with personal preference beginning to dominate syntactical logic.

Semantics:
Change personal associations with the chair.

Designers might gain more perspective if they speculate on the semantics of the chair's original designer: the curved, roundness of the back and seat; the chair's simplicity; sensuality of the curves compared to, for example, a Shaker style, high, straight-backed wooden chair design. The designer could have been from the Vienna Werkstatte period, considering the chair's Art Deco appearance. This is similar to the way an object can reveal information about its conception and history by tracing its syntactical characteristics to the root of personal choice and individual origination.
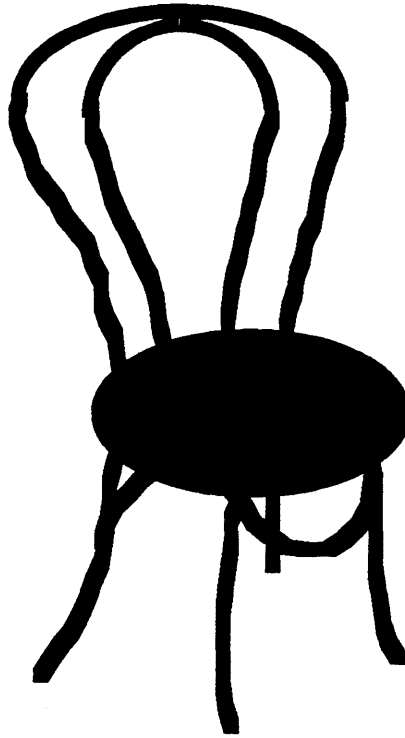
Fig. 2.6 The "Au Bon Pain" chair.

In order to change your individual semantic orientation, it is first necessary to define that orientation. Each designer made a list of their thoughts and feelings about their preferences in a restaurant chair. Then they randomly reversed every other one of these qualities to come up with a revised list of semantics - consciously altering their own semantics - and designed a new chair from this list. They tried to still fulfill the syntax of the restaurant chair as well.

Designer 1:

(My taste in general; what I like in a restaurant chair.)

1. I like the connotation of media

2. I like industrial sensibilities

3. I like electronics

4. I like straight lines and geometric shapes; circles, rather than curves

5. I like metallic colors

6. I like the chairs in the Cafe Beaubourg in Paris: they have flat surfaces, circles, green and brown metallic color, they are simple, machined, rolled metal, clean, big, with sides and a solid back

7. I like the suggestion of power, machines, less friendly or delicate

8. I like to look toward the future, not the past - not wistful.

Designer 1's revised list (with even numbers reversed in taste):

1. I like media

2. I don't like industrial sensibilities

3. I like electronics

4. I like curves rather than straight lines and geometric shapes, like circles

5. I like metallic colors

6. I don't like the chairs in the Cafe Beaubourg in Paris: they have flat surfaces, circles, green and brown metallic color, they are simple, machined, rolled metal, clean, big, with sides and a solid back

7. I like the suggestion of power, machines, less friendly or delicate

8. I don't like to look toward the future, but wistfully toward the past.

Designer 1's chair design based on his revised list and trying as well to follow the syntactical rules for the chain-restaurant chair listed above under 'syntax':

1. The chair would be spray painted multi-colored

2. Each leg is cut and used with the bark still on it

3. Chair plugs into the floor and has a light under the seat

4. The parts of tree limbs left cover my pretend dislike of basic geometry

5. Metallic spray paint is used

6. It has strong tree limbs

7. Trees were used in the past to make furniture.
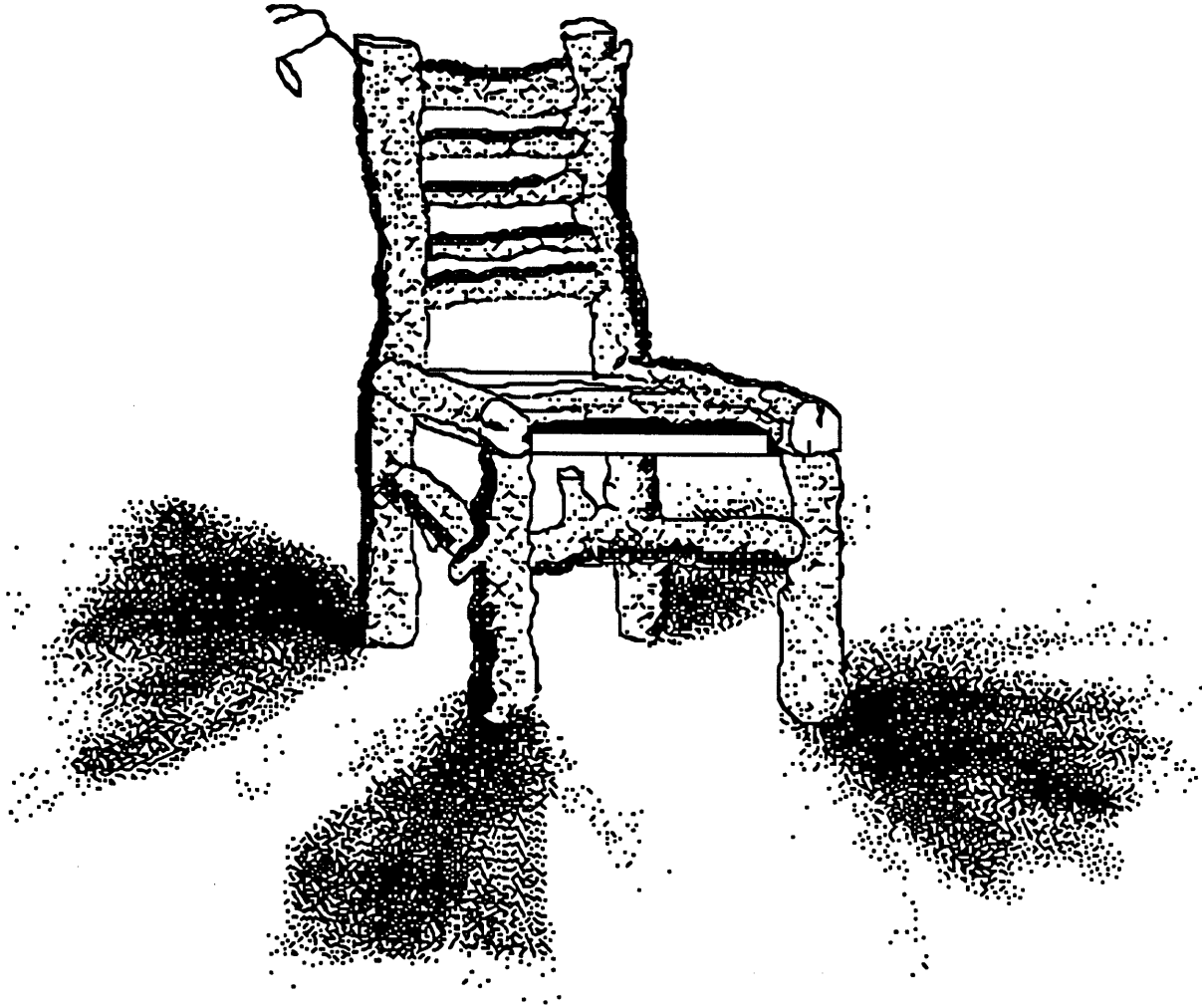
Fig. 2.7 New chair by Designer 1.

Designer 2's semantic preferences in a restaurant chair:

1. Should be dark, deep colors

2. Fabric must be really nice (not cheap stuff) and soft

3. Chair should have an interesting shape, but not too weird

4. Should be a little oversize, with arms and a little low

5. Wood is good, dark wood

6. Should match the rest of the decor

7. If it's a really fancy restaurant, it should be big enough to kind of sit back and nap in, especially after a big meal

8. Particular style is unimportant, but it should demonstrate care in conception, not look like a bad copy of something else, but really distinctive.

Designer 2's revised list of semantic preferences (reversing even numbers from above list):

1. Should be deep, dark colors

2. Fabric must be bad and plastic-like

3. Interesting shape

4. Undersize, with high arms

5. Wood is good, dark wood

6. Should clash with the decor

7. Should be big enough to slouch in

8. Quasi-good design, but flawed, a poor knock-off of a good design.
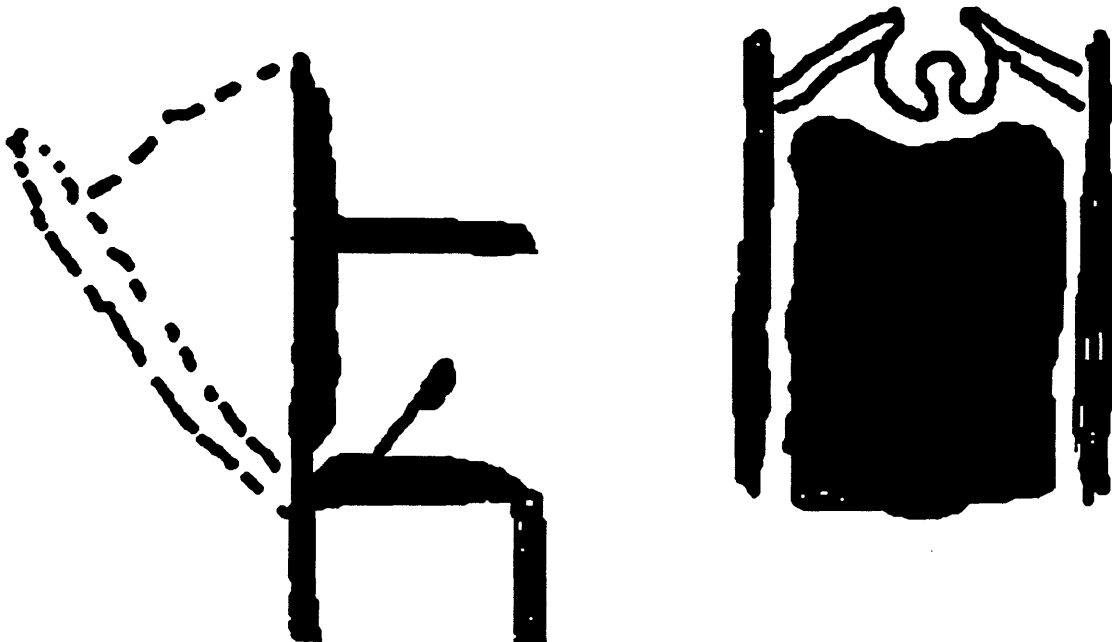
Fig. 2.8 Two views of new chair by Designer 2.

Designer 3's semantic preferences in a restaurant chair:

1. Comfortable

2. Soft

3. Supportive - so you can sit up

4. Large

5. Solid

6. Not too heavy to move

7. I like curves

8. Simple

9. Colorful

10. Plain

11. Expressive, elegant, supportive, present but not overwhelming, not too futuristic, not too old-fashioned.

Designer 3's revised list of semantic preferences:

1. Comfortable

2. Hard (not soft)

3. Supportive - so you can sit up

4. Small

5. Solid

6. Heavy to move

7. I like curves

8. Not simple

9. Colorful

10. Not plain

11. Expressive, elegant, supportive, present, but not overwhelming, not too futuristic, not too old-fashioned.

Designer 3's chair design:

My chair would be carved from marble, exquisitely polished so that it felt comfortable to sit on, curved in the seat. It would be low to the ground, a heavy mass of stone and colorfully painted. In fact it would be like the shape of a person or animal - like a statue of a saint in churches - bent to cradle the sitter.

Fig. 2.9 New chairs by Designer 3.

In retrospect designer 3 realized that there was not a completely fulfilled syntax of the fast-food restaurant chair. The chairs were not stackable nor simple to mass-produce. Either they must be redesignated to another function - perhaps a living room chair, or they can be modified again to fit the design for the restaurant. If they were cast from molds, for example, it may be possible to mass-produce the chairs out of a cheaper, more portable material.

By using an artificial manipulation of their semantic view points, the three designers separated themselves from their own semantic orientation and stimulated new ideas in their creative patterns.

2.4 Tools for Thought

> Take an object
> Do something to it
> Do something else to it
> "   "   "   "   "
>
> Jasper Johns[10]

The "Tools for Thought" list was compiled largely by Lowry Burgess.[11] The tools for thought are 'distilled' philosophies, thought methodologies encapsulated for easy reference and access. It is as if one is in a mental workshop and can reach for any of the mental tools - which are reasoning processes - while creating or modifying something. The tools for thought help define a creative problem and consider it according to different examples: it can be looked at it this way, or that way, or any number of ways. The cumulative effect is to aid in seeing the problem in detail and from unexpected perspectives.

The Tools for Thought list comprises methods of permutation. An object, word, or idea is subjected to permutation using one or more of the various tools. The formula could be: $a \ x \ thought \ tool \ \#n = a'$, where a represents an object, word, or idea. Permutation is useful for deconstructive analysis. It helps reveal your own perception and relationship to an object/word/idea, and so supports from another angle the deconstructive analysis of semiotics. As painter sculptor Jasper Johns notes in the quote above, permutation is also a useful reconstructive methodology.

An analogy to using a thought permutation would be some of the permutations that can be made on music sequences with music editing software systems like Performer. For example, a musical track can be made twice as long without changing the pitch. This permutation differs from a similar permutation on a taped sequence, in which the tape is played at half-speed to make it twice as long and the pitch is necessarily lowered. The thought permutations codify discrete parameters at work in the approach in order to give the most dynamic manipulation of it.

When I create something I can consciously employ the use of the appropriate thought mode or set of thought modes. If there is a complex structure of thought tools they can in an algorithm, that is, several operations occur concurrently, interdependently, etc. in the permutation. The process of applying the Tools for Thought in a creative project will be described in the concluding section of this chapter.

2.4.1 Tools for Thought List

The following is a list of the Tools for Thought as compiled by Lowry Burgess with brief interpretations I have made.

1) Deductive - Reasoning from the general to the specific. The conclusion follows necessarily from the premises from a principle to an action. This is analogous to a zoom lens; going from a general view into a specific, close up view.

2) Inductive - Immediate reality to the abstract or generalization. This is analogous to a 'zoom out', going from the specific to a more generalized notion.

3) Kinship - Ludwig Wittgenstein's 'Kinship' is the idea of going from one thing to another by way of related steps. An example of this was an art experiment by sculptor Tom Mangiratti.[12] He looked up the word 'love' in the dictionary. He then looked up the words in the definition. Eventually, but continuing this procedure, he arrived at the word 'hate', so step-by-step he evolved from one meaning to its opposite using 'Kinship', that is, these things were 'in kind', had 'kinship'.

4) Separation of the Middle - Removing what is not essential, also known as Lowry's 'acid bath'; asks the question 'What is not the thing'. The process is to take out everything that is not the element being focussed on. An example would be to consider a light fixture: what would it be if everything but the glass were to be taken away. The idea is to take away everything except that which is central to consideration.

5) Precedential - is used in the development of laws, standards, and in building on previous examples to justify subsequent cases. The idea is to build upon the precedents of the past. For example, in designing a new chair a precedent would be that chairs have backs.

6) Inside out - literal. Inside out is a literal turning inside out of a thing. Example: a coat turned inside out, a reversible coat. An orange might be cut in half and sewed back together inside out. It is a very physical permutation which could also work on a mental level.

7) Negation - This is an exploration as to the definition of an object beyond the first level of association. When considering a bottle one would say, "This is not a bottle." While doing so one would then observe what comes to mind. By thinking: ' What about this thing is not a bottle.' preconceptions about it can be surpassed. What might come to mind then is 'glass', where glass comes from; 'paper', where paper comes from; the label, what is involved in printing it. Distinct elements of the object are thereby perceived rather than the object as a preconceived whole.

8) Structural - Levi Strauss' variance and invariance. This is the idea of tribes of things. What happens to things through different processes. This is a structuralist approach of choosing something as a

constant e.g. 'the potato' and a variable 'the culture'. The 'potato' has a completely different value reflected by the structural changes, or ways in which it is cooked within various cultures.

9) Phenomenological essence - ' the phenomena an object produces'. By studying the phenomena that something produces, one knows about the thing, e.g. by observing the emotions one has while listening to a kind of music one might 'know' what its meaning is. That is it may be 'known, or felt ' what it is like to have lived in an earlier area etc.

10) Coincidence of opposites - jamming two opposites together creates a gateway to the sublime. When you combine opposite things a tension or friction is created that can reach the 'sublime', e.g., a bottle and its cap. Complimentary colors such as red and blue etc.

11) Occcham's razor - simplify by repeatedly cutting out what is unneeded. Both Umberto Eco's *Semiotics* and Ludwig Wittgenstein's book, *Remarks on Color*, are examples of Occcham's Razor. Eco remarks that he writes as such and Wittgenstein's "Remarks" are observations assuming almost nothing and often revealing many idiosyncrocies of language even while using a precise description.

12) Free association - opposite of separation of the middle. Rather than saying, what is this specific thing I want to look at, as in taking a lamp and considering only what is glass about it, which would leave only the bulb remaining, 'free association' describes what ever comes to mind likened to a continuum of gestalt cues. what if a light fixture had a personality imbued upon it. What if it were a face or what if it were in the form of an eyeball. This is imposing, through association, random thoughts upon something rather than pursuing a specific point.

13) Law of identity - Aristotle - Consider only things that are alike in some specific way.

14) Dialectical synthesis - word play. Using puns or word games to find a new meaning and to put things together. A good example is Bill Seaman's piece, "Soul Tap." It was an instrument used in shoe repair (a sole tap, for working on the soles of shoes) that was put in a frame and titled "Soul Tap."

15) Analogous - A is to B as C is to D. In analogies there is a matching process where the movement of one thing is analogous to another. For example, the shadow on a sun dial is analogous to the movement of the sun.

16) Syllogism - if A then B (and their families). Politics uses this often. Artificially imposing an illogical. If one makes the statement, "If it is a brick it is made out of clay." One might, as a reaction,

think about a brick made from an alternate material. It embodies the blaming of society, "the society is this way because..." is a complaint using a syllogism.

17) Logic - valid reason vs.irrational argument.

18) Hyperbolic - exaggeration. Examples of this are taking one part of something and exaggerating it, keying into a specific part and blowing it out of proportion, dramatizing a description and exaggeration to convey a point. An analogue is the hyperbolic microphone that is shaped like a dish and reflects sound waves into the 'focusable' pick up pointed at it's center .

19) Figure-ground reversal - Literally, reversing the figure and ground, the content and context. In a painting with a person standing in a field of grass the reversal would be to consider the context as the person and the field as the content.

20) Breaking and fusing - Literally, breaking things and put them back together in new ways.

21) Semiotic deconstruction - an attempt is made at separating sign, syntax, and semantics; the viewer, artwork and artist; the industry, product and consumer into the form of a triad . Then semiotic progressions may follow. Discrete lines of perceptions (or codes), within the global context are traced to indicate subtle nuances, peripheral data, or causalities contributing to the over all meaning of the content.

22) Seed to plant - Where did it start? What will it grow into? Think of the subject as a seed and imagine its evolution and entropy. It is a way of gaining foresight.

23) Postulated - Einstein's matching ideas against tested reality. Postulate and run tests to prove its validity.

24) Synectical - Psychiatrists use this with free association by allowing all the answers to surface with no preconceptions. after the phase of non-judgment, selectivity is brought in to action.

25) Ontological - "being" - the process of looking at something until its essence is revealed. Focussing attention on something and observing an automatic unfolding of meaning

26) Teleology - Is accessed by asking "towards what end or destiny are the manifestations of the design or purpose within the context of natural processes." Studying the technical side of a subject for the ultimate purpose of using it artistically is a teleological process.

27) Whys - past, future, and now. Why was this thing what it was in the past? Why will this thing be what it will be in the future. What is the present meaning of it. Consider the soda bottle. Why was a soda bottle what it was in the past? Associations can arise, such as soda machines, convenience, the adjunct soda can, etc. Why does a soda bottle exist now? There may be ideas reasons such as nostalgia. Why might there be soda bottles in the future? There might not be. It may remain as an artifact.

28) Mythic - divining, consulting cards, etc. Divining tools: rods, pendulum, cards, maps (common form of divining) emotional response, monetary, etc., discrimination and choice - Cage's chance art. This includes any and all spiritual and chance forms of thought. Generally the approach is to get outside of oneself. If one opens the book of change called the *I Ching* in a chance place and reads it the meaning is considered to be pertinent. These are systems that were developed to get an objective view on the situation or problem presented.

29) Synchronistic - Jung. A state of layline - position - circles of silence. This may be simply an awareness of the simultaneity of events. It is a subjective experience where several events have a similar meaning at the same time.

30) Metaphoric - Using a figure of speech that is ordinarily used for one thing is applied to another e.g., the curtain of night.

31) Sameness - Postulates the artificial preconception that the initial subject has the same content value as another and observes the thoughts that arise, e.g. by considering a book to be the same as a drinking glass one might find the association of drinking knowledge, or reading the taste of a wine.

32) Computational aesthetics - pixil/digital vs. hierarchical/analog. Time/form and the decisions made by man/computer. Computer Aided Thought - linear/non-linear.

33) Linear consisting of a line or lines of thought, and associated with causation as opposed to aesthetic, form based, multi-level, multi-layer, and Brownian gaseous movement theory.

34) Systematic Game Play - The use of math, and usually a computer-directed by curiosity to objectify aesthetic choices.

2.5 Conclusion

2.5.1 Summary

I have formulated the Schema for Creative Design from three different fields to facilitate a 3-pronged, cross-referential approach to the creative process. It posits that people begin with a mental scheme of information, some of it genetically encoded, some of it gained through growth and experience. They act on this information according to 'error signals' that convey their wants and needs. In the realm of creativity, the information can be analyzed with semiotics and then the Tools for Thought can be used to affect permutations. The underlying goal behind creative work is, in some way or another, new information. What constitutes "new information" is very much open to interpretation.

These three schematics fit together in sequence. Using the Schema to break down the codes operating in an object, word, or idea increases the so-called 'dynamic range' of expressiveness, because the artist becomes conscious of these codes and can thereby perceive on many levels: aesthetically, politically, formally, and so forth.

2.5.2 Practical Application of the Schema: Making the MIDI Bear-i-Phone

An example of using the Schema to create an object can be looked at in the development of the "MIDI Bear-i-Phone." I knew I wanted to create a character. According to Glasser's model, that was my first decision and that decision gave rise to other options. Should the character have eyes and limbs or only a head? Somehow it must represent a personality or personality type.

