BEYOND ELECTRONICS

A SERIES OF
THREE EXHIBITIONS
INVOLVING 11 ARTISTS
1989 WINNIPEG MANITOBA CANADA

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A SERIES OF
THREE EXHIBITIONS
INVOLVING 11 ARTISTS
1990 TOURING EXHIBITIONS CANADA

BEYOND ELECTRONICS

GALLERY ONE ONE ONE

School of Art, University of Manitoba
February 9 — March 11, 1989

MAIN / ACCESS GALLERY

Artspace, 100 Arthur Street
February 10 — March 11, 1989

GALLERY ONE ONE ONE

School of Art, University of Manitoba
March 16 — April 15, 1989

Co-sponsored by Gallery One One One and Main / Access Gallery.

ARTISTS INCLUDED IN THE EXHIBITION

SECTION I
MAIN / ACCESS GALLERY
DIANA BURGOYNE
GERHARD GEHRMANN
CHRISTINE HAWKES
JUAN GOMEZ-PERALES
DAVID ROKEBY

SECTION II
GALLERY ONE ONE ONE
ALAN BOUCH
LAURA KIKAUKA
NORMAN WHITE
NELL TENHAAF

SECTION III
GALLERY ONE ONE ONE
MARSHALORE
TOM SHERMAN

PRELIMINARY EXHIBITION CATALOGUE
(A final catalogue with colour photographs of the installations and additional documentary material will be available from Gallery One One One and Main / Access Gallery in May, 1989. Please refer to description and ordering information on page 18.)

PROLOGUE

In the beginning, so the story goes, there was sand, and when it was purified it came to be called silicon, in the terminology of science everywhere. One day, in the 48th year of the twentieth century, three men, inspired by the Divine Being who watches over all who aspire to nudge the process of history, came upon the marvellous device that was to become known as the transistor. No, it was not made of silicon, but that is another story. Crude and minute though it was, this first transistor, would become the foundation upon which would rest generations of revolution — a quiet revolution but its effects, nonetheless, would be both wonderful and devastating. For out of a lowly piece of glass would come an all-pervasive computer revolution, and that revolution would affect all aspects of life in the civilized world, altering forever the directions of science, communications, and even art. [1]

STREAMS AND RIVERS: A BRIEF BACKGROUND ON ELECTRONIC ART

In 1948, the American William Braford Shockley invented the transistor while working in collaboration with his fellow countrymen John Bardeen and Walter H. Brattain. [2]

The invention of the transistor triggered the birth of a revolution in communications and consumer electronics. But if there was an impact on the visual arts, it was almost imperceptible, at least in the first twenty years. In Europe and the United States, artists whose work was rooted in Constructivism were the first to embrace the new technology, just as they had embraced developments in Kinetic Art and its spin-offs. But all of this was part of an old tradition. Although the breakthroughs of the 1950s and early 1960s in the scientific and industrial arenas allowed artists to do things with movement, light, and mathematics that were unheard of a decade before, most, if not all of the work revolved around the application of the new technologies to an aesthetic born more than a half century earlier with the Constructivist Manifesto.

The Constructivists were not the only artists whose interests led them to involve technology in their work. The Futurists had a deep, almost fanatic fascination with all aspects of advancing technology. For them, it became a "worship of modernity". [3]

But the Futurists' involvement with technology was primarily theoretical. Their work remained pictorial, utilizing methodology based to a large extent upon Cubist approaches for the indication of movement. [4]

It was the Constructivist Naum Gabo who claimed that the art of the Constructivists was the first to accept the value of the scientific age and its spirit as a legitimate concern for art. He refuted the belief that "...the personality alone and the whim and the mood of the individual artist should be the only value and guide in an artistic creation." Rather, he welcomed it as "... the first manifestation in art of a totally new attitude towards the artist's task of what to look for,... what we perceive with our five senses is not the only aspect of life and nature to be sung about; ..." [5]

Gabo welcomed the investigation of those invisible forces of nature that could be made accessible through artists utilizing science and technology.