I chose an existing character that was already part of my world. The character I found was the Bear-i-Phone, a commercially manufactured telephone in the form of a teddy bear, with the call buttons on its chest. When the person on the other end of the line speaks, the bear's mouth and eyes move in sync with the voice, as if the bear were talking.

I chose this toy/phone and analyzed it with semiotics. From the sign node of the semiotic triangle, culturally, the object represented a cute toy that personalized a technology, the telephone. Syntactically it was a technically functional object: it rang and transmitted calls, fulfilling the rules that define a telephone. From the semantic point of view, my own perception of the Bear-i-Phone was that it represented a potentially frightening concept, the idea of giving a machine personality attributes. That someone would want a telephone anthropomorphized into a bear seemed absurd to me.

I decided that, in creating this new personality, I wanted to follow the lines of my personal semantic reaction to it. I would emphasize the idea that personifying technology was a strange idea. Several of the Tools for Thought came into play here: number 26, Teleology; and number 20, Breaking and Fusing. Teleology was the permutation by which I asked what is the destiny of the object, what is it going to be. I used Breaking and Fusing when I decided to take the fuzzy part of the head off and reveal the mechanical, robotic parts underneath.

In this action I was also interested in another Thought Tool, Coincidence of Opposites to Generate the Sublime. To incorporate this I wanted to retain the object's cuteness while using Breaking and Fusing to reveal its technology which has a bizarre quality. Juxtaposing cuteness and strangeness, juxtaposes opposites which result in the sublime. Precedential Law is also in effect, which is that it builds upon what was already there. The question is posed, 'What was it' and 'What should it be based on'.
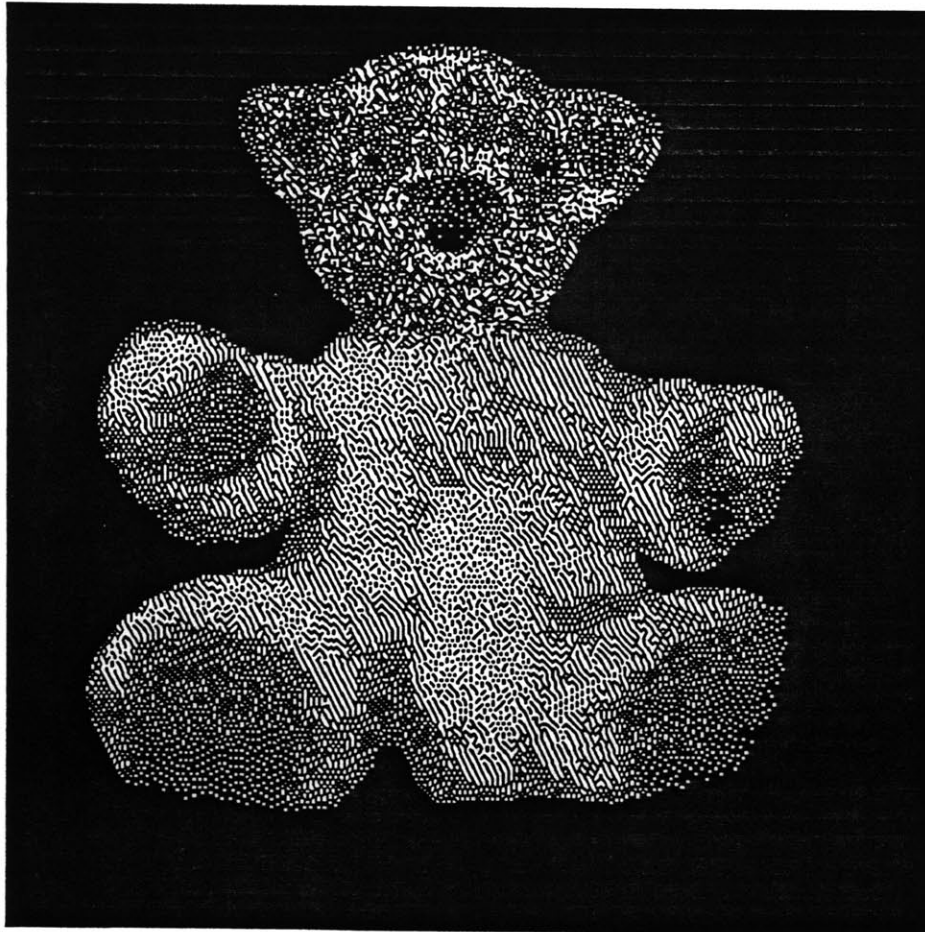
Fig. 2.10 Bear-i-Phone the commercial toy/telephone.

Another permutation was also based on Breaking and Fusing. Rather than taking away, I added. In addition to breaking, I did a fusion, which was to attach glass eyes designed for humans to the plastic bear eyes, giving a mechanical element a more visceral presence. Finally, in the MIDI Cube performance, the Bear was given a MIDI controlled computerized voice in a frequency range that was reasoned to be appropriate for a being of its size.
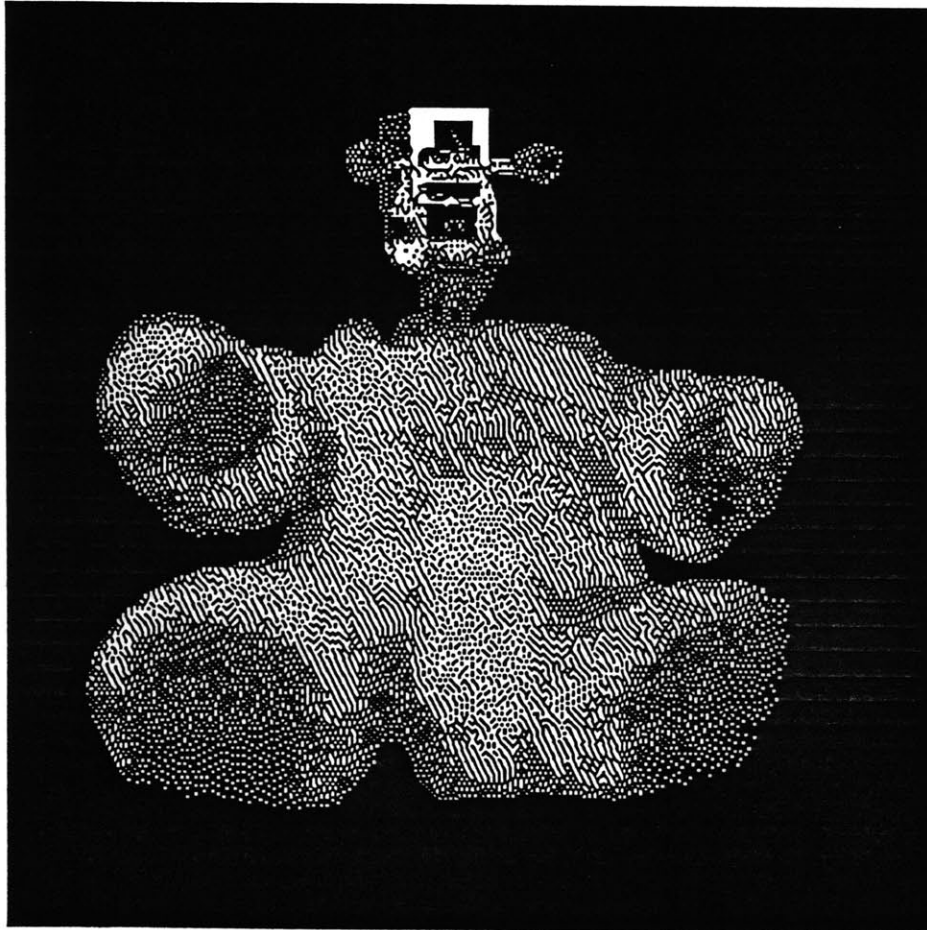
Fig. 2.11 MIDI Bear-i-Phone, the altered commercial toy/telephone, D. Atherton, 1988.

Using the mental model, semiotics and the tools for thought, I have thus generated a new being which is a resynthesis of a pre-existing object. It is a pre-existing object that has been evolved into something new. This theory and work is compatible with the idea that nothing is new and everything, even pure inspirational thought, comes from somewhere.

A schema of thought with all normal perceptions mapped out is the ground for crossing the branches, to, in a way short circuit the norm in favor of hybrid new meanings. When I chose to do the Breaking process on the Bear I had to go to another branch for mechanical operations, which offered all the 'how', that is, how to break it options I can think of. Should I use a razor blade to cut the fur, etc? It is having a map. If I am trying to get somewhere, this process of being aware of the global form can be an aid in the same way a map is an aid to find a location. It is more efficient, than asking random people for directions. With a map I know where to go because I have the greater picture and may even find other interesting places to go and things to do because of having the map.

Chapter 3

MULTIMEDIA PEFORMANCE AND GESAMTKUNSTWERK

3.1 Gesamtkunstwerk and Multimedia Performance

Gesamtkunstwerk is a term that is associated with the theories of German composer Richard Wagner (1813-83). There is no exact translation to English - literally 'together artwork' - though the term has attained common usage in the arts. Wagner used Gesamtkunstwerk to mean a synthesis of the arts. It describes the 'total work of art' he envisioned; that is, an art form in which all other art forms come together, creating a whole that is greater than the sum of the parts.

Wagner wrote his theories on the theater in the mid-1800s, elaborating his desire to personally create the music, text and *mise en scene* for his operas. He wrote, "For me tone and word must spring spontaneously and simultaneously from heart and head and the one must join the other as in a passionate kiss. Now, I can scarcely see how anyone can require someone else's intervention and assistance at such an act of love. That is why I take care of the matter without a companion." [13] One aspect of Gesamtkunstwerk is that the same artist composes for all the media comprising the artwork.

The romantic poets of the time, such as Goethe and Schiller, were concerned about the overwhelming role music had taken over text, particularly under the influence of Italian opera with the dominance of singers. The poets' attempts to achieve a more equal balance were less successful than the musicians' attempts, most notably the composers of *Lieder* for voice and piano, one of the great art forms to emerge from these efforts toward synthesis. The poets collaborated with various composers, but as the composers were not always of top quality, the results were only mediocre.

Wagner's letter continues: "What I create in the future in this regard will perhaps present me in a light which might be considered too glaring for the trained poet. But I should not be reproached for going my own way, and in the very near future I will be striking out in a direction which lies far afield from the main road." [14] As Jack M. Stein points out in *Richard Wagner and the Synthesis of the Arts*, "Wagner himself virtually admits his 'dilettantism'... he was nowhere thoroughly at home and authoritative, even in music, and, being impelled to take all art as his province, had to operate in a variety of fields at once, in none of which he was a specialist..." Stein quotes Thomas Mann, [Wagner's is] "dilettantism, monumentalized and elevated to the realm of genius by his extreme will power and intelligence." [15] As the term Gesamtkunstwerk has evolved in visual arts usage it has become associated with performance art. In performance art - and specifically the MIDI Gesamtkunstwerk I am concerned with - naivete is valid and sometimes even preferable in the artist's approach to new and varied media.

Is it necessary in Gesamtkunstwerk that a single artist compose for all the media or is it possible for several artists to collaborate on a work and still call it a Gesamtkunstwerk? What is clear, is that a Gesamtkunstwerk pulls together many media. Beyond that, it is hard to say. John Cage's 1960s happenings at Black Mountain College are the first recognized (categorized) performance art[16], although performance art has existed for much longer without a formal title. The performances were Gesamtkunstwerk consisting of many simultaneous media events. It is my personal belief that all multimedia performance art is an impulse toward Gesamtkunstwerk, because it approaches the audience from a variety of vantage points and circumvents traditional forms of performance.

The essential quality of Gesamtkunstwerk, then, is that it involves multimedia; and the media are used with equal emphasis toward a single vision. In Wagner's operas the media are intertwined so that music can replace text in conveying aspects of the narrative, as in the use of *leit motives* to signal a character's presence, Siegfried's horn call, for instance.

It seems that theater and film are not true Gesamtkunstwerk, although they come close, because both are generally motivated by the story and told primarily with text and language. Thus the narrative and the text are dominant and are supported by the visuals and music. In Gesamtkunstwerk the media share foreground and background or leading and supportive roles. Sometimes, all the media are equally present; other times one or the other is in the foreground.

There are examples within film and theater works, of course, that do demonstrate Gesamtkunstwerk. One such episode is the opening scene in Rainer Werner Fassbinder's film, *The Marriage of Maria Braun*. The explosion of war within a small German town conveys and transcends its narrative intent in the orchestration of objects flying through the air, sound effects, music and action in a visceral experience. This is the ultimate effect of Gesamtkunstwerk: to appeal directly to the audience through all the senses rather than emphasizing one or the other.

A transcendent moment within a Gesamtkunstwerk can have the effect of transporting the audience, giving them the experience 'of being there'. When driving recently, I noticed a particular confluence of events that had the effect of making me forget myself and become totally absorbed in the environment. The input at that moment included driving through a construction site, music on the radio and the movement of the car. It might be compared to simultaneous multi-modal synesthesia . I might describe the experience as feeling as though I was in a movie, because of the way the sensory inputs seemed to go together as if they had been planned or edited. When all the senses are stimulated in a particular way a moment of direct multi-level perception can occur.

To return to Wagner's thinking and the relationship of narrative to the 'direct experience', Wagner considered German mythology a story that was 'beyond narrative', a narrative that was deep in the mass psyche of the German people. Semiotically it had considerable sign value. For this reason, the mythological narrative could be considered a facet of direct, sensual experience because it was felt on some deep, internal level. Modern Gesamtkunstwerk does not necessarily have the trappings of 19th century nationalistic romanticism. However in MIDI Gesamtkunstwerk a 20th century form of mystic causality is implied, as will be described in detail in the final chapter.

As theatrical media have evolved in speed and ease of use, they have become invisible to some extent: electronic connections setting up mysterious collaborations between otherwise inanimate objects. MIDI Gesamtkunstwerk supports the idea that a single artist may control many elements: sound, imagery, machines, lighting, fog, etc. from a single locus. But it does not postulate that the work *must* be controlled by a single artist, nor that its effect will change the audience in some mystical or political way. It is more that an artist can have access to many media and compose with them in a highly specific and fluid manner. The MIDI aspect erases the need for a 'Superman' to orchestrate multimedia and allows for the individual's vision with aid of the personal computer.

3.2 Multimedia Performance Art

I have always worked in a variety of mediums, from music to sculpture, and have found performance art an appropriate setting for putting them together. I have been particularly influenced by the originators of performance art, the Futurists and Dadaists for their treatment of industrial noise and sound as music; their treatment of language as sound and vice versa; their use of mechanized performers and puppetry; their rejection of formal demarcations in music, dance and art in the creation of theater; and support of chaos and varietal overload because in a way it is life like.

Performance art has existed for a long time, but according to Rose Lee Goldberg, "performance became accepted as a medium of artistic expression in its own right in the 1970s." Acknowledgement during this time period was largely due to its being defined as "an art of ideas over product" and "an art that could not be bought and sold."[17]

3.3 The Futurists

3.3.1 Futurist Manifestos

Fig. 3.1 Filippo Tommaso Marinetti.

Futurism began with the publication of the first Futurist manifesto on the front page of the Paris daily newspaper, *Le Figaro*, in February, 1909. The author was the Italian poet Filippo Tommaso Marinetti, writing on the influence of the free verse being evolved by Alfred Jarry and others. On December 11, 1896 Jarry opened his slapstick and absurd production of *Ubu Roi* at Lugne-Poe's Theatre de l'Oeuvre. "The play was modelled on schoolboy farces from Jarry's earlier days at Rennes and on the puppet shows he had produced in 1888 in the attic of his childhood home..."[18]

"All literary Paris was primed for opening night. Before the curtain went up a crude table was brought out, covered with a piece of 'sordid' sacking. Jarry himself appeared white-faced, sipping from a glass, and for ten minutes prepared the audience for what they should expect. 'The action which is about to begin', he announced, 'takes place in Poland, that is to say: nowhere.' And the curtain rose on the one set - executed by Jarry himself, aided by Pierre Bonnard, Vuillard, Toulouse-Lautrec and Paul Serusier - painted to represent, in the words of an English observer, 'indoors and out

of doors, even the torrid, temperate and arctic zones at once'. Then pear-shaped Ubu (the actor Firmin Gemier) announced the opening line, a single word: 'Merdre'. Pandemonium broke out. Even with an added 'r', 'shit' was strictly taboo in the public domain; whenever Ubu persisted in using the word, response was violent. As Pere Ubu, the exponent of Jarry's pataphysics, 'the science of imaginary solutions', slaughtered his way to the throne of Poland, fist fights broke out in the orchestra, and demonstrators clapped and whistled their divided support and antagonism. With only two performances of *Ubu Roi*, the Theatre de l'Oeuvre had become famous."[19]

Futurism was ambivalent to classical or academic forms of presentation. Marinetti wrote a manifesto on the 'Pleasure of Being Booed' as part of his *War, the Only Hygiene*, (1911-1915). "Futurists must teach all authors and performers to despise the audience, he insisted. Applause merely indicated 'something mediocre, dull, regurgitated or too well digested'. Booing assured the actor that the audience was alive, not simply blinded by 'intellectual intoxication'. He suggested various tricks designed to infuriate the audience: double booking the auditorium, coating the seats with glue. And he encouraged his friends to do whatever came to mind on stage."[20] At the same time there was an interest in a very formal angle in the treatment of language, sounds, costumes and sets.

The *Variety Theatre Manifesto*, published in October 1913, formulated the official theory of Futurist theater. 'Variety' meant that Futurist theater incorporated a wide variety of styles and performance practices, generally geared toward creating a sense of 'madness'.[21] Story line was considered *passe* and the only obligation of performers and performance was 'incessantly to invent new elements of astonishment'.[22] Stimulating the audience to interact was also important, in order to free them from passive consumption.

One example of 'variety theater' was *Piedigrotta* by Francesco Cangiullo, performed by Marinetti and others in Rome in 1914. This performance is particularly pertinent because it featured home-made noise instruments. The author played the piano in the gallery, decorated by Futurists' paintings. A troupe of 'dwarfs' (played by Futurist artists) declaimed Cangiullo's 'words-in-freedom' texts and played instruments of their own design: "large sea shells, a fiddle bow (actually a saw with attached rattles of tin) and a small terra-cotta box covered with skin...fitted with a reed..."[23] As the style of poetic declamation evolved, Marinetti wrote that noise instruments should be held while declaiming with hand gestures and that the feet should gesticulate as well.

The variety theater demonstrated Gesamtkunstwerk in that the saturation with media and near-chaotic atmosphere stimulated the viewer into heightened awareness.

In a group comprised largely of writers and poets, Futurists' performances integrated language and sound: language that onomatopoetically evoked environmental sounds (e.g., Marinetti's "zang tumb tumb" evoked the sounds of artillery in WWI trenches) and sentences that strung words together because of their sound and poetic content rather than in grammatical structures. Noise instruments also evoked the sounds

of the environment. Noise was appreciated as part of a musical and poetic language based on sound: sound as meaning.

3.3.2 Futurist Precedents

The Futurists pioneered many of the concepts still active in contemporary performance art and in my own work with multimedia performance.

They were interdisciplinary: poets, painters, musicians, dancers, artisans who became performers and used each other's media. ·

They were naive: they preferred to use media in a naive way to counteract established concepts and expectations. For Marinetti their theater was "anti-academic, primitive and naive, hence the more significant for the unexpectedness of its discoveries and the simplicity of its means."[24]

They were interactive and participatory: they involved the audience in their performances so that they could experience art, "liberating them from their passive roles as 'stupid voyeurs'."[25]

These qualities - interdisciplinary, naive and sometimes interactive - and the integration of noise and sound as music recur in various proportions throughout my work. An example is the "midicube." As a visual artist, I use music in a deliberately untrained manner, based more on its timbre and instinctive visceral effect. Sound effects, Foley, industrial noise and invented hybrid, sculptural robots form the instruments, using digital sampling and MIDI to make them playable , 'convincing' and 'animate'.

The use of puppets, robots and toys, often 'primitized'/'hybridized' by pulling them apart to reveal their mechanisms - their so-called strings - or merging several parts in to one makes them the actors and our surrogates in my electronically-controlled environments. Their naive presence in a hyper-technological setting symbolizes to me some of the polarities in modern culture.

William Wiley, an artist I was greatly inspired by, created a sculpture called "Mr. Unnatural and His Friends." A piece of plywood was cut to the shape of a torso, head and hat. It hung from the ceiling. The legs were rubber surgical gloves with tree branches coming out of it. The plywood that made up his body was hand drawn image of the face and hat and his jacket and arms were drawings, sketches and comments. He had a small cape. Between his legs, like a witch riding a broom, was a pole 12 feet long and every 1/2 foot alternated between red and white - a red and white striped pole. Behind him, below, was a circle cut out

of some flat material (wood?) painted white with a face on it and a very crude arms and legs, partly coming out of it, barely exposed, flat like a stand up cardboard piece.

This was inspiring because it appeared to be very niave as if by someone who was not art educated. It seemed removed from traditional art means, yet it achieved immense character and personality.

Finally, the audience is inside the performance, wandering through it. The theater is not presented in a pre-packaged, linear or contained (as in the proscenium stage) manner, which would allow the audience to safely relax into their preconceived notion of what will occur. Complacency and even safety are issues are part of modern performance. As extreme as the dangerous explosives events by Mark Pauline, the subtle world of electronically controlled, and programmed, lifestyles can also be seen as unsafe.

The MIDI-controlled environment is not only a warning or social commentary. It also suggests a metaphysical view. Connections between people and events are insinuated to show that actions and volitions are interrelated. This is where the action and reaction leading to another action and reaction in a continuous, evolutionary (or de-evolutionary) cycle as part of the structure of the work. An example of artwork demonstrating one type of causality is a videotape by Swiss artists Fischli and Weiss in which physical objects affect each other through a sequence of physical, chemical, gaseous changes that cause motion (to be discussed in Section 4.3). I am concerned more with the special effects and aesthetics of the supernatural in a fine art context.

The computer embodies our metaphysical or psychological orientation, just as machines and artworks reflect, as all products do, the mind that made them. This is an argument that the functions of machines and artwork, industrial and cultural, practical and inspirational are linked and intertwined. Therefore artwork using industrial hardware and technological software can be provocative.