Many years later, Gabo used his Kinetic Construction No. 1 of 1920 as an example in a conversation with kinetic artist George Rickey to point out his awareness of the limitations of the technology of the time and the prospects for the future in the electronic age. As Rickey recalled:

> He did not, at that time, go further; he realized that,with the technology of the time, the machines necessary to make the movements would be so clumsy that they would obscure the movement itself. He now thinks that it becomes possible with electronics. [6]

So, in the fifth decade of this century, the river of Constructivist thought was already running into the tiny stream into which the electronic revolution could flow. But what would happen when the stream itself became a river threatening to engulf the mother river which had so readily accepted its waters?

It is still too early to know the final answer. For that matter, a final answer is rarely, if ever, an appropriate concept in the history of art. What has happened to date, however, is both a muddying of the waters of Constructivism, and an overflowing of the once clearly chiseled banks to produce rivulets, creeks and ponds where all manner of technologically aquatic life may thrive or stagnate.

At this point in the discourse the reader may have come to the conclusion that I am saying that the artists of today working with electronics as media are following in the footsteps of the Constructivists of old, and that their work is merely an extension of the principles expounded in the 1920 manifesto. Anyone who is at all familiar both with the history of art and with contemporary activity in this area would undoubtedly dispute such a ridiculously limited view of contemporary art, though they may admit that certain links can be established in the work of an artist like Nicolas Schoffer. Schoffer is credited by Frank Popper as being "the first artist to apply electronics, cybernetics and industrial techniques in his investigation into the use of real movement". [7]

There is much more to it than a simplistic straight-line analysis of history could ever show us. Two concepts that were central to the original Constructivist proposition are to be found in many of the works by electronic artists in the past twenty years. Foremost is the idea of the work of art being constructed or built up as an unique object rather than a reflection of another reality, either perceived or understood.

The second is the prominence of the underlying natural or man-made forces of the world. Concerns with movement, space, optical phenomena, mathematics and proportion, and even sound as fundamental building materials for the construction of the experience of the work of art were vital elements of Constructivist thought. The same array of forces occupy the attention of many artists working with electronics today. British artist Edward Ihnatowicz, [8] who has worked with electronics and computers for many years can undoubtedly be considered one of the pioneers in the field. He identifies the continuity:

> In our present period, appearances of things are no longer particularly vital, important or exciting. I am interested in the behavior of things. And it will always be a close run thing between technology and art because technology is what artists use to play with ideas. [9]

Many writers have recognized the Constructivist roots of contemporary electronic art and the art/science movement of the 1960s which spawned such shaky alliances between artists and scientists as EAT, an institution founded in New York known as Experiments in Art and Technology. [10]

Although contemporary directions in this area have definite links to Constructivist concerns, few of the artists working with electronics today have much knowledge of the thread that connects them to those historical references. Earlier artists were fascinated by the technology itself, building machines which created movement, drawing the viewer's attention to this process as an end in itself and to various invisible aspects of form and structure. They did not examine the results of these actions and of technology itself on society.

The revolution in information-processing and communications technology has led artists to deal with technology differently. Most of today's artists acknowledge its social ramifications and choose to investigate these concerns in their art. Technology is seen by the artist less as a subject in itself and more as a tool with which to examine the effects of other technological tools. Still, the lingering doubts exist. The separation of the tool from the subject comes only after the tool has become so commonplace as to be invisible in the process. That is unlikely for some time to come.

The combination of medium as tool and medium as subject is accepted as a major attribute of twentieth century art. So a painting by Monet is as much about paint as it is about the flowers, cathedral or haystack depicted. Any reasonably objective appraisal of the current situation would likely conclude that most, if not all, artists who are currently working with electronic media are dealing with a complex combination of the media as primary subject, examining its inherent properties and capabilities; as secondary subject, dealing with issues related to the effects of the technology upon society and environment; and simultaneously, as the tool by which these investigations may be carried out.