3.3.3   The Art of Noises: Historical Roots of Industrial Music

Inspired by Marinetti's 'zang tumb tumb' description of battle sounds, the painter Russolo wrote a manifesto entitled, *The Art of Noises*, in 1913. He was convinced that the 19th century birth of industrial machines had eradicated silence; the silence of the countryside was forever lost to the din of the cities. Music must follow suit and become noisier, because the level of stimulus for the listener must be higher than before. As he put it, "noise was born" and "pure sound, in its exiguity and monotony, no longer arouses emotion"[26] - surely an arguable point, although 20th century people have never experienced pre-machine age sound and can not appreciate the contrast as Russolo did.

Russolo created instruments for a concert of noise music (see Fig. 3.2) which, "...resembled the sounds heard in the rigging of a channel-steamer during a bad crossing...." The same London *Times* review called the players "noisicians."[27] Russolo was interested in the sounds of trams, explosions, motors, trains and crowds and felt that at least 30 thousand noises were possible.
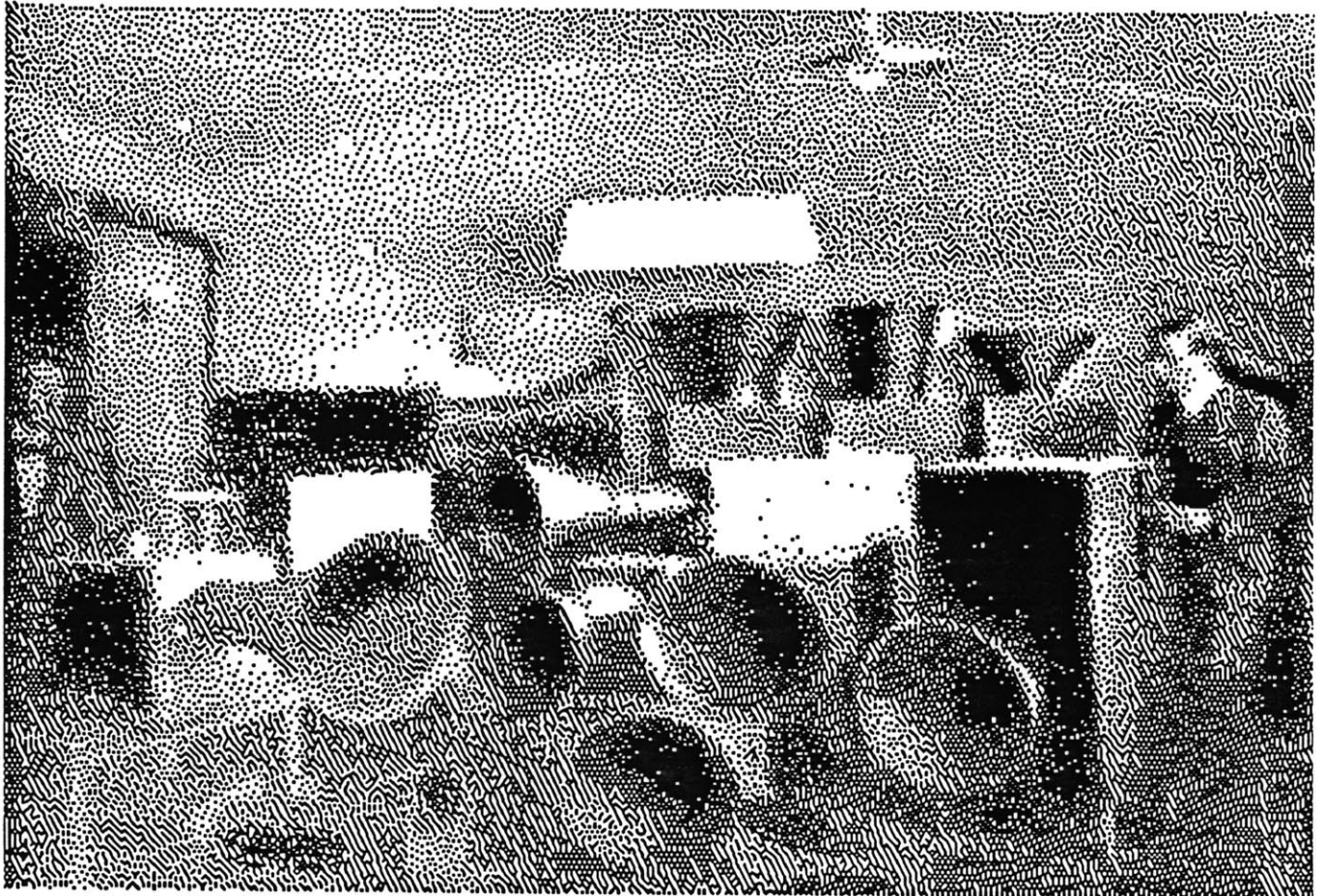
Fig. 3.2 Russolo and his assistant Piatti with *intonarumori*, or noise instruments, 1913. Russolo's manifesto, The Art of Noises, states that noise is a valuable source of music.

When I was young I had painting lessons which instilled preconceptions which later inhibited my approach to painting. In light of that when I became interested in music I wanted it to be purely my own discovery. I avoided lessons, hoping that I would not attempt to 're-invent the wheel' as I learned. The negative side of this approach is that you have to discover things you might have been taught. On the positive side I wanted to have my own internal sense and character to my music rather than having to grapple with established techniques. I was very interested in sound and timbre.

My earliest inspiration in sound was that my father had an oscilloscope. The way the oscilloscope interpreted sound visually was exciting. I built a color organ and a multimedia box about the size of a coffin, which contained a color organ section and a theramin, a device that maps physical distance proximity in relationship to pitch: the closer to the object, the higher the pitch.

There are a number of examples of industrial noise/sound bands working with performance artists. For example, SPK is an industrial noise band that has performed with Mark Pauline, further discussed in Section 3.5. These avant-garde performers have a link with musicians interested in sound as music, which I have also found to be an element in computer music. The interest in the barrier between sound and music - when is something sound and when is it music - is a common interest between these extreme polarities of synthetic music production and these very crude approaches to sound/music production.

For example, early in his career the popular synthesizer music composer Vangelis began making very rich and complex sounds by banging on a gas tank half full of water and moving it to get some eerie sounds. He collects unusual instruments such as these.

When working for Jonathan Harvey, an English composer, during his residency at the Media Lab, I played for him some industrial music which he agreed had similar properties of aesthetic focus as some of his music and other 'serious' contemporary computer music. The pieces I played for him included selections from the Cocteau Twins and This Mortal Coil, two popular recording groups who worked with very rich timbres of sound. Other popular bands, such as the Art of Noise, Pere Ubu and Cabaret Voltaire have taken Futurist and Dadaist namesakes.

SPK is famous for coming into a city to perform and going first to the junkyards to collect pieces of metal with which to perform, by bowing it, striking it, etc. Much of the research in synthetic music deals with matching the algorithms to strikes, attacks, decay, sustain and release of sound waves that is very much at issue with these noise/sound musicians. I think there are common interests, between contemporary musicians and artists towards expanding timbres to include influences of the industrial environment, whether it be electronically synthesized or a function of making noise with the industrial material itself.

3.3.4 The Mechanical Performer

With the Futurists, the influence of the machine extended not only to music, but also to the performers' costumes and movements. Marionettes were designed to look and perform like machines, such as locomotives, sometimes performing alone, sometimes with human partners. Choreographers traced the

movement of machines, like the pistons of an engine, in their dances. A manifesto called *Dynamic and Synoptic Declamation* outlined a style of movement based on machine motion: "Gesticulate geometrically in a draftsmanlike topical manner, synthetically creating in mid-air, cubes, cones, spirals and ellipses."[28]

Puppets are recurring icons which I consider symbolic of man's issue self-mechanization. The puppets in Fig. 2.4 were made on lathes. They look machine-made. Formally they are quite similar to Oscar Schlemmer's costumes, giving the human form a machine-made look (Fig. 2.5).

3.4 Dada

In 1916 cabaret performer Emmy Hennings and writer/artist Hugo Ball founded the Cabaret Voltaire in Zurich. The Cabaret Voltaire was a meeting and performing place for artists. The club lasted only five months and out of it the 'Dada' movement was born. Ball was a German, living in Switzerland to evade the draft and service in World War I. Profoundly discouraged with society and its *modus operandi*, Ball, Hennings and their colleagues sought to create a "...living art [that] will be irrational, primitive, complex: it will speak a secret language and leave behind documents not of edification but of paradox." 'Living art' would counter, in Ball's words, "an age like ours, when people are assaulted daily by the most monstrous things without being able to keep account of their impressions." He felt that, "in such an age aesthetic production becomes a prescribed course"[29] and hence the development of an art form that resists definition and is, most likely about resistance itself.

Ball had, several years earlier and for the same reasons, been very interested in Gesamtkunstwerk. Because the 'common sense' exhibited in political and cultural actions had such destructive results, he felt that artists would be best suited to unite and formulate philosophy. This philosophy should, above all, oppose common sense. "The 'regeneration of society' would come about through the 'union of all artistic media and forces'."[30] He attempted to bring together artists, writers and musicians in Gesamtkunstwerk through theater, but did not succeed in getting the backing. He eventually concluded that theater was of little importance and effect in light of the war.

Cabaret Voltaire offered nightly performances, dances, theories, manifestos, poems, paintings, costumes, masks in a highly charged, raucous atmosphere. Because there was little preparation time, spontaneity was a built in and valued aspect of the style. This agreed with Marinetti's theatrical idea of 'synthesis'. 'Simultaneity' was one documented stylistic feature, for example the reading of several texts at the same time.

However, style and documentation were at issue. After the cabaret closed down, its organizers went in different directions. Ball and Richard Huelsenbeck diverged from Tristan Tzara, who went about the business of formalizing Dada through publications and exhibitions. Ball and Huelsenbeck did not agree with codification of the work at that time.

"'*Dada*, is "yes, yes" in Rumanian, "rocking horse" and "hobby horse" in French.' 'For Germans', Ball said, 'it is a sign of foolish naivete, joy in procreation and preoccupation with the baby carriage.' On 18 June 1916, Ball was writing: 'We have now driven the plasticity of the word to the point where it can scarcely be equalled. We achieved this at the expense of the rational, logically constructed sentence, and also by abandoning documentary work.'[31] The Dadaists were carrying Marinetti's 'words-in-freedom' concept further.
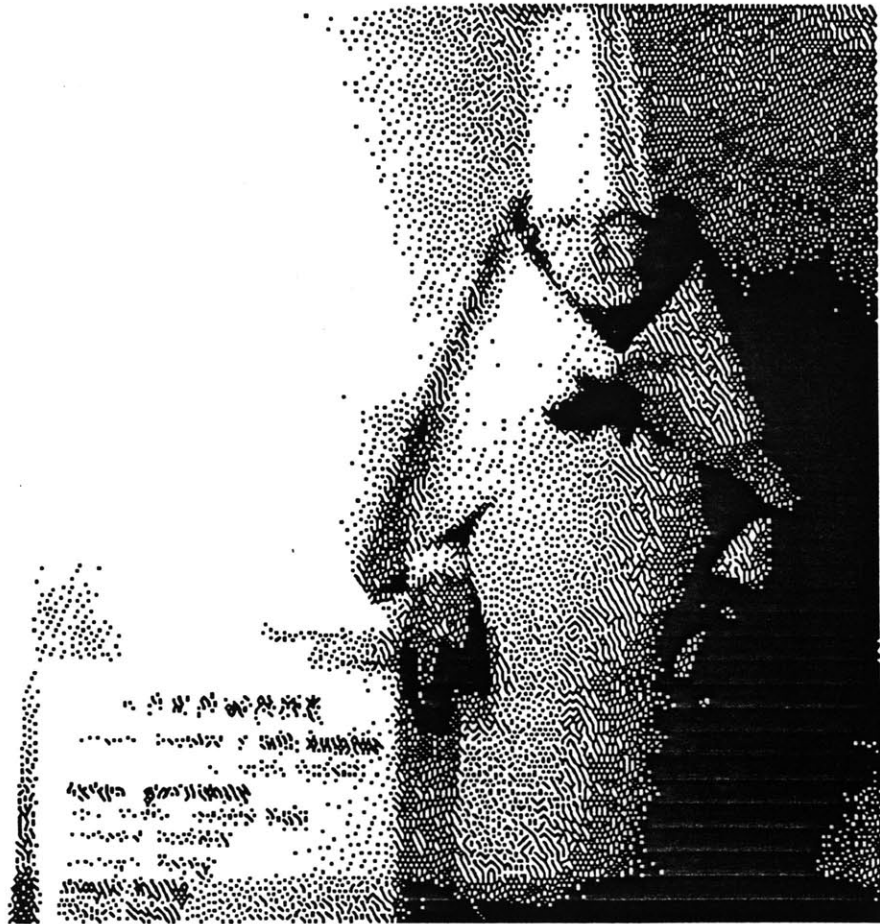
Fig. 3.3 Hugo Ball reciting the sound poem *Karawane*, 1916 at the Cabaret Voltaire. Ball placed texts on music stands.

Part of the underlying idea of Dada was that after the war, it seemed that life had no meaning after what had happened, then nothing had meaning. There was a specific antagonism to the bourgeoisie. Odd and useless objects were made, like Meret Oppenheim's teacup and saucer covered with mink fur.

In Berlin Dada took on a more political aspect with slogans like, "Dada kicks you in the behind and you like it"[32] as they battled against respectable art, specifically expressionism. Anarchy, embracing the unthinkable, near madness, anti-establishment and militant behavior characterized their rebellion.

3.5   Contemporary Multimedia Performance as Gesamtkunstwerk

3.5.1   Survival Research Laboratories
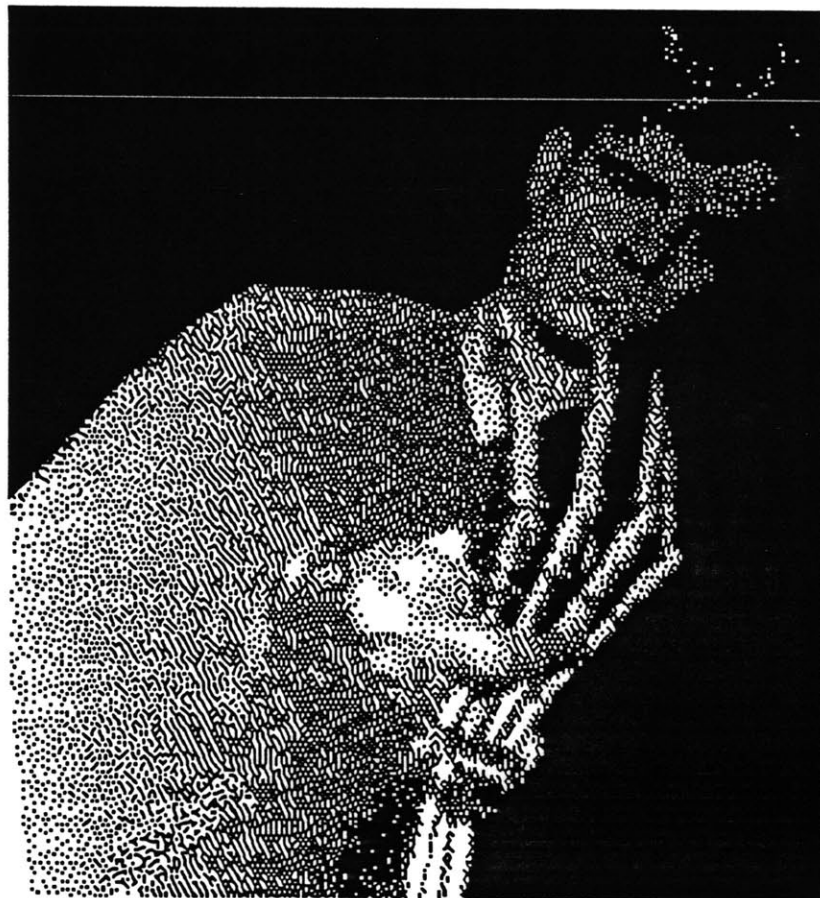
Fig. 3.4 Marc Pauline of Survival Research Laboratories examines Eric Werner's fully automated mechanical arm. Some of Pauline's fingers are missing from working with explosives.

As a member of Survival Research Laboratory Los Angeles artist Mark Pauline makes huge robots that attack and destroy each other. People have been known to be hurt during performances which take place in parking lots, but the artist considers that part of the performance. He works with charred animal carcasses and other kinds of terrifying imagery. The art is beautiful because it's true. It is not aesthetically pleasing in the usual sense of the word, but is pleasing because it is a true portrait of some of the terrors that happen in the world.
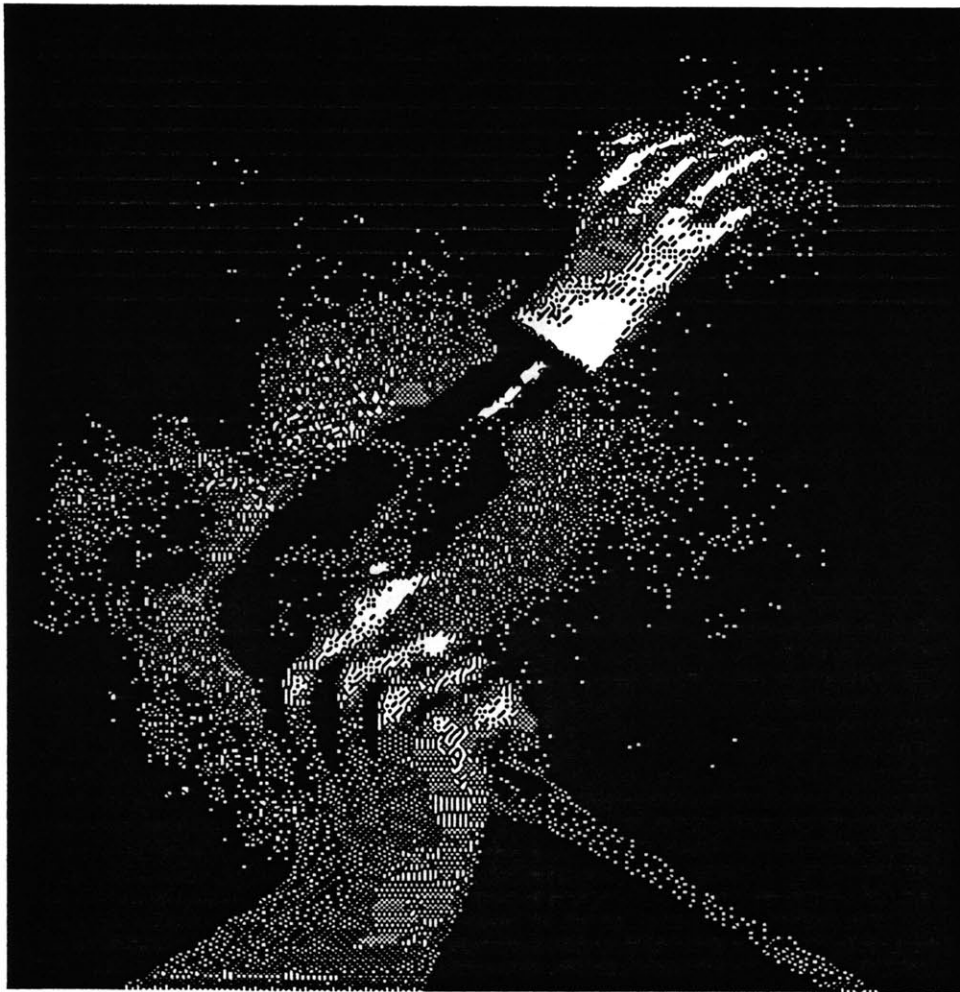
Fig. 3.5 Hand Drill for the Industrial Ballet, D. Atherton, 1981.

In one Mark Pauline piece a mechanical hand arises from a vat of oil. Four dead rabbit carcasses are supposed to be worshipping the hand. An explosion blew off much of Pauline's hand, leaving one finger.

One of the Tools for Thought (#10) posits that aesthetic ecstasy is achieved through the smashing together of contrasts, or opposites. The contrasts in the case of Pauline might be horror and truth. There are horrific images which are in contrast to the poignancy of the work.

Fig. 3.6 Piggly-Wiggly: the first attempt by SRL at mating meat (cow head, pig hide and feet) with machinery. It is equipped with one fully automated right fore leg and shuddering mechanism. From "Night of the Succubus," Ed Mock Dance Studio, 1981.

Survival Research Laboratories makes individual robots with archetypical personalities (such as various mummies on the Mummy-Go-Round, Piggly-Wiggly, The Mobile Mr. Satan, Flamethrower and Face Prop) and puts them into performance together with a similar conceptual orientation to the way that I conceive of and assemble the MIDI Robot Orchestra for performances.

3.5.2 Influence of Films on Multimedia Events and Gesamtkunstwerk

In Ridley Scott's science fiction film, *Blade Runner*, J. F. Sebastian, a bio-mechanical engineer, lives in a penthouse filled with animated beings, friends that he literally 'makes'. Within the context of the movie there is a wide spectrum of his creations that are robots or are biologically alive, or variations of both, which presents a confusing definition of what it means for something to be alive. This issue is a central theme of *Blade Runner*, set in the not-too-distant future when robotics, bio and genetic engineering will be highly evolved techniques.

J. F. is greeted by two midgets when he arrives home each night, one with a teddy bear head and one with a foot-long nose and orthodontic retainer, heralding, "Home again, home again, jiggidy jig!" Harrison Ford plays a 'Blade Runner', a detective specialized in tracking down rebellious 'replicants', which are lifelike robots indistinguishable from human beings. When he searches for Daryl Hanna, a replicant, at J.F.'s home, he finds an infinite variety of 'life' in J.F.'s living room, including puppets that are mechanized, a jolly man who wobbles back and forth whose voice is a crude laugh recording, and other breathing, walking, or swimming clones or gene strains. For the audience, the variety of creatures present a confused mixture of science and magic. In the midicube I hoped to provoke the sense of unconventional things seeming alive and having almost human feelings and emotional responses to each other. Assumptions about mechanized environments was also a concern through the interaction of lights responding to the mechanical movement.