NOTES FOR STREAMS AND RIVERS:

1. Anonymous quotation discovered on an ancient floppy disk (original IBM 3740 8" format)

2. Valerie-Anne Giscard d'Estaing, *World Almanac Book of Invention* (New York: World Almanac Publication,1985), p. 307.

3. Frank Popper, *Origins and Development of Kinetic Art* (New York: New York Graphic Society, 1968), p.123.

4. Ibid, p. 43.

5. George Rickey, *Constructivism: Origins and Evolution*, (New York: George Braziller, 1967), pp. 28-29. Attributed to Naum Gabo "Art and Science," Gabo, op. cit., pp. 180, 181. — I believe the op. cit. refers to Naum Gabo, *Studio International*, (London, April, 1966).

6. Ibid, p. 183.

7. Popper sees Schoffer as "the most important contemporary representative" of the constructivist tradition" established by Gabo and Pevsner and maintained throughout the inter-war years by Moholy-Nagy."

Popper, op cit. pp. 134-137.

8. In 1970 Edward Ihnatowicz produced his Senster, a large scale sculpture which responded to viewers in robot-like fashion with efficient, human-like movements.

9. Brian Reffin Smith, *Soft Computing Art and Design.* (Wokingham, England: Addison-Wesley, 1984), p. 150.

10. EAT (Experiments in Art and Technology) was established in New York in the 1960s to establish liaisons between artists and scientists and to provide opportunities for artists to acquire technical knowledge and gain access to resources and equipment. A similar institution, The Centre for Advanced Study of Science in Art, was established in London, England. Although both of these initiatives did provide for some productive interaction between artists and scientists, probably their greatest accomplishment was to point out the difficulties to be encountered in attempts to bridge the gaps that exist between these two fields.

Popper, op cit. p. 210.

TOOLS

"Technology" is a very broad term. It can refer to any extension of human capabilities and in that sense, even the lowly charcoal stick is a form of technology used by the artist.[1] It is a tool. Seldom is it considered as the subject of the art created by the artist; when it is, there is little, if any, confusion as to its role or identity. The charcoal is either tool or subject, or in rare cases, both. But in every case its role is secure. The same cannot be said for technology in its most advanced form. Probably this situation is not unique to the present day nor even to the present century. More likely, it is a product of the newness of the technology and an uncertainty about the place of that technology in our lives.

Contemporary electronic technology can be seen as a tool which artists use in much the same way that they use a myriad of other tools in their expressive endeavors. In reality it is a broad range of tools which are often lumped together without concern for their relationship to each other or their lack of same.

In his book *Soft Computing: Art and Design*, Brian Reffin Smith describes three categories for the use of the computer by artists. The first is the use of the computer as a tool, in much the same way an artist uses a pencil; the second casts the computer as a kind of creative partner in the process of production, taking part in some of the decision-making processes. The third category has more to do with the interaction between the person and the computer. The work with the computer changes the artist's perception of the problem and results in new ways of seeing and of coping with problems. The artist goes back to the original tool,such as a pencil, but goes on to produce a result that might not have emerged without the involvement of the computer. [2]

An examination of the history of the use of other, more familiar,artists' tools can provide insight into the current state of involvement with technological tools. Perhaps the most appropriate of these would be the charcoal stick, as it is one of the oldest tools used by the artist and, like the cockroach, has survived millions of years of evolutionary history relatively intact in form and function.

The original stick of charcoal used by the prehistoric artist undoubtedly began life as a by-product of the entirely unrelated process of fire. The discovery of an artistic function led to the exploration of the capabilities of the tool as subject. In this case "subject" is taken to have a double meaning. The tool is both the object of scientific study or examination and, in the truest artistic sense, the subject of the creations of the early artist. The artist pictured the charcoal stick not by drawing its likeness, but by placing its mark on a surface. The mark became the representation of the charcoal as much as an examination of it.

At some point in our hypothetical prehistory, the representational potential of the charcoal became apparent. It began to function as a tool used to create magical and symbolic images. At this point, it is unlikely that the tool ceased to become subject, in either of the predefined senses. Rather, the subjective aspects of the tool's identity probably assumed less importance than its functional properties, and the charcoal became primarily a means to an end. The re-examination of the charcoal as subject continued periodically as the concept of art developed throughout history, then changed over the centuries.

A good example of the preoccupation with the tool as subject can be seen in the early work of Norman White, namely "Abacus", 1976, [3] wherein electromagnetic pulses send small aluminum cylinders back and forth over two steel arcs, while blinking LEDs (light-emitting diodes) display the underlying logic of the system. The visual experience is simple and understated, with the focus on the medium - the underlying process producing the constantly changing relationships. It is a concentration on the tool. In the purest sense, the medium is the message.

The most recent, and possibly the most explosive re-examination of the lowly charcoal as subject has come in the last century, beginning with the development of the "modernist" tradition at the end of the nineteenth century and climaxing in the art of the mid-twentieth century Abstract Expressionists. The properties of the medium became the legitimate sole subject of the work of art possibly for the first time in millions of years.

Canadian artist Michael Hayden's work of the nineteen seventies is usually described as light sculpture. It is an exploration of the tool, with the real subject being the medium itself. So although the initial experience of a work such as *Jacob's Ladder* [4] is visual in nature, involving lights, mirrors and implied motion, the deeper response is to the qualities and capabilities of the underlying medium, the computer. What the artist seems to be really fascinated by is the potential for sequential change and altered patterns that involve the counters, gates and memories of the electronics that comprise the heart of the piece. Hayden is not, in this work, using the tool of technology to examine or define the world around him. Rather he is looking for an outward expression of the hidden capabilities of the medium itself, in much the same way as the prehistoric artist sought to express the capabilities of the charcoal, or the modernists attempted to deal with the medium of painting within its own parameters.

Canadian art is not without its examples of artists who use electronic media strictly as a tool. Gerald Hushlak has, for many years, used a sophisticated colour plotter connected to a mainframe computer to produce drawings with little reference to technology itself in the finished work although they draw heavily upon the capabilities of the machine in their conception and production. Hushlak describes the role of the computer in his work:

> Traditionally, machines used in art-making functioned as tools performing only in an external mode. Today, the computer can assist the artist at all levels: selection and organization; instant visual playback of information; and an instant memory actively addressing data many years old. Most important of all are present software developments which allow subjective inclinations to become workable information for the artist. The artificial intelligence liberates the artist from the drudgery and laborious activities which are so often necessary in art-making. [5]

The electronic media have become as much a part of our stock of communication tools as pencil and paper or charcoal. Yet despite the recent explosion of involvement in these media, artists have yet to do more than scratch the surface of these tools' potential for expression. Here, media is being used in its traditional definitive sense in the arts, not in its cultural contextual sense to describe radio and television and other modes of information dispersal.

The electronic media have unique attributes which can expand the range of potential expression through their inherent capabilities. The artist, however, must overcome

certain built-in barriers before their potential can be realized.

The most obvious of these is, of course, their technical complexity. For an artist to realize a tool's proper potential, he must understand it to the point where its use is instinctive. The more complex a tool, the more difficult it is to reach a point where the work can rise above the fascination or the struggle with the tool itself. In this sense, an artist working with electronics must be something of an engineer able to see beyond the practical, the mundane, or even the titillating applications of the tool in much the same way that the painter must be capable of seeing more than the pleasurable effects of colour, surface and line. Not every painter understands the chemistry of pigments, or even, the theory of colour. Some instinctively grasp the expressive possibilities of a medium without knowing a great deal about it. What they know is how to use the expressive potential of the media without being trapped by its more seductive superficial attributes.