As mentioned previously, in the opening shot (more so than the final shot though they function as bookend 'explosions' in the film), of Rainer Werner Fassbinder's film, *The Marriage of Maria Braun*, the wildly explosive nature of the sound and visuals interact to create an intense yet slick and visually fluid perceptual fabric. The compilation of many discrete actions: explosions, paper flying, one man tackling another, screams, doors flying, etc. into a visual and aural display that interests me rather than the narrative function of these events. It is precisely because they seem to stand out of context (functional daily life) which makes them beautiful in and of themselves, so that they function as a poetic or artistic experience. The sheer intensity of sound and image overwhelms the viewer, creating the type of peak experience I associate with Gesamtkunstwerk.

The same paradigm exists in *Fanny and Alexander*, by Ingmar Bergman, when the child Alexander finds shelter at his cousin's puppet studio. One night Alexander is snooping around and is frightened when the puppets suddenly come to life. An ambiguity about whether the puppets are alive or not - similar to the Pinoccio story - is sustained in both Alexander and the film audience until he discovers that his cousin was putting on a show for him.

A mystical theme of real versus illusion extends to the film maker and his relationship to film - creating the experience of a real world that is a complete illusion, as film is. This ambiguity is portrayed through the eyes of two children, for children have less differentiation between fantasy and reality, or, as it is evoked in the film, magic and reality/religion. Film as Gesamtkunstwerk, an art that transports the audience away from their own into another reality, is explored as the audience is not definitively told what the 'truth' is. They are left within the children's subjective perception of the story, to speculate for themselves on how far the illusion extends.

Alexander is introduced to an Egyptian mummy and told that if he looks carefully, he can see it breathing. At first it is unclear whether this mummy is a convincing robot or a real creature. It is later revealed that not only is it real, but it is used as a voodoo-like catalyst to destroy a distant building and its inhabitants. After Elysia, the locked-up, androgynous psychic, encourages Alexander to unleash his hatred for his evil preacher-stepfather, there is a synchronous sequence between the mummy and an elderly, obese woman at the austere home of the stepfather. As the mummy raises his arm, there is a cutaway to the sick woman raising her arm toward an oil lamp; another cut away to Elysia holding Alexander encouraging his rath until the woman is seen running through the house as a human torch, burning the house and the stepfather. The psycho-physical magic implied in the sequence is a major perception that can be engendered in the audience. In a multimedia performance, for example, they may not attribute their perceptions rationally as scientific or technical connections between the robots and the environmental light and sound.

The Australian film *Road Warrior* (George Miller), depicts a post-nuclear world in which machines are forged together from debris. The simultaneously crude and sophisticated mechanisms reveal the fragility and interdependence of man and machine. In these films, civilization is broken down. Mastery and survival goes to those who have superior machines. Some characters are inextricably identifiable with their machine. One character's virtue is his awkwardly effective man-powered flying machine. He hovers overhead like a strange bird. The vulnerability of both man and machine is highlighted, as the story centers around the fight over gasoline. Man shrinks from superiority when a piece of his machine breaks. I have interests in revealing inner mechanics and transforming them from their original function into hybrid objects, engineered together like a conceptual collision of several sources. Like Mark Pauline's robotic hand, distinctions between the living and simulated living beings are explored.

Chapter 4

MIDI GESAMTKUNSTWERK

Computer-Controlled Multimedia Performance

4.1 Introduction

The integration of the computer into multimedia performance has created a new subdivision in performance art and sculpture, in the same way computer and electronic music has become a subdivision in the field of music.

The ability to connect different media electronically engenders unique results. A vocabulary and syntax for this new media subdivision has yet to be evolved and a working format - the electronic multimedia studio - yet to be initiated. I am concerned with developing both.

My personal exploration of computer-controlled multimedia has lead towards the development of what I call 'MIDI Gesamtkunstwerk', a multimedia system of eclectic and original objects, music, sound effects, lighting, atmospheric effects (such as fog), projections (film, video, slides), special effects and mechanical performers, centrally connected and controlled via MIDI.

The mechanical environment of MIDI Gesamtkunstwerk is a world of simulation, in which events are carefully programmed to give the appearance of life. Gestures from real life are the models for gestures in the mechanical world. Anthropomorphization of individual objects and interactions between objects is a motivation. It is not that the mechanical objects should be seen as coming to life, but that the possibility of life is raised in the perceptions of an audience who realize they are looking at toys. Moments of contradictory perception is what I am looking for.

Because control over the mechanical world is comprehensive and exact, I believe a Gesamtkunstwerk in its ideal sense can be approached. The MIDI-controlled media are interconnected in an unprecedented manner. Their interaction can be programmed to split-second timing, exactly recorded and played back, with detailed editing available to hone events to their utmost realization. Not only does the artist have greater access to realizing a personal vision with media, but events in performance that were not previously plausible can enter the vocabulary.

For example, some of the control film makers have over narrative exposition is available in MIDI-controlled events. The 'tricks of the trade' used in filmmaking to create effective simulations - such as

narrative connections that carry over time and space; narrative situations, like convincing deaths; or special effects, like dramatized explosions - can be studied and applied in performance.

The ability to program these kinds of filmic simulations is like having film reality open up into a 3-dimensional, physical reality in the MIDI-controlled performance/installation. One viewer felt that being inside the installation, the "midicube," was like being inside of a movie. It was a dark environment with large image projections overhead. Actions in the space were unpredictable, keeping the viewer in suspense, and were conveyed by contrasts in light and dark, sound effects, and movement. For this particular viewer, it transcended the category of theater. He felt it surrounded him as if he were walking in a 'filmic space'. The barrier between stage and audience was broken.

The issues of Gesamtkunstwerk, editing techniques, anthropomorphization of mechanical worlds, advantages and disadvantages of MIDI-ization, interaction between mechanical and live performers, spontaneity of prerecorded events, interaction of media, and the computer-controlled multimedia studio are explored in the remainder of the thesis, as well as the issue of whether MIDI or computer control engenders a new artform and what the characteristics of that artform might be.

The example of my own work in this direction is used, especially work toward MIDI Gesamtkunstwerk.

4.2   Anthropomorphization in Multimedia

4.2.1   Anthropomorphization of Objects

It helps to begin multimedia design with the individual elements. My designs originate from sculpture, in which I am formally trained. Chapter 2 described the making of a 'hybrid object'. The objective in making a hybrid object can include the simulation of life. Making them appear to be alive in some way or to have lifelike qualities means that techniques of anthropomorphization are important.

The process of making hybrid objects is to use found, functional objects and divert their function by merging them with other found, functional objects. The new combination-object has a hybrid function which is a sum of the contradictions and connections between the original functions.

Early examples were purely sculptural. I cut a foot-long section out of a broom handle and replaced it with a large piece of chain, maintaining the original dimensions of the object, but rendering it unusable as the end would swing. Another object was made from a shovel. The shovel end was replaced with a very

old, used broom end having approximately the shape of a spade. The motion implied by the shovel handle was contrary to the motion implied by the broom bristles. Each end of the object had a contradictory function; the broom would not work for digging.

The sculptures took on other dimensions, such as electronics, sound and lights. One example is the "Bird Call" sculpture. An old-fashioned telephone was implanted with electronics from a Christmas tree ornament so that when the receiver was lifted a bird chirping emitted from the ear piece. A bird tail and talons protruded from the mouth piece as though a bird had been stuffed into it. One viewer remarked "Oh, this is a bird call," which gave me the idea for the title, a verbal pun as a co-efficient to the visual/experiential pun of the object.

The idea of hybrid objects also applies to sound. When making digital samples, I often combine several sounds in a similar way to create an 'impossible' sound. This will be discussed more fully in the section on sound in this chapter.

When I create a new object, I think of creating a personality rather than a thing. I search for ways to give it the illusion of life, coming up with its personality attributes based on its character, motivations and purpose. Whereas a painter might make a painting of a glass, thereby translating a common object into art, I would translate common objects into 'beings'. Instead of choosing types and colors of paint, surfaces and brush strokes, I would be choosing attributes to give inanimate objects the implication of having their own volition.

To resume the example of the "Bear-i-Phone" from Chapter 2, a commercial telephone in the shape of a bear was chosen as the base of the personality I want to make. It looked like a teddy bear and worked like a telephone making it a hybrid object to begin with. To reveal its function and robotics I cut the fur off the head. It then looked like part cute teddy bear, part functioning machine. The dichotomy of the machine/toy was revealed. I further embellished its personality with human glass eyes and a computerized voice. The "Bear-i-Phone" was one of the performing sculptures in the "midicube."
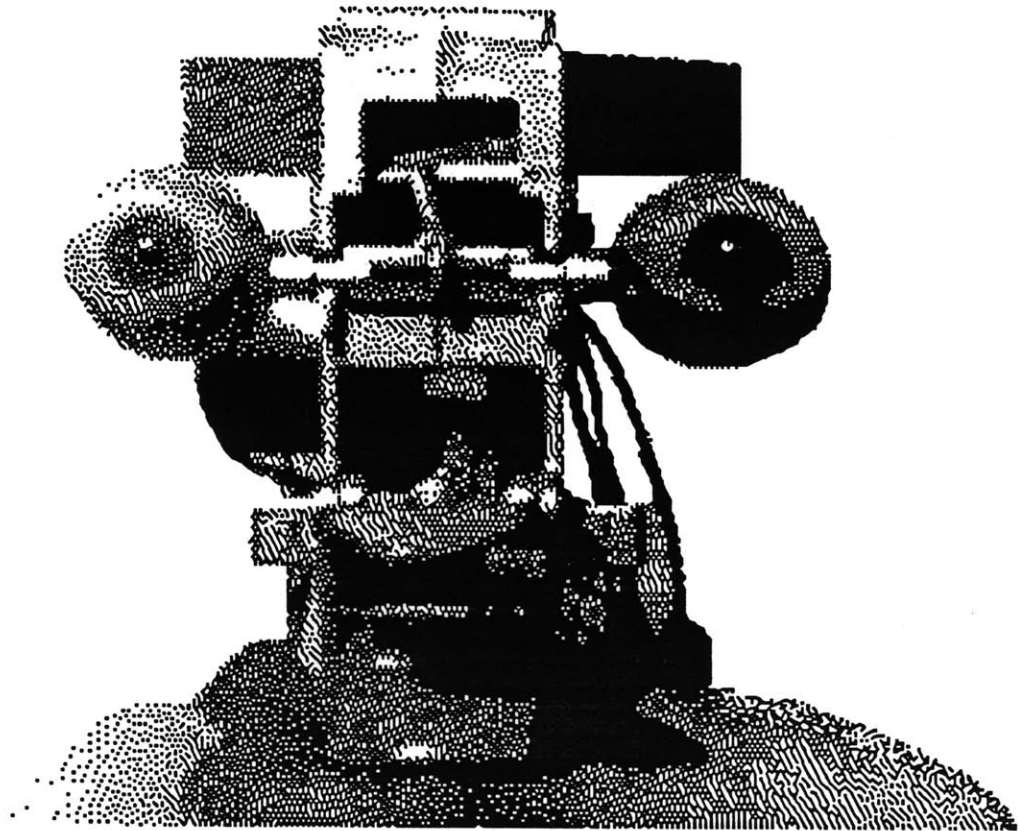
Fig. 4.1 Face of the MIDI Bear-i-Phone, a philosopher in the midicube, D. Atherton, 1987.

If consumers are convinced a phone is lifelike, it might inspire trust. Because people generally don't understand the true nature of its existence - that is, how a phone works - the bear shape is meant to soothe the fear that it might not work and, one could postulate, on a larger scale that our entire technological superstructure might break down. The phone is packaged in the form of a living object that engages positive emotional response. The "Bear-i-Phone" is designed specifically to evoke soothing feelings of safety, like the teddy bears children take to bed. I am more horrified by the original "Bear-i-Phone" as it appears in stores, than the sculptural "Bear-i-Phone," with its robotic head because of the above connotations and the idea that people want this. So I am motivated to make the object that I feel they are really looking at without realizing it.
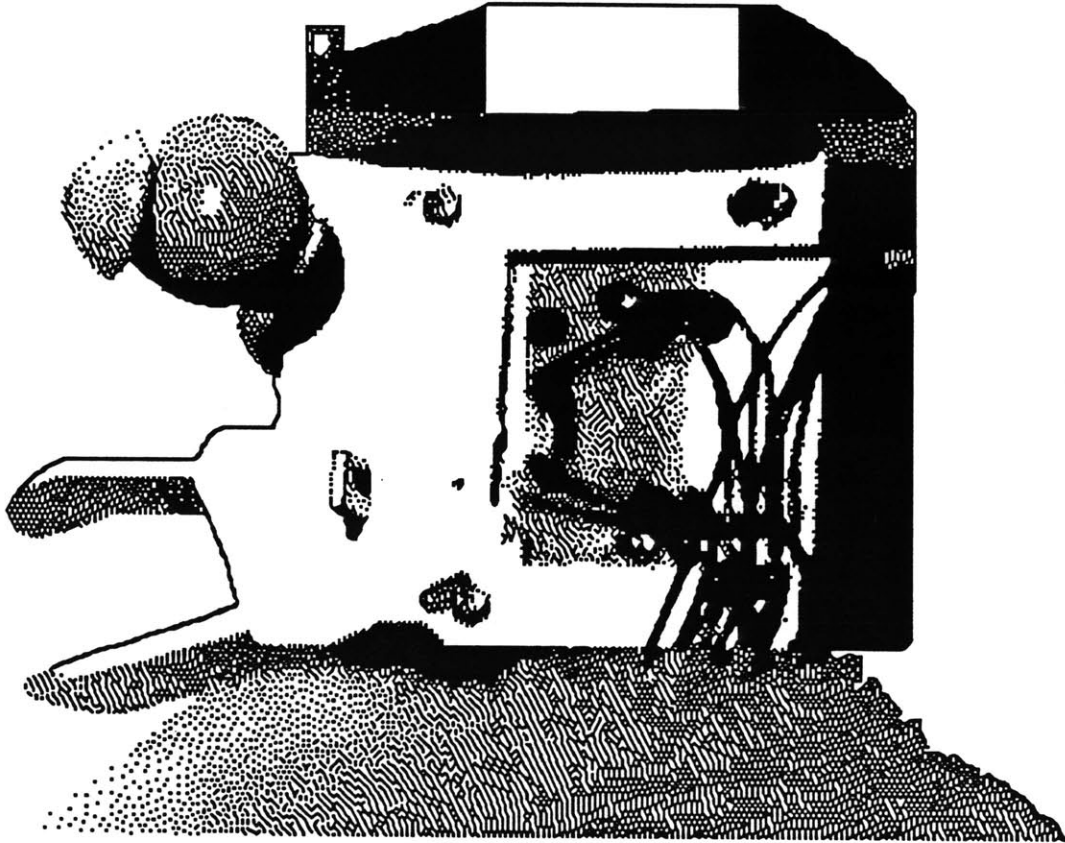
Fig. 4.2 Side view of the MIDI Bear-i-Phone head, a philosopher in the midicube, D. Atherton, 1987.

What is the motivation behind hybrid objects? In this case it was to expose the manufactured robotics of this absurd toy, and reveal the mysteries of a technology that is usually taken for granted. The "MIDI Bear-i-Phone" reflected my reaction to the packaging of technology in an anthropomorphic and emotional form that industry used to court acceptance and encourage consumption. Should the consumer be comforted or horrified by the original "Bear-i-Phone"; should the viewer of art be amused or dismayed by the sculpture, "MIDI Bear-i-Phone." The common characteristic of hybrid objects is contradiction and the unresolved tension between opposing emotional and physical implications in one object.

There are two reasons why I have found toys to be good base objects for modification and automation.

(1) There is friction due to conflicting responses: amusement, horror, tenderness, usefulness. The "Bear-i-Phone" is a humorous as well as functional object.

(2) People let their guard down around toys and objects they feel they can control. A toy is 'played with' by both children and adults. Fantasies are acted out with them. They are a source of pleasure. All of these responses are non-threatening and allow the person to respond to the artwork openly letting in ideas they might otherwise resist or feel intimidated by. (I am doing the same thing here as the "Bear-i-Phone" manufacturer in terms of soothing the consumer.) I want to encourage an emotional involvement with the artwork. Toys are neither conceptually nor emotionally threatening. As broad-based consumer items, they encourage non-esoteric attitudes towards an artwork.
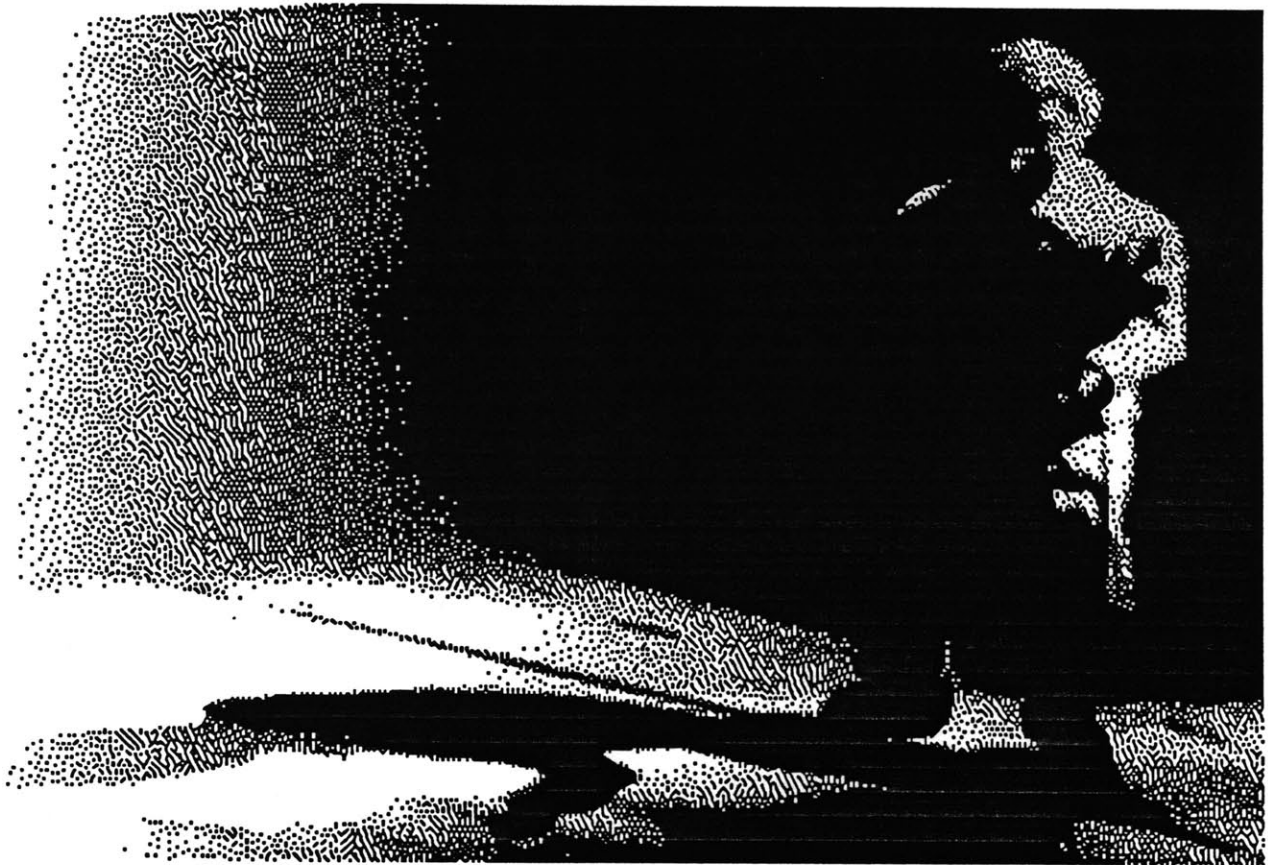
Fig. 4.3 Dennis Oppenheim, Theme for a Major Hit, 1975. A puppet with strings, (15" high) designed by Dennis Oppenheim that danced to a theme song.

In the "midicube" the "Bear-i-Phone" was further anthropomorphized by a Dec Talk voice we created for it. The bear's mouth and eyes moved when it talked.

4.2.2 Anthropomorphization Through Intermedia Gesture and Sequence

Greater possibilities in anthropomorphization are opened up by juxtaposing more than one object or placing an object within a fluid, multimedia environment. Engaging objects in relationship opens up two important areas of multimedia performance, 'gesture' and 'sequence'.

While an object may or may not look alive when static - for example, a doll's face triggers associations with life that another object like a lamp would not - movement implies life. If the doll were to suddenly open its eyes the illusion of life would be greatly increased. When working on the anthropomorphic aspects of a multimedia interaction, gestures from living movement are observed and used as maps for the gestures of the mechanical objects.
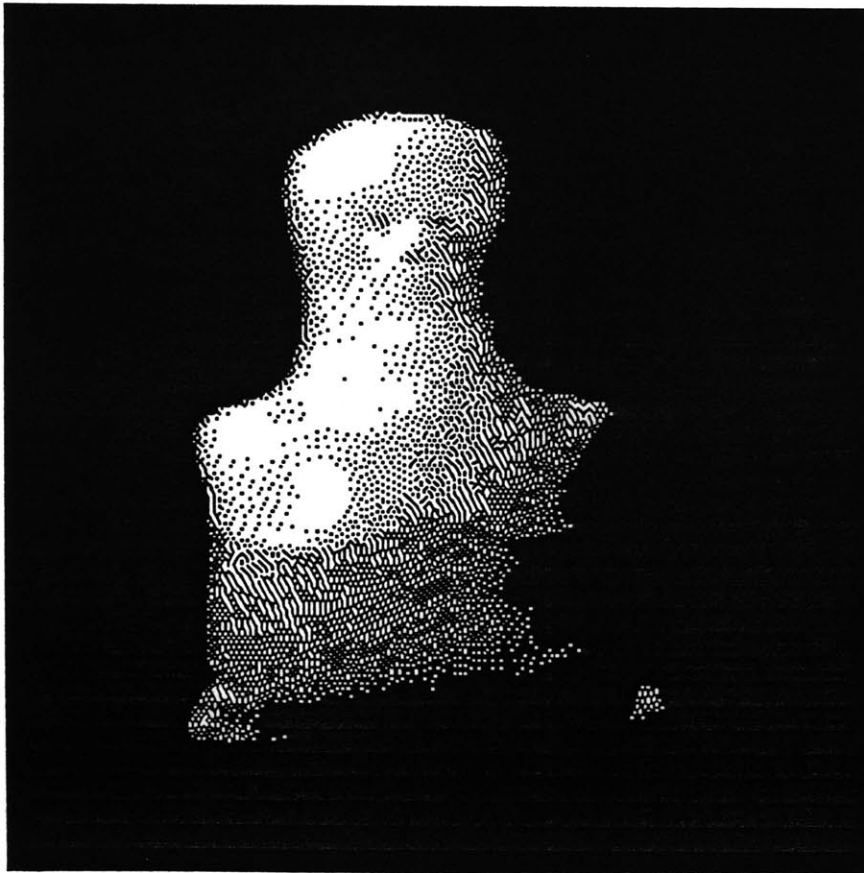
Fig. 4.4 MIDI Dolly from the midicube, found object, D. Atherton, 1987.

Fig. 4.5 Close up of MIDI Dolly from the midicube, D. Atherton, 1987.

Once out of the corner of my eye I noticed a bird, but when I looked directly I realized it was a plastic trash bag blowing down the street. A mental gestalt had been cued: the movement map of the bag resembled the movement map of a bird in my mind. If the minimal parameters needed to mentally cue the gestalt of bird movement can be codified they can be utilized in performance. The movement of a bag or another material could be used to cue the concept or sensation of a bird to the audience by cueing the 'bird gestalt' in their minds.

A multimedia environment can be programed to simulate lifelike interactions between the media. The environment includes both anthropomorphic objects, like a puppet, and non-anthropomorphic media, like lighting, fog and sound. By having the media participate in what I call 'intermedia gesture' a sequence of events can imply that non-anthropomorphic media are causal in enacting movement and change within the space. It can seem that a light going on causes a trapeze to swing which causes a puppet to start walking and so forth. If the sequence is precisely timed, it adds up to a convincing gesture between the media and makes the entire environment come to life. In this way, the non-anthropomorphic media are also given lifelike associations, which intermedia scoring can reinforce.

For example, it could be established by repetition that a particular drum beat is always followed by a blackout. A puppet begins to perform. The drum beat and the lights are intercut to interrupt and frustrate

the puppet's procedure. Each time the drum beats and the lights go out, the puppet has to stop and when the lights come on, start again. A contest of will between the drum and puppet could be set up. Whether the lights continue to cooperate with the drum or not could be explored. Once expectations about each media are established, they can be changed to further invoke a sense of volition to the media.

This example is theatrical in a narrative sense that I am not concerned with in my performances. It is used to clarify intermedia gesture and to show the importance of sequence. I am more concerned about gesture itself, rather than overtly described personalities or dramatic interactions between characters.

The medium of film deals with sequence to simulate a convincing reality in the montage. Semiotics has evolved around film to help define the grammar behind cinematic reality, which usually involves a compression of events and real time. I study films because a similar grammar or sequence can be translated effectively into intermedia gestural programming. Evolving a grammar of multimedia is important both in making effective performances and developing a vocabulary of media interaction.

The narrative aspect of theater helps reinforce its artificial reality for the viewer. The audience is carried along by the story and their expectations fill in gaps so that they do not question too carefully the veracity of events, such as inexact timing of special effects and awkward transitions in the lighting.

In my performance art, narrative is not the motivating context for the structure. Precise timing in the sequence of events is crucial without the cushion of content that narrative provides. MIDI allows the sequence to be programmed with exact timing so that the intermedia gesture is convincing. This is very difficult to achieve without computer control. Events must appear causal, as if one triggered another, to weave together a fabric of a 'living' world with its own movement and relationships, sense of time and space.

In MIDI Gesamtkunstwerk, the timing of intermedia gesture is scaled proportionally to the size of the environment. Small rooms require a more rapid tempo of movement than larger rooms. One issue that can be explored in MIDI multimedia theater concerns whether time is scaled to the human viewer or proportionally to the size of the performer. Should the arm movement of a small puppet be quick and miniature or exaggerated, more like a full-sized person? The meaning is changed by the choice the artist makes.

Humans generally identify with a gestural speed that correlates to human scale, regardless of the size of the performer. When two different scales are juxtaposed, for example a King Kong type movie, viewers identify with the people moving at their own speed. The oversized character is seen to be moving in slow

motion. Whatever moves in human speed determines the scale the viewer identifies with. If the movie switched perspective to the oversized characters point of view, it would be seen to be moving at human speed and the smaller characters would appear to be going too fast.

A lifelike artificial world has parameters of time and space which are determined by movement and related to scale. Studies of motion graphics that incorporate gravity curves, show that a slow movement, with weighted gravity curve, gives the impression of being larger and farther away than faster movements, again with weighted gravity curve, which are seen to be at human scale or smaller.[33]

4.3 Causality

The puppet theater of multimedia performance demonstrates interactions between objects which imply a 'supernatural' causality. Like the causal relationship in the physical world, that "every action has an equal and opposite reaction," I believe in unseen sympathetic resonances between events that appear unconnected. The multimedia theater reflects a subtle but powerful connection between thoughts and objects.

Swiss artists, Peter Fischli and David Weiss, explored causality in their videotape, *"Der Lauf der Dinge"* ("The Way Things Go," 1986) depicting chemical, physical and mechanical triggers to a sequence of actions. The videotape, shot in the artists' studio, traces a carefully set up series of events. A garbage bag held up by rope begins a domino effect when it unwinds and descends until it touches a tenuously balanced car tire, causing the tire to roll into an inflatable raft and so forth. Chemical changes also cause objects to move, such as a fire under a tea pot that is corked with a knife creates pressure due to steam until the cork pops and the knife breaks a water balloon, the water pours out causing another chemical reaction.

My work portrays physical and mechanical interactions as interpretations of psychic, mental connections. MIDI-control, which is precise and invisible, functions as the nerve center of the interactions.

In 1987 I made a videotape, "The Folies of Youth," comprised of sequences that suggest causal connections between different locations. The tape cuts between images of a pumpkin being dropped, a glass accidently knocked off the table, a match being lit, all at different locations. The ability to jump cut instantly between locations is particular to film.

Part of the action is set in a Foley Pit, which is the equivalent an the orchestra pit, where Foley artists make their sound effects. The Foley master is characterized as a kind of wizard, working in a laboratory of objects to create sound effects. The Foley master has gone slightly mad in his lab and

believes that he can influence real life through his work. The group of people he is affecting are having a dinner party and are unaware of the situation. The third location is a chessboard-style, gridded plaza, where two fencers dual and a third mysterious figure dowses.

Foley and sound effects are the key structural element of the tape, providing the source of both the sound and imagery. Sound is used as a segue between scenes. The sound of a sizzle accompanies an image of a burning fuse in the Foley Pit and then for dinner being prepared in a frying pan. The image changes but the sound remains the same, which is a way of separating the sound from its function and distinguishing it as a sound effect; and a way of tying the two scenes and situations together.

"The Folies of Youth" depended on flawless timing in cutting between actions in different scenes to make it seem that the actions were interconnected. I did not achieve as much of a sense of irrefutable sequence, or cause and effect, as I would have liked. This was a function of the editing. With careful enough timing and cutting, the sweep of gesture from one scene would cross into the next with an undisturbed flow: the burning fuse would get to the point of explosion and at that precise moment, a glass would break in another scene.

The timing is determined by one event - for example the burning fuse - but the image can be replaced - as when the glass falling replaces the explosion. This is like mapping out the shape of a sound, for example, and replacing the timbre. The effect should be a flow of scenes as tight as a musical form. With this careful organization, I believe the the viewer would be compelled to see that the magician's work in his laboratory lead to disruptions at the dinner party. One event would explode or flow seamlessly into the next.

The same type of careful editing is crucial to making causality believable in multimedia performance. The need for exact sequencing and extensive editing ability that MIDI affords is even more necessary to tie together the disparate media. At least in film and video everything appears on one screen. No multimedia event I have experienced up to this point has achieved an optimum coordination between media and I argue that it is not possible without the unified scoring a central controller, such as MIDI, provides.

The issue of causality led me to look at the science of cymatics. Cymatics shows scientifically that the interference patterns of sound waves make physical forms in human beings and various frequencies resonate with particular parts of the human body. Cymatics demonstrates that sound has a physical presence that interacts with and influences the human nervous system. This is one way in which something invisible and immaterial can influence physical properties.[34]

Frequently people interested in sound/image relationship try to find shapes that correlate to certain sounds in a final or definitive way. They make computer graphics or abstract images to represent a sound. I belive this is an intuitive realization of the relationships cymatics attempts to codify.

Cymatics has demonstrated that by running sound waves through a sound plate with granular matter on it, the matter will form into different images based on the interference waves. Some of the images that result from different sound combinations have been categorized by the scientists to include images of the galaxy, cell division, spinal columns and insects. Peter Guymanners and his associates were able to get a 3-dimensional image or form when they added a fifth tone to the four they were already using. At that point the material came up off the surface of the plate and moved around like small cities as if a magnet were attracting the material away from the plate.

Cymatics shows that there is a scientific correlation between image and sound, however the sounds that make interesting images are a combination of detuned pure tones that are sustained on one pitch. They are rather uninteresting musically.
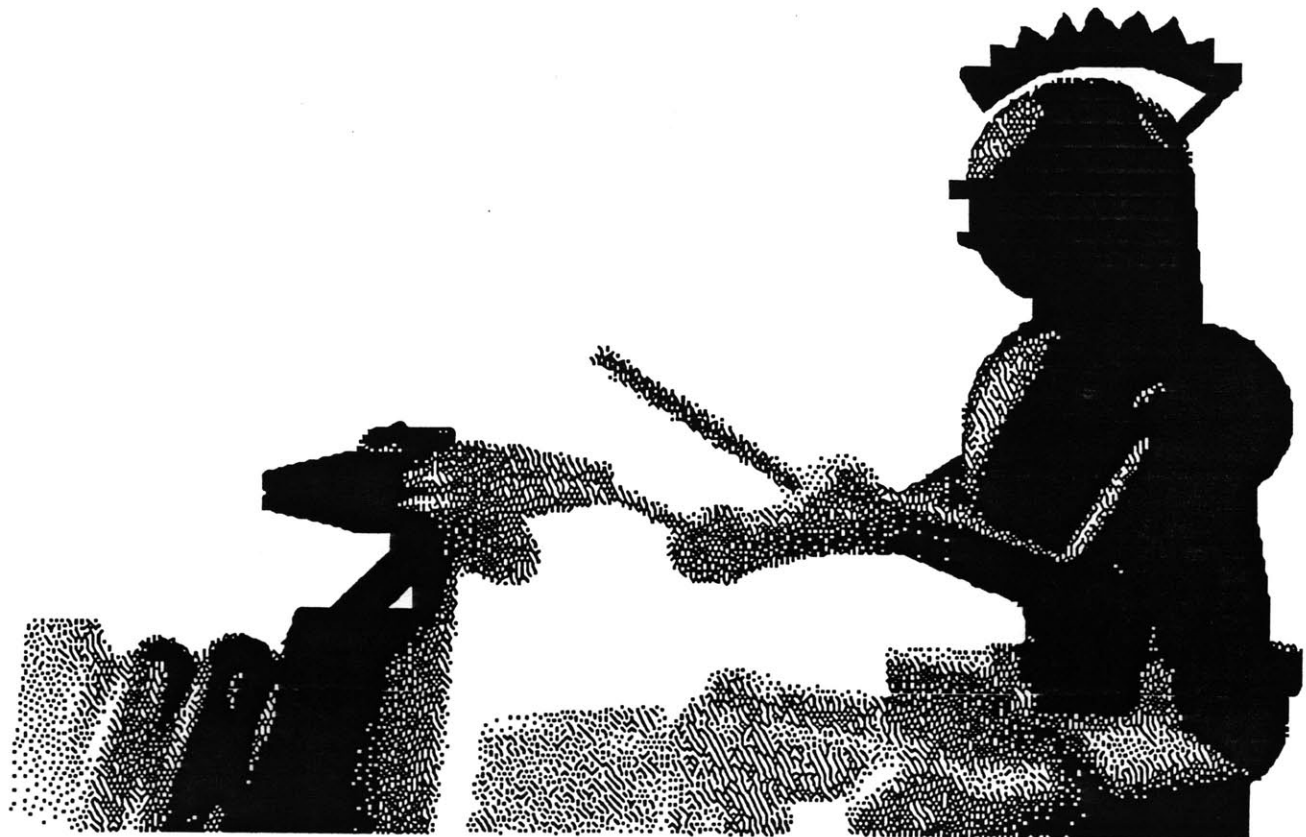

Fig. 4.6 "Beat Dedication," computer graphics drummer. Bob Sabiston, computer graphics, videotape; D. Atherton, sound, 1988.

4.4   Sound

4.4.1   Sound Effects

I came to music and multimedia through sculpture. Studying sculpture at the Rhode Island School of Design, I carved stone and wood and modeled clay, using very traditional sculptural techniques. Gradually I began to work with more ethereal media, such as light and sound. I designed light environments and became fascinated by the hypnotic quality of repetition as in, for example, repetitive music.

I used sound processors as musical instruments and was interested in digital delays, reverbs, flangers, chorus effects and distortions as ways of making timbral changes, playing the knobs of these units as if they were musical instruments. Continuous tape loops that overlapped and were altered by an algorithm of the line signal resulted in musical pieces that had very thick, layered sounds.

My interest in audio effects corresponds to the interest in special effects I have explored in video, film and multimedia. Processes that been developed traditionally to 'underscore' featured events are elevated to the foreground. Foley - movie sound effects - is used compositionally and, as in the example of "The Folies of Youth" can propel or become the content of a work.

Special effects like pyrotechnics, prosthetics (artificial aging, wounds, etc.), models and puppetry are other movie techniques developed to support the plot, which I am interested in for their own sake. What has been background material is moved to the foreground. Musical effects processors, sound effects and special effects comprise the idea of 'special effects as artform' that I want to develop as part of the multimedia studio and Gesamtkunstwerk praxis.

Among the early sound installations I created was, "A Sudden, Singular and Cyclic Series of Destabilizations," for the Rhode Island glass makers show (1982). I recorded a 6-minute tape loop using a marble, a household cooking wok and a Tibetan bell. The reviewer thought all of the sounds were glass when, in fact, none of the sounds were glass. It interested me that visual context could qualify the sound. Likewise, my interest in video has been in qualifying images with the sound: experimenting with changing the meaning of an image by using a different kind of sound.

The way that context - be it an image, sound, environment or narrative structure - and content interact was articulated in a conceptual piece I did in 1982. The piece consisted of a formula: "Meaning Equals

Content over Context." This was the first of a number of 'formula' artworks. The content and context are two variables that modify and define each other.

$$MEANING = \frac{CONTENT}{CONTEXT}$$

Fig. 4.7 "Meaning Equals Content Over Context," D. Atherton, 1982.

Foley is an excellent illustration of this point. Many movie sound effects taken out of context would not conjure up the image they are illustrating, while together with the image, they are completely convincing. Likewise, the real sound an object makes taken out of context sometimes does not sound like what it in fact is.

This is how Foley evolved. It was found more effective to clap together coconut shells timed to the image of a horse galloping than to record a real horse galloping. Much of this has to do with audio fidelity. In the real world, the human ear sorts out sound with amazing precision in terms of identification and location. In film, the 3-dimensional environment is reduced and the source of sound limited to the speakers. Sounds must be amplified and possibly exaggerated to be clearly recognized. In addition, the sound of the movie camera and environmental interference makes location sound difficult to record.

Foley was named after Ed Foley who invented the practice of post-production sound effects. I find the visual imagery of the actions of Foley artists fascinating. A Foley artist might turn a jacket inside out to emulate disrobing, or smash melons for a fight scene. The feather is the most used tool in the Foley Pit. Many convincing sound effects are produced through surprisingly unexpected methods. Since I have been engaged in creating digital samples for music composition, I am also curious about the relationship of a sound to its source. When a composer asks for the sound of a bird flying or a branch breaking it is not necessarily most effective to produce these sounds by recording an actual bird flying or a branch breaking. Imagining what might produce these effects in the listener's mind forces one to analyze the qualities implied in the actions of such sound images.

Utilizing intermedia perception - how the perception of one media is affected by its juxtaposition to another media - is very significant in multimedia performance. In 1980, I staged a performance called "The Color of Sound," at the Rhode Island School of Design. It was produced in the form of experimental art or

rather art as experiment specifically exploring synesthesia: the seeing of sounds; the tasting of colors and so forth. Subjects were asked to keep their eyes closed as I threw a series of needles, pins, tacks, screws, nails and a railroad spike with differing velocities and in various groupings into a 25-gallon container suspended in front of them. After each sound, people were asked to describe what they had seen.

4.4.2   Environmental Sound/Sound in Environments

Placing sound in an environment is an important part of multimedia performance and installation. In 1982 I made an installation called "F and B Every 12 Minutes." It consisted of a tape loop twelve minutes long installed in a lounge area. Every twelve minutes the notes F and B would gradually fade in and fade out, similar to the way a vehicle passes by outside. I was interested in the ambient effect: the presence of the sound dictated a rhythm in the overall level of talking in the room, in the same way that a jet goes by sometimes making it impossible to talk over the noise. This piece was not loud enough to prevent hearing what another person was saying; it was just loud enough to attract the attention of some people. Some people didn't notice it at all, while others were drawn to it. As it only occurred every twelve minutes, it was difficult to be sure that an artwork was present in the room. It was ambient for some viewers who thought that the sound might only exist in their imagination after all.

Ambient effects are a component of multimedia. The "midicube" (see Section 4.8.5) was designed to be both an installation and a performance. It ran on an extended cycle. At times very little seemed to be happening in the environment. At other times the activity of the various media was dense. I feel that subtle environmental effects, like those used in "F and B Every 12 Minutes," can be as important to an installation as the more aggressive, obvious effects. The viewer may not realize right away or even while they are in the environment that they are in an active environment which is subtly influencing them with ambient phenomena. They may never become conscious of these phenomena. Can an effect so subtle that they never become conscious of it be considered a success? Disappointed viewers would classify it as a failure. Other viewers seem to respond to and enjoy an ambient environment. If the disappointed viewers are left with a feeling or ambience that comes back to them, which would be enough. Control over the ambient environment is a potent aspect of multimedia installation which can easily be overlooked in favor of more obvious elements.

"Photon Voice" was performed in the desert in southern California, in the Alabama Hills near Lone Pine. It was part of "Desert Sun/Desert Moon," a group of works by artists from the Center for Advanced Visual Studies (1986). "Photon Voice," for which I made the sound, was a collaboration with sculptor,

Shawn Brixey, and dancer, Laura Knott. I also made sound for an environmental poetry performance by Elizabeth Goldring called, "Coyoteization."

Both works were experiences in creating environmental sound - the environment of a dramatic outdoor setting - and sound that was interactive with live performers.

For "Photon Voice," I sampled Tibetan Bells and Hammer Dulcimer sounds and looped them forwards and backwards. The sound was played through a grid of tiny speakers with mylar over them. Light reflecting from the sun off of the speakers was picked up by a solar cell plugged into the amplification system. This apparatus was made by Shawn Brixey. As Laura Knott danced in front of the speakers her movement interrupted the light and this would change the sound. The sound was like a thunder clap, dampened as she moved past.

The dancer's image also appeared in a magnifying lens. The light of the lens was focused on a small flask that was evacuated with unbalanced graphite particles. The particles would float due to the pressure of the light, which caused them to spin about. It looked like dust floating within the lens. When the dancer moved in front of a mirror, the light beam to the particles was cut off, causing them to drop. The trail of her movement was traced in the tiny flask. Shawn Brixey designed this aspect of the installation.

Sunlight activated both the music and particle image. The dancer could move so as to interrupt the flow of sun and could thereby affect and interact with the image and sound.

The sound for "Coyoteization" was heavily saturated with reverberation to make it seem that the coyote sounds were coming from deep within caves. Sound in this outdoor environment had a very short, dry reverb.

4.4.3 Digital Samples

The sound tracks for "Photon Voice" and "Coyoteization" were made with digital samples. The coyote sample was stored in a digital delay setup so that when Elizabeth Goldring recited her poem, her voice would trigger the sample. A vocoder was used to conform her voice to the timbre of the coyote sound, which gave it a more gruff, distorted quality.

My orientation toward music, which has been a conscious approach from a non-trained background, has been like the Futurist noise music idea. I am fascinated by industrial sounds and noises from the

environment and the way in which industrial sounds enter the environment (such as the way "F and B Every 12 Minutes" used the model of the car passing by to shape the sound).
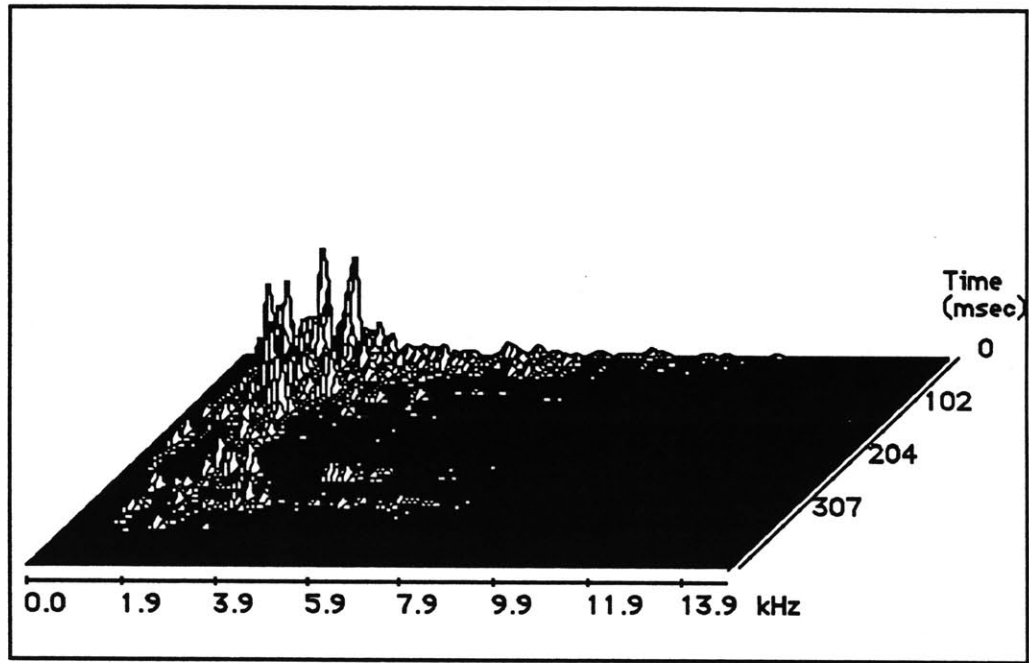
I have made samples for composers including Greg Garvey's "Terrain,"[35] Ellen Sebring's "Aviary,"[36] and Jonathan Harvey's "From Silence."[37] When I am making digital samples, I think of making 'impossible' instruments. This is the audio version of the hybrid object technique. These can be thought of as hybrid sounds. The orientation is towards noise and timbres, rather than an instrument a musician might physically play. I might combine several different sound samples which play forward and backward to make one 'instrument'.