The electronic media provide their own unique properties of surface seduction. Although they possess visual and aural stimulants that rival the most attractive of other media, they also have developed a cultural veneer which readily implies veracity and substance to some of their most superficial applications. There is a trap for the unwary artist in the culturally "loaded" property of all these media. The technology itself is neutral but there are definite social connotations in the way it has been used in society. From its beginnings, the television has been used for propaganda and popular entertainment purposes.

Electronic media are not neutral tools as are most of the traditional tools used by artists. Making a work of art with a video image or a computer is much more like doing a drawing with a submachine gun or an antiballistic missile than with a stick of charcoal or a pencil because it cannot be separated from the cultural reflections inherent in the tool. Nor can a videotape played back upon a monitor be experienced without an element of cultural baggage. The artist must deal not only with the traditional subject-tool dichotomy, but with the added cultural role influence of that tool. The viewer brings a bundle of expectations to the work, not from the history and traditions of art but from the exploitive world of commercial culture. The work of art is simultaneously viewed through the distorting lenses of both expectation and prejudice. The expectation may be of entertainment at the level of popular television, while the prejudice places its value on the same negative scale associated with television in our society.

The cathode ray tube or CRT is a basic tool like canvas or paper to another artist, with the beam of light equivalent to the pencil, brush, or crayon. But where the paper has, over the centuries, acquired a somewhat neutral identity, the CRT when it becomes part of a television carries with it a large measure of cultural baggage which must be stripped away by the artist if it doesn't contribute to the expression of his ideas. That "baggage" can, of course, become part of the expression, but the danger lies in the overwhelming power and innate superficiality of the cultural residue. That residue includes the Pavlovian automatic response mechanism that has developed in members of societies who live in day-to-day contact with the technology. Artists must be aware of the inherent bias which has been instilled in their potential audience through this widespread cultural use of the technology.

"Subject" in works utilizing or dealing with electronics materializes then as a three-horned beast. On the left temple rises the visible media itself - computer as computer, television as television. On the right temple, the internal and external processes of the medium protrude, more or less visible, depending on the medium and the artwork/artist. Finally, in the very centre of the forehead, sits the horn of cultural context - either separate and isolated or intertwined with one or both of the others. It can be a massive, overwhelming growth; at other times it will be a mere bump, perhaps even invisible. Still it is always present. It is this central horn of cultural context which makes discussion of the electronics/art interaction so difficult, It is difficult, maybe even impossible, to know which aspect of the work is being analyzed, or which is contributing what within the work.

NOTES FOR TOOLS:

1. Jeanne Randolph, in her article "Ambiguity and the Technical Object", outlines two approaches to the definition of technology. One equates technology with 'technique', making it inclusive in nature. The other approach defines technology so narrowly as to include only the "very recent actual inventions", primarily what is commonly regarded as the most advanced technological hardware.
Jeanne Randolph, "Ambiguity and the Technical Object." *Vanguard Magazine*, (September, 1984): p. 25.

2. Brian Reffin Smith. *Soft Computing Art and Design.* Wokingham, England: Addison-Wesley, 1984.

3. Described by Smith in his book *Soft Computing* , pp. 135-136.

4. *Jacob's Ladder,* completed by Hayden in the mid-seventies, is composed of a ladder of neon tubes set in front of a mirror surface and controlled by a bank of switches which the viewer can operate to vary the sequence of illumination of the neon tubes and the speed of the sequential change.

5. Brian Reffin Smith. *Artists/Computers/Art.* (London: Canadian High Commission, 1982), p. 12.

ORDER

The question of order presents yet another issue to explore which derives from the nature of electronics, and in particular, of computers. All human existence depends on the maintenance of a balance between the extremes of order and chaos. Of the two facets of this existence — the physical and the psychological — the latter is of most relevance to the realm of art. If the outward manifestation of the work of art is physical, the raison d'etre behind its existence, is psychological.