Sometimes I use my sculptural interests to make an instrument specifically to be played for samples. The instrument has no other function, except, perhaps, as a sculptural object. I welded together two metal bowls and a metal pipe which served as a neck. The bowl section contained water. The neck was bowed while the instrument was gently swiveled to disturb the water. The resulting sound was a singing tone modulated by a vibrato from the water. I have produced many digital samples from this instrument. Therefore it exists as a physical instrument which is primarily played on the synthesizer. I have frequently played traditional instrument in unorthodox manners to generate interesting sound samples (like bowing a hammer dulcimer or electric guitar).

My interest in sound effects with little emphasis on traditional musical forms such as harmony has extended to my treatment of music composition. In her article, "Timbre and Harmony: Interpretation of Timbral Structures,"[38] Kaija Saariaho introduces the sound/noise axis, which she used to create musical tension by replacing the dynamic function of harmony. Along this axis, 'noise' replaces the concept of dissonance and 'sound' that of consonance.

Saariaho means by 'form' precisely the idea that Vassily Kandinsky defined in *The Spiritual in Art*, 1969: "Form is the external manifestation of inner meaning." Saariaho claims she has never referred to pre-established formal structures in her work.

SPLASH

Time
(msec)

0

102

204

307

0.0   1.9   3.9   5.9   7.9   9.9   11.9   13.9   kHz

Rx5 Gun

Time
(msec)

0

102

204

307

0.0   2.3   4.6   6.9   9.2   11.5   13.8   16.1   kHz
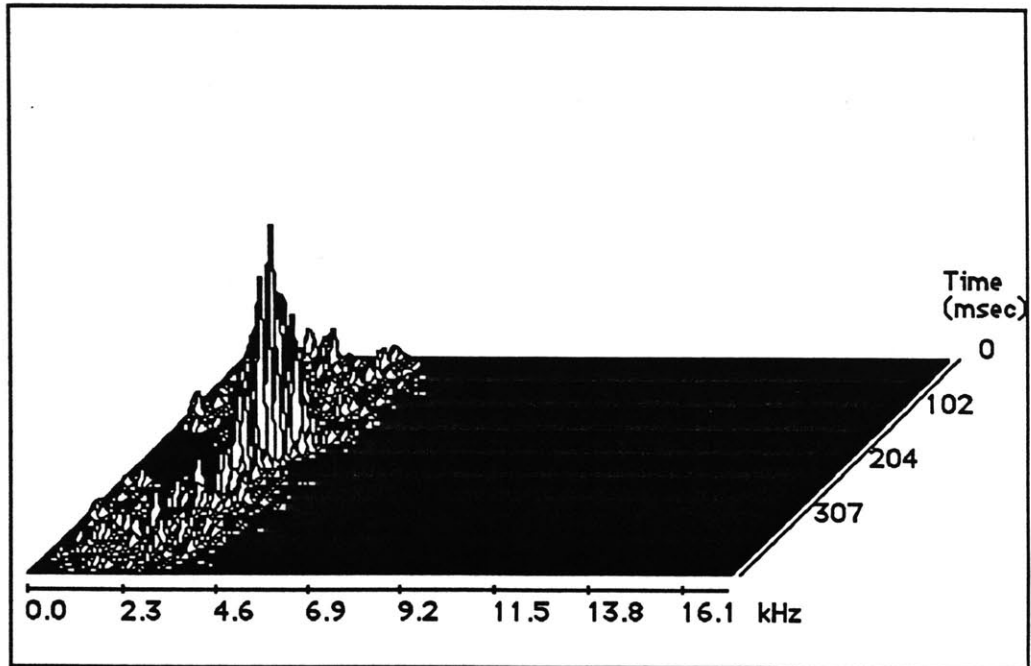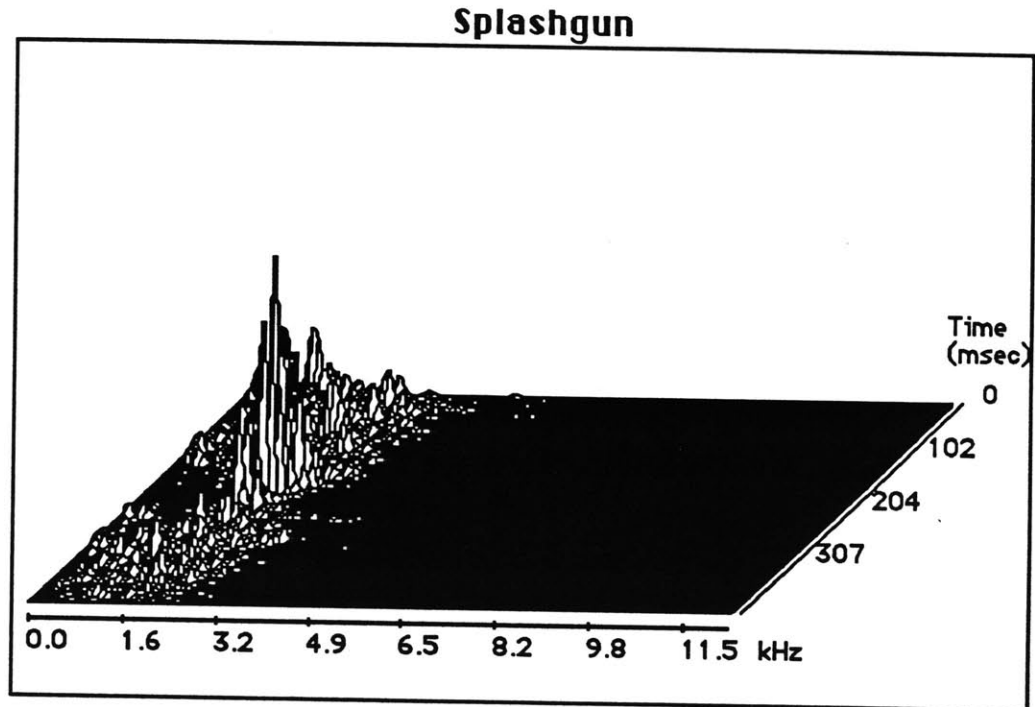
Splashgun

Fig. 4.8 Images from DigiDesign demonstrate combining two samples to make a hybrid sound., "Splashgun," D. Atherton, 1988.

4.4.4   Spatialization

Music recorded into the computer as a sequence from a keyboard or drum pad, can be played back as numerous different instruments. Instruments can be stepped through even as the score is played. There is an addressable orchestra that can play in a virtual space. The virtual space consists of combinations of parameters in digital effect processors, able to simulate psycho-acoustic spatial dimensions and the various surfaces off of which the sound is reflecting and reverberating.

Because the emulation of the orchestra in various environments - symphony halls, cathedrals - is essentially numbers, a very natural sounding orchestra can be configured to play some humanly impossible scores in spaces that have acoustic properties that seem to defy physics. For example, one musician will play one note each on all the instruments and keep perfect time as each instrument that is played is moved from one space to another, and some rooms will have non-decaying echos such that notes played will repeat indefinitely, and in other halls sounds will reverberate for 99 seconds.

When working for Jonathan Harvey I helped him to do essentially this. After step recording hundreds of notes to be played back at an inhuman rate and with perfect regular pace another level was added. As the notes went from the sequencer the MIDI channels had been configured in such a way that each of the TX-816 modules (set to have slightly different variations of a piano sound) would receive and play the notes in various combinations. This sequence was then triggered by a live operator in the performance.

The multimedia environment is usually in a physically-confined space. By using the sound processors, the dimensions and qualities of the sonic space can be manipulated to artificially alter the physical environment.

The experiences with sound I have described demonstrate ways in which artists and composers can approach multimedia. The disciplines cross-pollinate in ways that are conceptual, physical and design-oriented to create unique results. These results are part of the emerging computer-controlled multimedia vocabulary I want to help evolve.

4.5 Video: Correlations Between Image and Sound

I became increasingly interested in intermedia automation, that is, ways in which media qualify each other as they perform simultaneously or in sequence. It is important to understand these dynamics to work with multimedia events. One way to explore simultaneous media interaction is with videotape, which combines sound and image. I have already described the video, "Folies of Youth," which explored sound effects, causality and gesture. "Babylon" (1985) experimented with editing imagery to a pre-recorded sound track.

The basis of "Babylon," a 5-minute videotape, is a poem of the same name written and narrated by Otto Piene. The poem was the first structural element. Therefore it made sense to create the sound track around it and edit the images to it.

I used a drum machine to make a click track and recorded a series of samples on one track of an 8-track tape. With two digital delays, one set to the time between the first sequence and the new sample that was stored in the second delay. By changing the time factor on the first delay it would alter the time between the first and second sounds. I progressively did this and added some synthesized strings.

The video was originally shot in Super 8 and transferred to video. I used video black to create a dark field, which different lights and forms would enter. I treated it like a 3-dimensional space; lights would fly

around like birds. With black as the segue between images, car tail lights passed by, flames leapt up in the foreground, the skyline would appear. I was trying to get at a quality of the unknown with the black fields.

I transferred my experience with transitions from one sound to another to transitions in the imagery. For example, there is a pan across the horizon and there is a pan down into a valley of light between buildings. I found a tail light image that matched the same coordinates. I call this a 'match' cut. Formally the valley matches the tail lights.

4.5 Pre-MIDI Multimedia Installations and Performances

4.5.1 Audience Participation and Interactivity

"Tent/Content," my thesis piece at RISD in 1984, prefigured a style of audience integration into multimedia installation that was to be further developed in my most recent installation, the "midicube." I set up a camping tent in a large room with no light. Black polyurethane covered the windows so it was as if night was a physical substance that filled the out of doors. When the viewer walked near the entrance of the tent a motion detector would turn on a film of fire projected onto the front of the tent from the inside. The idea of being inside a tent and looking out at the fire was reversed: the viewer was outside looking in at the fire.

People tended to circle the tent and view it by sitting down and relaxing on the floor. After five minutes the film would turn off. If someone got up the detector would be activated and start the film again. It was a trap of sorts. People wouldn't leave once the film started again. They would usually stay for more than one five minute sequence. There was a certain causality implied: movement initiated a response from the installation.

In the "midicube" the similarly darkened environment seemed to invite the visitors to relax and, again, they sat or lay down on the floor for long periods of time, watching and waiting for media events. The interactive element of movement connected to events in the installation was not a part of the "midicube," although it could have been. I am not convinced that viewer interaction is optimum for realizing the precise sequencing in the Gesamtkunstwerk ideal I have in mind.

I value an environment that is not pre-packaged, in the sense that the viewer does not know what to expect, as well as an environment that is open, so that the viewer can relax into the high and low points of the installation. Providing an accepting atmosphere for experiencing the different rhythms that are part of

real life is not always easy to achieve in a formal installation or performance. However, these rhythms can make the synthetic environment more lifelike.

Interactive artworks can also be limited by the need to demonstrate their interactivity. If the audience does not realize they are triggering a reaction from the technology, then it may not matter that they are; or, they may be mystified by the content of the artwork if it depends on their realizing this. I worked on Dec Talk television monitors for the Antenna Theater project, "Radio Interference," in the Cube, and we experienced this type of problem. When more than one person came near to the monitors (which were supposed to turn on and speak privately to anyone who stood close enough to them), they played continuously rather than turning on and off. This invalidated the surprise element and implied intimacy. The video segments designed for intimate interaction became nearly meaningless.

Other interactive systems I have seen can have the problem of just that - remaining interactive systems. They must be so simplified to be clear to the audience, that the content of the work doesn't get beyond the form of a demonstration. Interactive technology is a natural component of multimedia theater. Sorting out these types of problems with interactive installations is a specialized and time consuming endeavor. This is one of the problems the Intermedia Studio is concerned with.

4.5.2   Loose Sync

Before coming to MIT I worked on conceptual and multimedia performances that were live with some prerecorded elements. Most events were triggered by hand in what would be the equivalent of a live mix. In that situation one is limited to a 'loose sync' performance. There are both dead and unique moments in the live mix. The problem is that it is difficult to rehearse and repeat with precision. For me, the interaction of the media is never as effective as it could be because it is not carefully enough programmed. Performance art often takes the approach that just putting different media together is enough to make it interesting. I do not find the barrage of media works well. Individual devices compete, due to different requirements within the space, such as types of lighting, scale, mechanization, etc.

A good example is integrating video into a multimedia setting. Video monitors are too small to be seen by a large audience. Video projections need to be shown in a dark space, making lighting of other performance elements extremely difficult. The different qualities of light - phosphorescent video light pointing toward the audience - and the more ambient stage lighting can conflict, although that can be used to advantage. Video space and performers' space have difficulty in meeting. Dancers often try to work with a video backdrop, but cannot find an appropriate place to work: in front of, below, next to, behind the video projection or monitor. Two and three dimensionality compete rather than merge.

Video works successfully in performance when there is a conceptual component: when video is recognized as video by the performers. For example, in Tod Machover's "Valis," a performer holds a closed circuit video camera on himself. It is additionally effective because the video adds another spatial dimension to the performance. The performer's image appears greatly enlarged on a grid of monitors. The audience can see a close up of his face and read his expressions in detail. There is an excitement in seeing the complete technology: the camera pointed at the actor's face; his image on the monitors. It seems to be happening live. This is a different effect than if it were prerecorded and the camera were eliminated. It would be less spontaneous and tenuous, probably less exciting.

Integrating different media together is one of the essential problems of multimedia art. For me, the solution is in split second sequencing, rather than just turning everything on. Then the media can be programmed to blend and integrate to best advantage, much like a musical composition. Instead of having several technological media vying for attention and communicating very little, I have tried to get as much control over as few things as possible, to experiment with the conventions of what organic and mechanical gesture might convey. There is not enough time spent fine tuning the relationships between media. In my experience with other artists and in my own work, the restrictions on time and space create a bottleneck that results in intermedia relations that just 'get the job done'. The available technology of MIDI

synchronization and the formation of an experimental media studio would do much to advance knowledge of intermedia relationships.

I believe most performance art that uses multimedia is in some sense Gesamtkunstwerk. However, my frustration has been with the lack of precision in controlling the various media inhibits the realization of Gesamtkunstwerk. For a long time I didn't know the term Gesamtkunstwerk and only later came to characterize the media synchronicity I was looking for as my interpretation of the term.

In my first attempt at integrating computers at MIT I got a Commodore 64 and started with an interface to program sequences that could be run in different ways. I hooked up a digital delay that had a sample of a Hammer Dulcimer stored in it, with solenoids that would hit a Hammer Dulcimer and a slide projector and some bells. This would sequence in a very crude way and it was very difficult to achieve the desired effect. It was very difficult to change something. If I wanted one part of the sequence to happen a little quicker it would require enough programming to kill the inspiration to go on.

I did an installation called "Folie Pit Port" which was a videodisc sequence. The viewer looks into a fish eye hole, like those people have on their front doors enabling them to see who is outside. The viewer sees a knife being sharpened by a cook. The door knob to the room would occasionally jiggle in a nervous way. This piece dealt with limiting what the viewer gets for information. It was a very simple piece which I sequenced using the Commodore 64.

4.5.3   Ritter Time

One of the major differences with MIDI programming is that a sequence can be played back immediately. MIDI is a gestural recorder. It can record a gesture and play it back. It can record expression very well in terms of preserving the artist's expression at the moment of recording and in terms of allowing the artist enough freedom from technological concerns to remain in an inspirational/creative frame of mind. These are large benefits of MIDI. A composer can even playfully experiment while recording and later edit out what is unwanted to preserve any surprisingly good 'mistakes'.

Part of this proposal is that one of the benefits of submitting to a completely MIDI-controlled performance does have the advantage that in composition it is very readily replayed.

The length of time from the input to output in a creative endeavor is what I call 'Ritter Time' (after another artist who was involved with computers). It is a subjectively, individually-determined acceptable

time ratio for an art medium to render its output to its maker. If that ratio is too large, the maker is inhibited or gives up. Ideally, MIDI establishes the current state of the art standard as a turning point for multimedia performance art away from loose sync to computer-aided Gesamtkunstwerk.

4.6 MIDI and Multimedia Composition

4.6.1 MIDI: a Common Expressive Language

MIDI[39] is an acronym for Musical Instrument Digital Interface. It is a software and hardware protocol, a serial code sent from one device to another through MIDI Ports via MIDI cables. The time, note, velocity, duration and channel (a denotation used to decide which device or keyboard or sound gets the message) are the kinds of information that can be communicated in about 1000th of a second. It is a standard agreed upon by audio manufacturers so that any brand can connected to any other as long as they are MIDI capable.

MIDI has become widely available and flexible, including modifications for keyboard,drum pads, gloves, guitars, etc. Anything with pitch can be modified for MIDI pitch through different devices such as a pitch rider. MIDI is, in a sense, a common expressive language. It can be used to centrally coordinate a wide variety of multimedia components. For example, with MIDI-controlled light boards the lighting can be adjusted according to the timing of the music directly from the score. Since lights are usually slow to respond, they can be programmed to start slightly before they should be noticed, looking more exact.

Scoring for the lights and other theatrical effects is not a matter of rehearsal and practice, nor of fitting effects around a completed musical or dramatic piece. It is a compositional decision made by the 'multimedia composer' as the piece is written. The idea that the artist can write concurrently for musical instruments, mechanical devices, lighting, special effects is unique and will spawn a new type of composition. A composer could decide to end a musical phrase with a punctuation from the lighting. Drums could be replaced by a flash of lights, or an explosion. The entrance of fog might take the place of or enhance a mysterious musical timbre. MIDI is the first interface to make intermedia synchronization truly possible and practical.

In the past, it would be possible for a composer to score a multimedia piece on paper. I believe, however, there is a qualitative difference in having the score in the computer, connected directly to the media devices. It is an exact rendering of the composer's intentions. It is practical to record it, play it back, rehearse it, refine and edit it without an assemblage of people to run the media. Because "Ritter Time" is a

measure of practical usage, this more or less instantaneous feedback, among other factors, argues that it makes possible a new type of artform.

The other factors have to do with the score. I normally use the software, "Performer," on a Macintosh computer. "Performer" operates like a multi-track recording tape deck. It has the functions of play, stop, fast forward, rewind, record and an infinite number of tracks to record on. Information can be mapped from one thing to another: tracks can be reassigned; the MIDI channels can be assigned to more than one device or track. A line of music for the percussion can be assigned to the lights as well. One can go into the lighting track and assign particular notes to particular lights. Without computer control, this type of detail would not be possible. The interactivity of the score enables a unique interactivity between the media devices.

4.6.2 Practical Aspects of Adapting Media to MIDI

The practical situation of adapting non-MIDI designed devices to receive MIDI can depend on something as rudimentary as controlling motors and AC outlets in order to turn them on and off. It could mean starting, advancing and stopping slide projectors; turning on film projectors or motors to automated cars and so forth. I made relays that switched an X-10 controller brain. The X-10 modules are plugged into outlets. Devices plugged into those can then be switched through MIDI. I can control about ten devices, each taking up a channel on a light board. One limitation is that the X-10 system is serial; it will only do one operation at a time. Devices can be turned on and off sequentially, but several devices cannot be turning on and off at the same time.

In working with Performer, there is a default of 16 channels on which the MIDI information can be sent. This mean the tracks must be grouped and assigned to different channels. For example, the information on tracks 1 - 5 can go to a synthesizer; tracks 6 - 8 can go to a drum machine; tracks 9 - 14 can control sound effects on a sampler; tracks 15 - 20 can be lighting cues; tracks 21 - 30 can be fades on a MIDI mix board. I have used up to 80 different tracks in one score. This creates a very large file, which sometimes results in a MIDI collision, where there are too many things happening at exactly the same time. That can be solved by moving things around slightly, which does not have any noticeable effect on the output.

People have found it very convenient to have MIDI devices controlled from one keyboard. Automated mix downs help get very subtle changes because the mix can be played back many times and refined. Devices are being designed that can be altered in real time through MIDI A reverberation can be made to get

longer or shorter, for example, due to MIDI information in real time. Previously a program change was needed which would switch from one reverb effect to another, or one voice to another. With MIDI control in performance time, so you can segue from one kind of effect to another.

4.6.3   The Folie Pit

The first multimedia performance I did with MIDI wasn't completely MIDI controlled. Only some events were under MIDI control. It was called the "Folie Pit" (1986), which is a reference to the Foley Pit, the place where Foley artists do their work. The "Folie Pit" had a live performer. Media Lab graduate student, Marc Locascio, appeared dressed as a fencer. He had instructions to carry out a series of actions.

The performance started with CAVS director, Otto Piene, lighting a fuse that was hanging above a wash tub. As the fuse burned, water started to drip. A MIDI-controlled solenoid caused water to drip into the tub. As the sparks hit the water in the tub they fizzled and made sounds. There are similarities between this performance and the videotape, "Folies of Youth," which used much of the same Foley inspired actions, sounds and characters of the Foley 'wizard' and fencers.

Marc appeared dressed in his fencer's outfit. (Originally I wanted to have two fencers in the performance and take information from their foils touching to trigger things.) Marc picked up a small music box and started turning the crank. It could barely be heard. He touched the music box on the side of a large, 4' x 8' piece of metal which amplified the sound so it could be heard. He also touched it to the tub which amplified it as well.

The lights went out and through MIDI the artificial fireplace was triggered. Cow toys were attached to a meat grinder on one side and a chicken rotisserie on the other over the electronic fireplace. When they were rotated by the rotisserie, they 'mooed' as they turned upside down. When the toys began to 'moo', there was a barrage of drums from a drum machine and visual flashes to accent them.
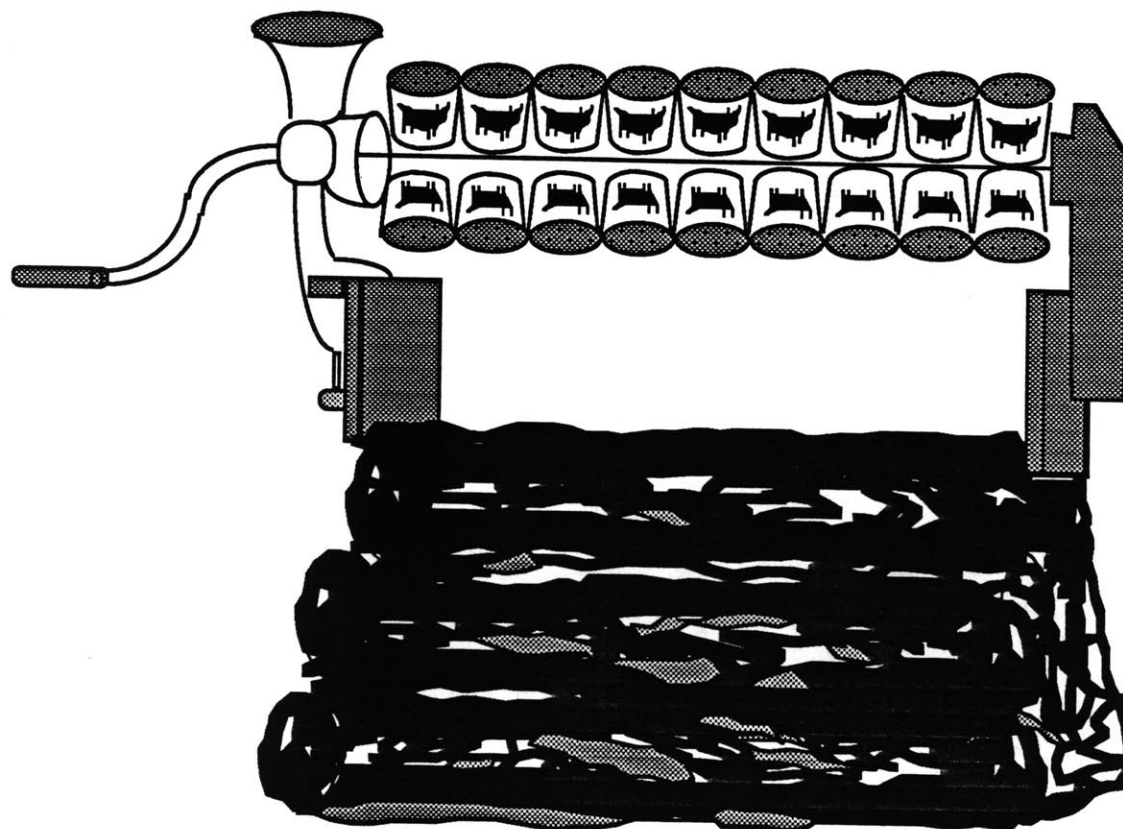
Fig. 4.9 MIDI Fireplacegrinder, a hybrid sculpture, D. Atherton, 1986.

Marc took a sword and scraped it on a large piece of metal and bent the metal to make the sound of thunder, the way it was done in old plays. He then took a wine bottle full of vinegar, dumped baking soda in it, put the cork on, aimed it at the metal and waited until it exploded. When the cork hit the metal, he took the sword and triggered a giant crossbow that was mounted on a pole. It fired through a piece of glass into a container of water stuck in a door. Water dripped down into a metal bucket,which was the final sound of the "Folie Pit" performance.
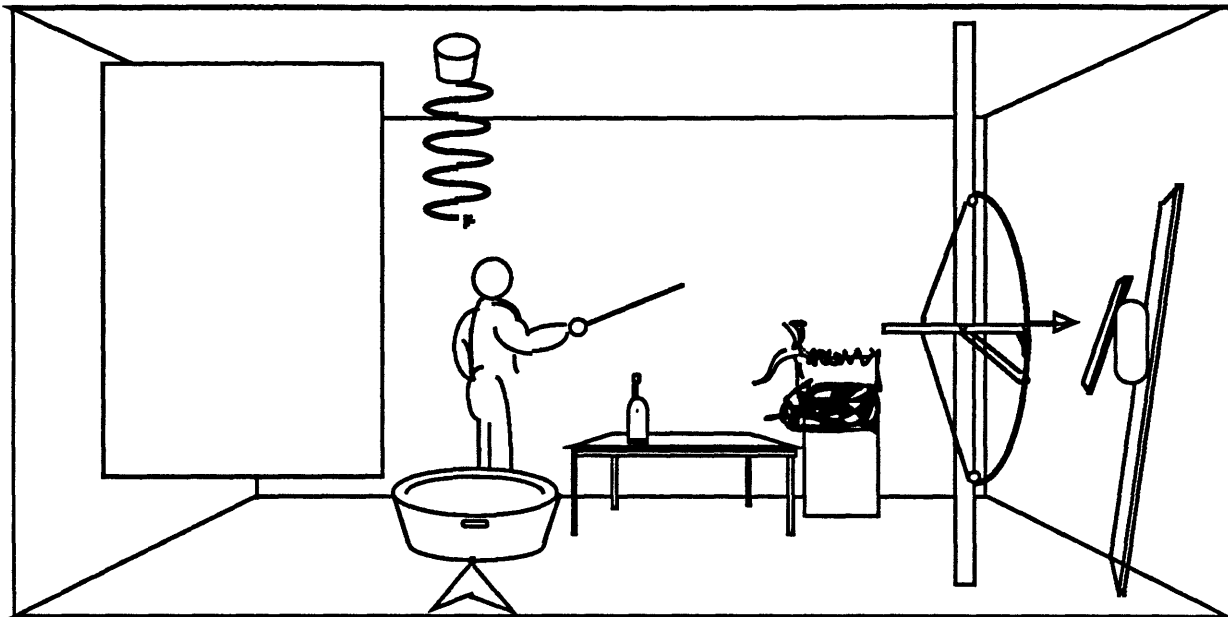
Fig. 4.10 Diagram of 'The Folie Pit' D. Atherton, 1986.

In the "Folie Pit" performance I made a score which used a combination of sound effects and sound effect-making objects to emit music. It was conceived of as a musical performance, which used sound effects devices and the practice of Foley to generate its visual imagery.

The "Folie Pit" was the transitional performance. I only had one MIDI channel of device control. I had to switch from one device to another manually. It was an experiment in synchronizing live sound effects and MIDI controlled electronic devices.

4.7 The MIDI Robot Orchestra

I began designing devices that could be MIDI-controlled. It was natural to adapt the hybrid objects and sounds to MIDI. I thought of these devices as players in a MIDI Orchestra. Like a real orchestra, there were members, not all of whom appeared in every performance. I called it the MIDI Robot Orchestra.

Some of the players include,

MIDIcrossbow

MIDIblenderfonehorn

MIDIbullwhip

MIDI fireplacegrinder

MIDIrobot Ruxpin

MIDI Faux Roof Leak

MIDIhand-drill

MIDIearthquake

MIDIdoorslam

MIDIvideodisc

MIDIneon-paintbox

MIDItent

MIDIrockingchair

MIDIfog

MIDIconductor

MIDImummy

MIDIblowingtime

MIDIwalkietalkie

MIDIdriveinspeaker

MIDIprojection.

Fig. 4.11 Diagram of the MIDIblenderfonehorn , D. Atherton, 1987.

One example of an adapted device is the MIDI Hand Drill. "Hand Drill" originally appeared in a show at RISD, "Industrial Revolutions." It is a hand drill with a mannequin hand where the bit normally goes.

In the show, it was set to low speed and placed on the floor. Some viewers associated its movements with an artificial limb groping and creeping helplessly about, occasionally getting tangled in its own chord. The audience got involved untangling the drill, a phenomenon which also occurred with other self-motivated devices that got into trouble during the "midicube."

Adhering to utilitarian design, I chose objects that looked functional at first glance, or if one did not really think of using them. At this point, according to Glasser's system, the viewer experiences no error signal. This is where the assault on convention begins. "Hand Drill" made the analogy that both machines and physiological bodies have electrical systems. Of course, these series of perceptions occur very quickly.

4.8 MIDI Gesamtkunstwerk

4.8.1 Multimedia Performance and Gesamtkunstwerk

Gesamtkunstwerk provides a historical context for my intentions with multimedia performance. After reading and thinking about it, initially with Wagner and currently with performance art, I believe it means the collaboration of many media emanating from a central impulse, be it one artist or a centralized control station . No one media is dominant throughout.

Gesamtkunstwerk seems to imply a direct stimulation of the senses to convey meaning through experience to the audience, which is why narrative theater, for example, does not qualify - because it conveys meaning through text with the support of music, lights, etc. Gesamtkunstwerk as 'direct experience' has occurred in contemporary visual arts as the 'happening', with John Cage in the '60s, in which the audience was surrounded by many media. The stimulation of all the senses make it logical to utilize different media which appeal to different senses.

4.8.2 The Idea / The Ideal / The Practice of MIDI Gesamtkunstwerk

The use of MIDI as a controller and organizer of the media opens new possibilities for the artist to create a multimedia environment. Whereas in the past many people and much equipment was needed to produce a performance, MIDI opens up a subtle and powerful realm that was not previously available. This allows for a personal Gesamtkunstwerk - the creation of a personal world or theater of many different media.

The 'idea' of Gesamtkunstwerk is a medium which brings together many of the major artforms in its expression.

The 'ideal' of Gesamtkunstwerk is when all the media come together to create a seamless, unified experience. The experience of this type of Gesamtkunstwerk is complete identification with the performance. It corresponds to the highest level of perception outlined by William Glasser which is 'oneness'; the outside and inside merge; the experience is not distinct from the experience.

John Warrack also described the ideal Gesamtkunstwerk. "The Gesamtkunstwerk ideal, one only partially realizable in different practical forms by different composers, essentially concerns not reinterpretation of ideas in different arts, but the co-operation of the arts in a single expressive aim."[40]

I believe that MIDI gives composers the possibility of realizing Warrack's ideal Gesamtkunstwerk. The ideal I have described - the merging experience - could be the effect of realizing Warrack's ideal - all the arts functioning together toward one end. My ideal Gesamtkunstwerk emphasizes what might be recognized as a peak type of experience, an experience of heightened awareness. MIDI Gesamtkunstwerk is geared toward capturing, refining and sustaining this type of experience. The reason MIDI makes this an even remotely attainable goal is the access to editing, which brings us to the third aspect of Gesamtkunstwerk, the 'practical' Gesamtkunstwerk.

'Practical' Gesamtkunstwerk is what actually happens in performance. It describes the actual events. I will describe the first MIDI-controlled environment I have made in this category, the "midicube" (1988).

4.8.3   Editing and Gesamtkunstwerk

The ability to edit performance and multimedia is what allows the composer to refine it to the point of Gesamtkunstwerk, where the media will truly function together. Michael Geisler has argued that film is the closet thing to Gesamtkunstwerk in modern culture. He believes that because it uses many codes in a unified medium, it draws the viewers into its world completely.

I believe that the reason this works for film makers is that they have the possibility to edit and refine their material for optimum effect. (Not all films achieve this.)

Frame-by-frame study of films on videodisc or videotape reveals the complexity of events that go by too quickly to be seen in real time. Explosions, for example, are often the combination of several rapid

explosions, edited together to enhance the effect. Fast chases or falls are slowed down slightly so they can last longer and be seen better. The parameters of real life are stretched to give the simulation of real life.

With MIDI-control, the same detail in editing can happen, reinforcing events that would otherwise be less powerful. Gesamtkunstwerk can be achieved because it combines editing precision of film - heightened life - with physical objects and multiple elements that have the increased power of real life. Computer control places MIDI Gesamtkunstwerk somewhere between film and live performance in perception.

If one can succeed in programming a peak experience, what would be the effect? If peak experiences were sustained or repeated, would they cease to be peak experiences? These are questions which can only be answered fully by doing it. They would be appropriate concerns of the Electronic Intermedia Studio, described in Section 4.9.

4.8.4 "...r-e-m-o-t-e..."

"...r-e-m-o-t-e..." was a collaboration between Ann Stoddard and Ralph Paquin at the List Visual Arts Center, MIT, in 1988. Ralph came to me with some sounds he had and others he was thinking about. I digitized parts of them and resequenced it and we worked together developing different sections, like vignettes in a sort of abstract poem at the installation.

"...r-e-m-o-t-e.." was the first multimedia event in which I programmed nearly all the effects and sounds with MIDI. Dana Friis-Hansen's reference to this work as a Gesamtkunstwerk furthered my thinking and investigation into Gesamtkunstwerk. The performance interested me from the point of view of the interaction between mechanized events and live performers.

The lighting and motor control of "...r-e-m-o-t-e.." was completely MIDI controlled. The things that were not under MIDI control were some flash paper explosions at the end which I fired by hand. We could have MIDI-ized them, but wanted to leave the timings flexible for each performance.

One of the exciting examples of the use of MIDI in this piece was a monolog that was quite long. We took a long sample and in DigiDesign I took out the breaths, so that it became a truly run-on sentence. It was a subtle effect which was ironic in the sense that the monolog was delivered by a giant latex head that was five feet tall, lying on its side. The eyes would rotate around and the eyelids would blink and the mouth would move on separate, independent motors which I controlled through MIDI and the X-10 system.

The installation had strobe lights and colored lighting. Since we used the same file that we had used to create the sound track tape for the lighting. I took time information about when something occurs and used it to place a light or a motor action.

"...r-e-m-o-t-e..." involved five performers. The gallery was completely altered and full of objects and constructions built by the artists to embody an obscure narrative content. Almost every surface was painted. There was a homemade, hand-cranked elevator in the space and dense layers of action, although the composition was fairly uniform. With more time - a common problem in multimedia performance - I feel more variation and building up to events would have improved the impact of the performance. In a sense "...r-e-m-o-t-e..." and the "midicube" are examples of Gesamtkunstwerk in an infant stage.

4.8.5   Practice of Gesamtkunstwerk: The "midicube"

The "midicube" was conceived and created in collaboration with Joe Chung, a graduate student at the Media Lab, with contributions by many students from the Media Lab. It was performed in 1987 at the Media Lab, Experimental Media Facility, which is known as the "Cube" because it is a large (64' x 64' x 64') empty room roughly in the shape of a cube.
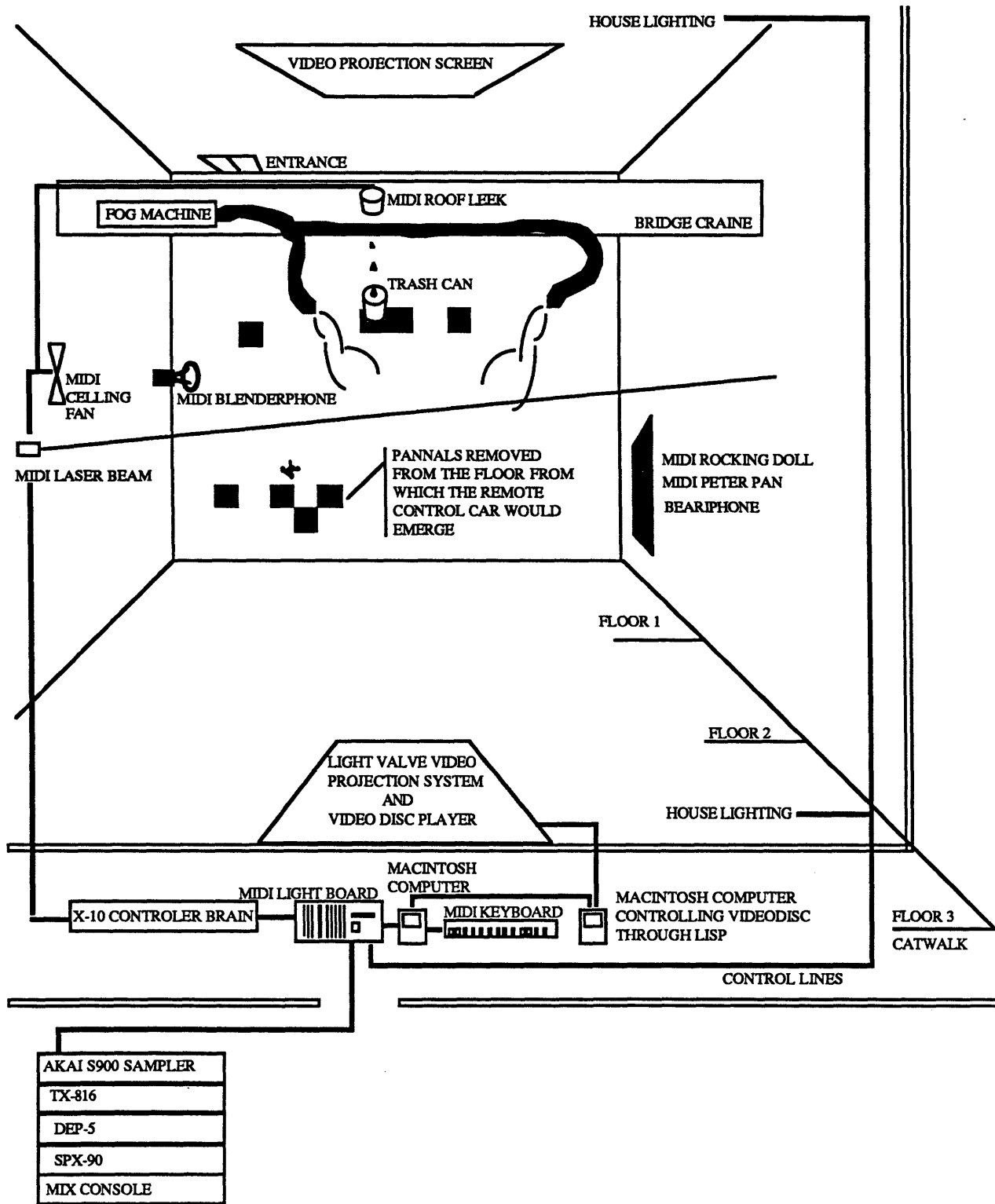
Fig. 4.12 Diagram of the "midicube," as seen from above; D. Atherton, Joe Chung, Experimental Media Facility, (Cube), MIT, 1988.

Technically, the idea was to have MIDI control new and old devices of performance art: slide projectors, video, videodisc, lasers, light projections, robotics. Aesthetically, we were interested in placing the audience within a particular movie aesthetic. We drew on the genre of several movies: Ridley Scott's "Blade Runner," John Cleese's "Brazil," and George Miller's "Road Warrior," because they were pertinent to our lives at the Media Lab surrounded by high tech machinery and because those films deal with some of the frightening elements of high technology and the way it effects people.

We spent two months "MIDI-izing" the lasers, that is, making MIDI-controlled galvanometers so we could map velocity and pitch onto the different axes of the laser. We constructed robots using a light board and relays as an interface to control them and make them move.

In contrast to the Antenna Theater project in 1987, whose extensive sets we felt were dwarfed by the Cube, we decided to use the Cube itself as a set and work with the ominous qualities of the empty 64 x 64-foot cube. The space already had a lot of the qualities we wanted. We filled it with fog emitted from the overhead bridge crane. The fog was MIDI-controlled. It was important aesthetically how the fog entered the room. It wasn't supposed to look like a fog machine hidden away. Instead the fog came out of hoses so it looked like something in the inner workings of the building had broken.

Normally the audio technicians during a performance would sit in a control booth behind a window. This room was used instead as a small puppet theater, viewed through the window. There was dramatic lighting and a Peter Pan puppet danced to the sound. A toy bear was made from a bear phone - a commercial telephone that is a teddy bear that moves its mouth and eyes with the incoming caller's voice. It was modified by removing the head and exposing the plastic interior. It was spray painted silver and glass eyes were added, so that it looked robotic. This was in keeping with the idea of mechanical prosthetics in the midicube's design concept.
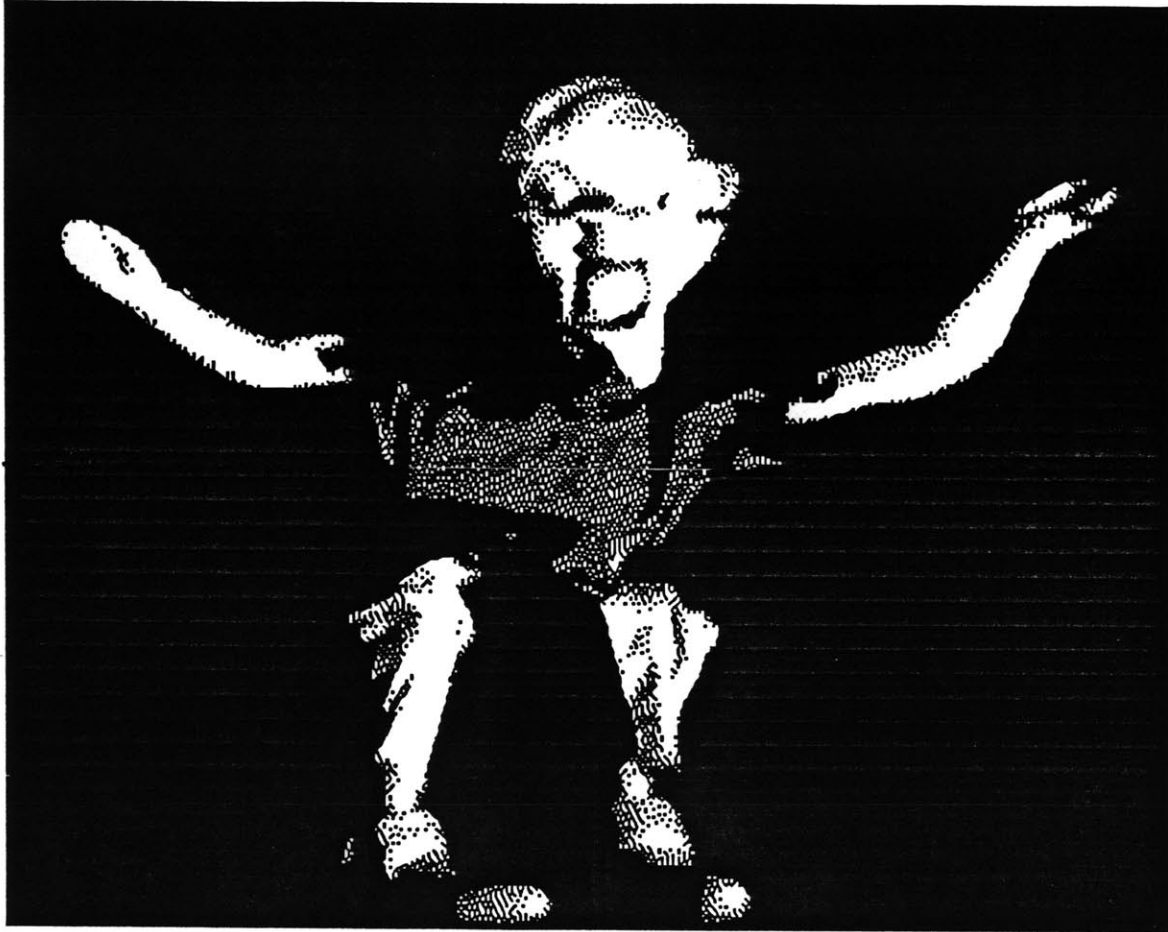
Fig. 4.13 MIDI Peter Pan as a philosopher and dancer in the midicube, D. Atherton, 1987.