Human psychological well-being depends upon the maintenance of a delicate balance between the polarities of order and chaos. Similarly, the artist, in each work, attempts to realize a particular balance within the culturally acceptable range on the order-chaos continuum. For the most part, this involves making order out of the apparent chaos of our environment. The internal electronic environment, however, consists of almost total order. Consequently, the challenge to the artist is quite a different one from that of the artist working with non-electronic media. Though pure sloppiness or poor technical knowledge or skills can result in apparent chaos in a finished work of electronic art, underneath it all is the absolute order of off-states and on- states, of controlled sequences that occur in microseconds, of motors that turn with variations in speed imperceptible to the human eye, and countless other ordered processes that resist the introduction of that proven ingredient of art — the personal expression of the artist.

Attempts to introduce the unpredictable and the unexpected into the extreme order of the electronically controlled environment have taken many forms, such as the introduction of pseudo-random elements into the process. They have also included the insertion of extreme complexity beyond the scope of human pattern recognition, combining the electronic elements with non-electronic, and the creation of interactive works that allow entry of the less ordered and less predictable human brain into the process. In artists' videos particularly, there have been attempts to deny and to camouflage the underlying order and to pretend that the end result is something other than sequential spots of light on a monitor or electromagnetic pulses controlling an air-moving device, the speaker. Even at the most flexible and unpredictable end of the electronic spectrum — the coupling of electronic impulses to the air to produce sound — progress is threatening this randomness as development toward digital sound-processing is removing, bit by bit, the uncertainty that could be incorporated by the artist.

Ironically, the appearance on the horizon of 'artificial intelligence' in computers (AI in the trade), is likely to prove to have its greatest value to artists working with electronic media in introducing some human fallibility and disorder into the order and perfection of the digital environment. Previously it had been expected that AI would have maximum impact in the area of complex problem-solving and in the improvement of the human-machine interaction as described below.

> Developments in AI might permit artists to make artworks with human sensibilities, those that interact with viewers in ways considered intelligent and those that learn from experience. Imagine, for instance, a sculpture that solicits and understands comments from viewers and responds in accordance with a personality provided to it by its sculptor. The potential applications of AI in the visual arts add challenging perspectives on theoretical debates about the relationship between artists and viewers and between artistic processes and artworks and about the fundamental characteristics of aesthetic qualities of artworks. [1]

This will prove to be even more true should the promise of AI in every home computer ever come to pass. However, experience should have taught us that the real issues to be faced will bear little resemblance to the hypothesis formulated prior to the occurrence of the development. In the glowing predictions of what artists would do with the readily available microcomputer, video recorder, and other technological marvels of the twentieth century, was there any recognition of the struggle and frustration that would accompany the appearance of these alien creatures in our midst?

For those who embraced rather than ignored it, the past several decades have been a time of assessment, of sorting and sifting. All too often, the realization dawned upon the artist that the promised land with infinite horizons more closely resembled a prison of expectations and cultural norms, of biases, prejudices, and mind-boggling technical complexity. Those who survived were often those who ignored the aesthetic issues and avoided the technical questions. They played with the superficial properties of the media or adopted aspects of them as minor elements in otherwise 'traditional' works of art. A few artists persisted, often alienated, ostracized, and marginalized. It is these few who have laid the groundwork for the eventual understanding of the electronic media, both as a subject and as a tool.

There is no artificial intelligence in *Beyond Electronics.* In fact, one might be tempted to say that there is no intelligence at all, other than that invested in the works by the artists who created them. All of the artists, however, walk the tightrope between the dualities described, balancing order-chaos and tool-subject relationships. Each of them takes their involvement with the electronic media beyond the simple subject or the simple tool. They work with the media both as tools and as the subject of their artistic creation. At the same time, they acknowledge the media's influence on society as significant enough to warrant this influence being examined, utilizing the capacity of these media for simulated veracity, speed of communication and/or storage and control of information.

1. Stephen Wilson, "Computer Art: Artificial Intelligence and the Arts", *Leonardo*, 16,1, (1983), p. 15.

SOME HISTORY

Undoubtedly, the four inventions to figure most prominently in the development of electronic-based art over the past twenty years have been the television (1923), the video camera (1923), the video recorder (1955) and the microprocessor (1971).