Dec Talk - a computer-generated voice - was used for the voice of Peter Pan and the Robotic Bear. The Bear would get the telephone messages and speak through MIDI Dec Talk. We had to, through MIDI, call up the Bear. Then it was ready to talk. On MIDI command the Dec Talk files would be executed and other Dec Talk files would be executed too for Peter Pan.
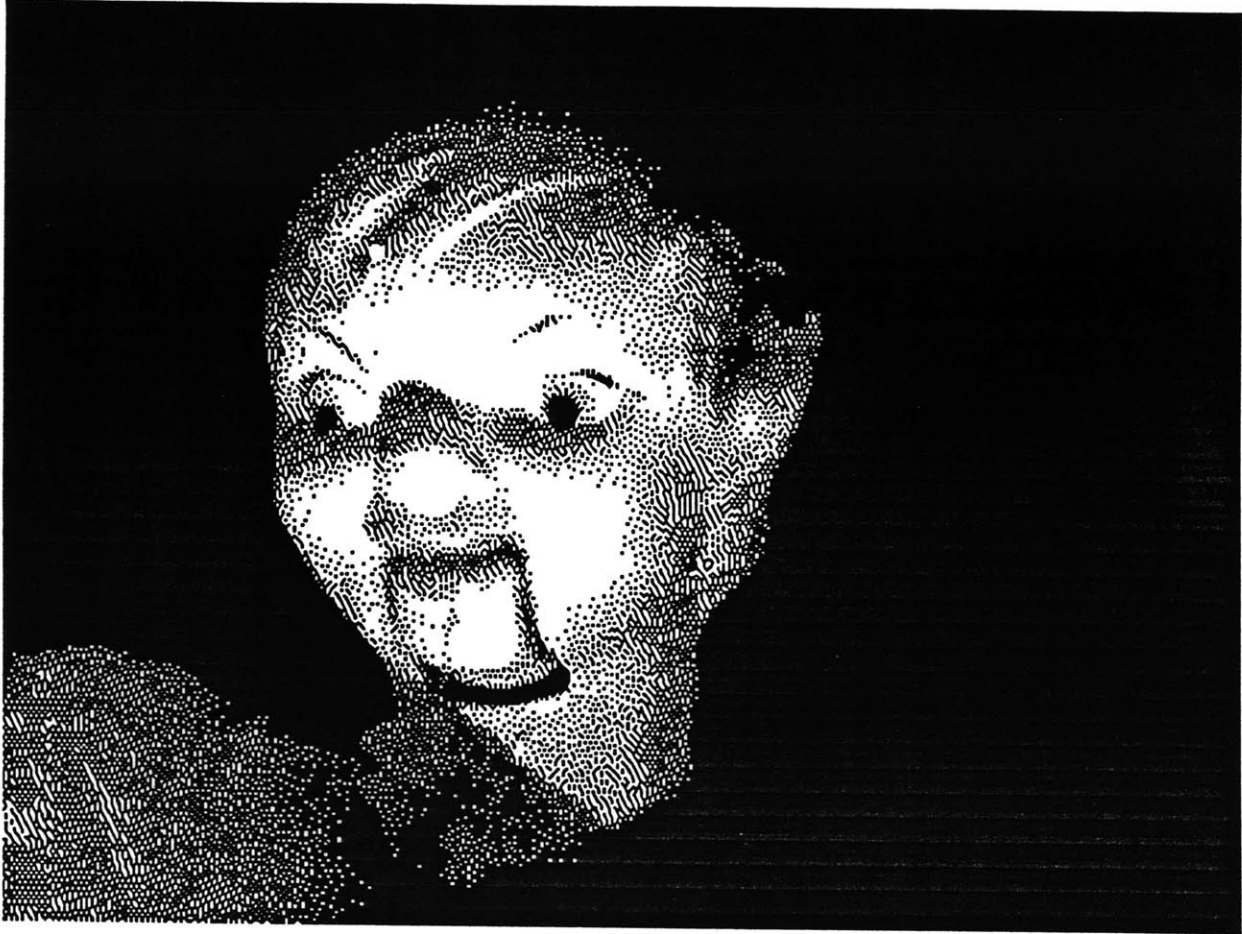
Fig. 4.14 MIDI Peter Pan as a philosopher and dancer in the midicube, D. Atherton, 1987.

His mouth movement had to be recorded sitting in front of him playing keyboard and playing notes that would trigger his mouth. It was not really an automated recording system. We had to do it by hand. Then we had a MIDI-controlled kitchen household blender with a gramophone horn protruding from it. We could, through MIDI, play with the pitch of the motor and some of the industrial sounds which were some of these loud crashing sounds.

Fig. 4.15 MIDI Peter Pan as a philosopher and dancer in the midicube, D. Atherton, 1987.

We had a MIDI videodisc which we mapped. Different parts of the keyboard had different effects on the videodisc. We used the MIT Media Lab videodisc and designed a section of it that was an animated shark swimming. Different parts of the keyboard caused the shark to swim faster or slower or forward or back, so we had video editing on the MIDI keyboard and it was able to be recorded and played back the same as other devices.

Most of the MIDI control of the sculptures was made possible by me and some Media Lab students. The software package we used was the commercial software package, Performer, to run the sequences. Joe and I worked together, but he was primarily responsible for the MIDI video disc software .

A radio-controlled car (inspired by Martha Swetzoff's conception of a radio controlled car with a tiny VCR monitor mounted on it); carried a walkie-talkie instead. It was the one non-MIDI device in the show. We could drive it around up through holes. Panels were removed in the floor so suddenly the car could

come driving up from a hole and disappear down into another. We found that we could interact with the audience. If it got stuck in a hole, we could drive it back and forth. People would tend to have sympathy and pick it up and take it out of the hole. It was a very fast driving car, so it would go very quickly and we had stripped it down so it looked like a bare-bones, home-made car.

There was also an artificial leak in the ceiling that was MIDI controlled, so at certain points water would drip. One of the great strides made in this piece was the dynamics. We could go from a drip of water to a barrage of motors and sounds that were very loud or very soft. Things could be acoustic or synthetic. The biggest problem was that since spending all this time on MIDI-ization of technology. Compositionally we did not get to do as much as we wanted to do.

4.9   Conclusion

The concept of MIDI Gesamtkunstwerk can be traced back through the MIDI Robot Orchestra to my initial reactions toward synthetic sound.

I recognized two levels in my response to analog synthesis of acoustical instruments, such as the artificial string section. There was a mental awareness that the synthesized sound was related to strings. The 'gestalt' of strings was intellectually cued. However, the emotional experience evoked by a real string section only happened through a memory association. Roughly put, I *knew* I was hearing 'strings', but I didn't *feel* I was hearing strings.

I was curious about this separation of mental and emotional experience, which seemed to be connected to physiological impact of the electronic vs. the acoustic sound. Rather than trying to improve the quality of the electronic sound to better imitate acoustic instruments, which was pursued by musicians and audio engineers, I thought it would be interesting to experiment with the split experience: consciously cueing a mental association by stimulating a particular gestalt; and likewise, consciously cueing an emotional association by stimulating physiological responses. Both of these endeavors involved working with the perceptual system by utilizing effects thought to have known responses. While these efforts would be realized only later in the format of multimedia, my first work in that direction began with sound instruments.

While I initially disliked the experience of synthetic sound, I made use of it in my work by expressing its artificiality. I used the model of the symphony orchestra stored within a synthesizer to conceive of the MIDI Robot Orchestra. This would be an orchestra of synthetic and acoustic instruments that were not all within the synthesizer, but were still controlled from a keyboard and computerized score.

The physical instruments of the MIDI Robot Orchestra were built to articulate natural sounds with a deliberately artificial degree of control. A Hammer Dulcimer was fitted with a solenoid which triggered it to play electronically, but it could only play one note. The software instruments were also of the hybrid type. Rather than electronic instruments intended to imitate acoustic instruments, I merged parts of several sounds to make a new artificial instruments. Synthesized sound was combined with the physical hybrid electronic/acoustic instrument's to form the overall musical fabric.

With the MIDI Robot Orchestra assembled in my studio, I attempted to get the instruments to play together, based on the model of a real orchestra. This was the impetus behind MIDI-izing the players so they could be triggered by the central computer. I became aware of the visual and environmental qualities suggested by these sound devices that had sculptural presence and even a suggestion of 'character' as a result of the physical and conceptual analogies I made as I was building them. Stringed instruments appeared to be played by ghosts because no musician was present when the string was plucked. A Jacob's Ladder (a high voltage generator) intended to make 'the sound of electricity' conjured visual allusions to the science fiction lab. Having MIDI-ized the instruments, I realized that I could go farther than just a sound-based orchestra, into creating a complete environment that could stimulate all of ones senses and in an orchestrated way.

In addition to obvious MIDI-controlled effects, such as lighting, the MIDI Robot Orchestra grew to include 'instruments' that were designed to simulate natural phenomena, such as the MIDI Roof Leak, which mimics a natural occurrence by triggering a water drip from the ceiling. It was still an instrument, because the sound of the dripping was part of the score. Yet had a strong visual impact as well, allowing me to expand by using the score to sequence not only sound events, but also visual and physical actions.

Design of the MIDI Roof Leak recalled the idea of 'cueing the schema' and the exploration of artificiality. The audience knew that the roof was not really leaking - it was not raining outside - and that the leak was artificial. It was similar enough, however, to a real roof leak to cue an association, such that they would accept the suggestion of a roof leak with whatever implications and secondary emotional associations/memories it had for them. Generally, the model of real phenomena was the basis of the artificial designs. What makes this particular device especially 'hybrid' is that it combines the concept of a drum with a roof leak: it could drip in tempo.

At this point it was clear that a closed studio in which all elements, such as lighting and sound, under computer control, enables extensive articulation of the viewer's sensory input. The MIDI Robot Orchestra outgrew the emphasis on sound and I evolved the concept of MIDI Gesamtkunstwerk.

MIDI Gesamtkunstwerk uses multimedia to access and control perception. Early behavioral psychology posited a straight stimulus-response theory built on the belief that the internal world was a function of external input. The contribution William Glasser and others have made to the field is to recognize the existence of an internal world which judges and responds to stimuli from the external world and is not controlled by it. In the same way, while I want MIDI Gesamtkunstwerk to aspire to a virtuosic control over the perceptual input, I do not believe that the internal state is or should be controlled.

Children are generally more susceptible to internal acceptance of or belief in external perceptions, accepting cartoons and environments like Disney World as realities for the duration of the experience. Adults generally have stronger internal worlds in which they differentiate between the artificial and the 'real'. However, adults often believe that their own personal reality is, in short, reality for everyone. Conflict often grows out of conflicting personal realities. That is, a person usually believes that their own concept of reality is or 'must be' the same for everyone. Glasser points out that personal realities are unique for each individual and interpersonal cooperation comes from accepting that there are two realities - one's own and an external world which includes everyone else's reality. Two people can better resolve their differences by recognizing and addressing the differences in their respective internal worlds, which could be called in layman's 'point of view'.

MIDI Gesamtkunstwerk creates a convincing artificial reality, in which sensory perception is comprehensively controlled to generate a powerful experience. But the Gesamtkunstwerk does not extend to control the internal world. To do so would invade, deny and replace internal mechanisms, the way those working in propaganda and 'brainwashing' attempt to do.

In the same way movies create convincing artificial worlds that provide deeply satisfying temporal experiences for people, the multimedia environment can create a convincing temporal media world. The difference between this and a commercial environment like Disneyland is, of course, the concept and intention behind the environment, that is, its meaning. The Disney-type artificial reality, often expertly done, tries to smooth over conflicting inputs for a relaxing, recreational purpose. The artistic venture raises issues about perception and reality by juxtaposing conflicting signals and arousing tension that stirs thoughts and associations. It deals with ambiguity. Synthetic and acoustic elements are mixed; the synthetic is exposed rather than enhanced to be that which it is imitating; high and low tech devices are used, fused and sometimes hidden, sometimes exposed.

Models from the external world are referenced to stimulate convincing perceptual experiences. This is done in a deconstructive manner, by separating functions. The deconstructive/reconstructive tools from the

Schema for Creative Design are useful in this step. The physical vocabulary of an event might be taken from a factory, for example, with sounds and actions that reflect a mechanized environment. The emotional vocabulary might be chosen as 'anxiety', for example, denoting particular perceptual effects to promote it. The audiences attention might be focused in one direction. A wind and noise would occur from behind. Since there is a primal tendency toward fear of the unknown and the area behind the body is not monitored by vision, then sound and movement from behind is quickly attended to, to discover if it is safe. Thus, anxiety could be triggered. Separating emotional, physical and mental responses and mapping a media environment that cues the various sets of concepts and emotions generates a unique synthetic theater.

4.10   The Electronic Intermedia Studio

The conclusion that I can draw from my thinking and experiences with MIDI-controlled multimedia is that the technology warrants an investment of time and space to develop optimum results.

Establishing an ongoing studio setup with electronic and MIDI-driven media is essential to learn the vocabulary of this new artform. Experimental situational synthesis in the programming of multimedia scenes is a new area due to the advent of computer control. The rare multi-sensory moments I have experienced in film and other dynamic artforms are an area of discovery and learning toward building the multimedia environment.

The future concerns of the Intermedia Studio are many: the integration of live performers into computer-controlled environments; the interaction and integration of the various media; adapting devices to MIDI control; spontaneity in composition; spontaneity in performance; qualities of live vs. prerecorded performance; and many as yet unseen relationships. Just as the realization of the MIDI Robot Orchestra was the inspiration for MIDI Gesamtkunstwerk, the realization of MIDI Gesamtkunstwerk will open the way to other new artforms.

I project that MIDI Gesamtkunstwerk is achieved by the definition and precise emulation of perceptual experience. It is a theater of perception rather than a theater of illusion. Traditional theater set on the frontal, proscenium stage has mastered illusion. The multimedia theater must master manipulation of the perceptions if its goal is a Gesamtkunstwerk-type experience.

Future work in MIDI Gesamtkunstwerk includes an intuitive cataloging and testing of perceptual effects to build a vocabulary similar to the phrasing and harmonic forms in music. Scores can use the media to cue a unified 'gestalt' - one in which all the media work together to express one idea - or use the media to cue a 'hybrid gestalt', for example the intellectual gestalt of one idea with the emotional content of

another, as in combining two events that don't naturally occur together but are staged together to create obscure meanings.

Development of the hybrid gestalt through multimedia theater is the exciting area for new research and works. The qualities of hybrid objects and hybrid sounds are known from existing examples. Hybrid gestalts are more ethereal - less tangible than objects or sounds - temporal experiences of media working together. A catalog of perceptual effects which is reconfigured with tenets of the Schema for Creative Design and then realized in performance can give us hybrid perceptual experiences. Original, newly made gestalts may give us clues to unknown configurations within ourselves.

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3-minute videotape with poetry by Otto Piene, "Art/Video Boston '86," M.D.C. summer series, Hatch Shell, Boston, 1986.

The Mock Ties
9:30-minute videotape contrasting images of space/time relativity with time effects in video, 1986.

The Folies of Youth
3-minute videotape exploring the role and manipulation of film/video sound effects, "Art/Video Boston 87," M.D.C. summer series, Hatch Shell, Boston, 1987.

Sculpture

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Masonry installation, Market Square, Providence, Rhode Island, 1982.

Fire Box
Film installation object, Room 332, Rhode Island School of Design, Providence, Rhode Island, 1983.

Film Lighting Highlights
Architectural film installation, Hall Gallery, Rhode Island School of Design, Providence, Rhode Island, 1983.

Match Box/Marriage Mirage
Film loop assemblage, Woods Gerry Gallery, Providence, Rhode Island, 1983.

Blowing Time
Assemblage, the face of a clock replaces the blades of a fan, Carreiro Gallery, Boston, 1983.

The following sculptures, MIDI-controlled, modified objects, are members of "The Robot Orchestra"

MIDIcrossbow
35 - 80 lb. compound, archery bow, machined into a crossbow and fired through MIDI into various materials, such as glass, water jugs and wood for sound effect, 1987.

MIDIBear-i-phone
Commercially manufactured telephone/teddy bear, modified with exposed mechanized head, glass eyes, and computered voice, 1987.

MIDIblenderfonehorn
Motor speed of a household blender is controlled through MIDI; water sound within blender is amplified by attached gramophone horn, 1987.

MIDI fireplacegrinder
Fake electronic fireplace fit with a chicken rotisserie meat grinder supporting "can"-type toys that "Moo;" the firelight is dimmable and the toys rotate through MIDI, 1987.

MIDIPeter Pan
Antique Peter Pan puppet; strings are MIDI controlled, enabling him to dance and 'speak', 1987.

MIDIrobot Ruxpin
Commercially manufactured talking teddy bear toy, modified with exposed the robotic mechanism, computerized voice and original vocabulary, 1987.

MIDIRoof Leak
MIDI triggered liquid solenoid drips water on command, 1987.

MIDIhand-drill
Conventional handheld power drill; drill bit replaced by a mannequin hand, 1982.

MIDIvideodisc
Software program controls videodisc through MIDI; uses MIT Media Lab videodisc; in collaboration with Joe Chung, MIT, 1987.

MIDIneon
MIDI-ized neon bulbs switched through X-10 AC controller, 1987.

Videodisc

Folie/Pit/Port
Videodisc installation, sponsored in part by a grant from the MIT Council for the Arts, Center for Advanced Visual Studies, MIT, 1986.

Performance

The Color of Sound
Kinetic sound/light performance, Waterman Building, Providence, Rhode Island, 1982.

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Audio/visual event, Rhode Island School of Design Auditorium, Providence, 1982.

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College Building 412, Rhode Island School of Design, Providence, 1982.

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Sound Installation

A Pentagram of Sudden Singular and Cyclic Destabilizations
Sound installation, 6-minute audio loop, Rhode Island Glass Show, Lily Iselin Gallery, Providence, 1983.

F and B Every 12 Minutes
Sound Installation, 12-minute audio loop, Rhode Island Snack Bar, Providence, 1982.

Illustration
Sound track aired on cable television, Providence, 1982.

Interactive Installation

The MIDI Time Trap
Interactive multimedia installation, with Tom Sullivan, The Children's Museum, Boston, 1988.

Mojo Tech/I am the Alpha and the Omega
Ambient environmental sound accompanied by interactive sound, rocking chair interface and sounds by Tom Sullivan. Sculpture installation dedicated to the sculptor's mother, by Betty Sarr, List Visual Art Center, MIT, 1986.

Collaborative Video

b
Sound Track for Don Ritter's organic computer graphics, Center for Advanced Visual Studies, MIT 1986.

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Interactive video monitor "Radio Interference" by Antenna Theater, Cube, Media Lab, MIT, 1987.

Beat Dedication
Sound effects and music score featuring MIDI controlled computer graphics, for videotape by Bob Sabiston, premiere at SIGGRAPH 1988.

TERRAIN
Digital samples, audio engineering, voice processing and composition, by Greg Garvey, 1988.

Collaborative Sculpture

Grass On the House
Sod Installation on a house, with Claudia Flynn, 138 Benefit Street, Providence, 1982.

Breaking the Mind Barrier
Sound effect and photo strobe interface for painting and sculpture by Todd Siler, Ronald Feldman Gallery, New York City, 1986.

Impressions of an Invisible Sculpture
Ambient sub-sonic sound for sculpture installation by Carl Cheng, List Visual Art Center, MIT, 1988.

Collaborative Videodisc

Double Cross
Interactive video disc for the Boston Shakespeare Company, live actor argues with himself on video, 1986.

Collaborative Performance

Embarrassment Coincidence
Audio-visual happening, with Paul Jacob, Lee Hall Memorial Gallery, Building 412, Rhode Island School of Design, Providence, 1982.

Appearance
Cconceptual art piece, selling posters of our selves, with Paul Jacob, Rhode Island School of Design Tap Room, 1982.

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Media and dance performance, with Judith O'Connor, Portland School of Art, Portland, Maine, 1984.

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Media, dance performance and video installation, with Judith O'Connor, Student Union Gallery, University of Massachusetts, Amherst, 1984.

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Environmental Dance and sound sculpture, with Judith O'Connor, Campus Center Site, University of Massachusetts, Amherst, 1984.

This is the Dance of Birth and Change
Music composition and performance, with Judith O'Connor, Carr House, Providence, 1984.

Reflections on Protections
Music composition and performance, with Judith O'Connor, Memorial Hall, Providence, 1984.

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Computer voice/video sculpture installation with voice activated neon runes featuring Mitsubishi video printer, which printed out the viewers image as they observed computer/video, with performance by Judith O'Connor and two dancers at the Maine Festival of the Arts, Bowdoin College, Maine, 1984.

Photon Voice
Sound composition transmitted via light waves thru the optic sculpture by Shawn Brixey during dance performance by Laura Knott, at "Desert Sun/Desert Moon", Center for Advanced Visual Studies, MIT, collaborative environmental art work north of the Mojave desert, California, 1986.

Coyoteization
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Digital samples, sound mix and 3-D spatial sound design for collaborative performance by Beth Galston, Ellen Sebring and Sarah Skaggs, Philippe Villers Experimental Media Facility, The Cube, MIT, 1987.

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"The Bachae"
Music composition, performance, for the Rhode Island School of Design Performing Arts Group, 1982.

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