It is uncertain who can rightfully claim to have invented television, as the final product was the result of the integration of many separate developments and inventions. The Scottish engineer John Baird was one of the pioneers. In 1923, he applied for a patent based on the use of the Nipkow disk (1884) in a mechanical television capable of displaying eight lines. Variations of the mechanical scanning and reproduction methods for television were used until 1935. Then the cathode ray tube, which had been developed in 1897, was put into service to make it possible to replace mechanical scanning with the electronic. At this point, television and video, as we know it, was born.

The video camera, without which there can be no television, is credited to the Russian-American Vladimir Kosma Zworykin. He developed the electronic analysis procedure that led to the creation of the iconoscope, the device that made the conversion from an optical image to an electronic image possible. For this he is known as the "father of television".

The first demonstrated recorded video images were produced in 1951 by Mincom, a subsidiary of the Scotch 3M Company. However, the system was unworkable due to the high tape speeds required. The first practical solution came from Alexander M. Poniatoff. He developed a workable moving head recording system in 1955 and founded the Ampex Corporation which produced the first commercial videorecorder, the Ampex VR1000, a year later.

The first microprocessor was the Intel 4004, which contained 2,300 transistors and could deal with data in four-bit bytes. The Intel team was working at the time to develop a family of integrated circuits intended as components for a calculator. This first microprocessor would be followed by the Intel 8008, an eight-bit processor which would be the central processing unit for the first line of home microcomputers, the Altair and the Imsai. Although these machines were crude and difficult to program by today's standards, they were the springboards to the compact and complex, but user-friendly machines that have made computer technology accessible to a generation of artists.

In Canada as in much of the Western world, there were two parallel interests developing simultaneously among artists utilizing new technologies. The first was the use of video as an art form, with artists exploring the potential of the medium in ways largely unrelated to the approaches taken by the television industry. The second was the direct involvement in the manipulation of electronic technology, mainly at the hardware level, with the primary manifestation being in the area of sculpture. Michael Hayden, Doug Back, Dennis Vance, and Norman White were among those who acquired the technical skills or found assistance from experts to enable them to work within the complexities of transistor and integrated-circuit technologies, even before microprocessors were available to the general public.

Artists also became involved in computer programming to a more limited extent. The constraints of having to be associated with a major institution or corporation to gain access to a machine, however, and the complexity of the scientifically oriented languages for anyone without a degree in computer sciences, meant that little finished artwork of any significance came out of this area. The arrival of the microcomputer provided the kind of access to low-cost, easily programmed machines necessary for artists to do significant work involving computer programming.

To understand the significance of the contemporary desktop computer to the artist, one must have some understanding of what programming earlier machines was like. A glimpse of the problems associated with the very earliest computers comes in Glenn Howarth's description of British mathematician Alan Turing's work with computers. In 1985, Howarth, one of the first artists in Canada to work extensively with computers, identified Turing as the first computer artist, and cited Turing's abilities as a rationale for ceasing his own involvement with the media.

> After he invented the computable number in 1936, Turing began writing programs in anticipation of the first practical machine. The mathematician used the first computer in England, a Ferranti installed at the University of Manchester in 1951. He idealized plant shape, designing algorithms for wireframe pictures of plant buds. Using a fractal of Fibonacci progressions, he automated the bud opening, unrolling and becoming a leaf.
>
> He became the computer artist who thought pictorially in what today would be the lowest of computer languages. He could read base two-punch holes, pulling the tape across his hand. Coordinate by binary coordinate, his computer pictures would appear, before CRT (cathode ray tubes) screens and plotters had been invented, assembled in the ideal Cartesian space of his imagination. [1]

Thirty years later when computer technology had been made accessible to many artists, a variety of input and output devices had made the electronic media much more approachable. The enormity of the change in the last twenty years, however, can be realized by comparing what an artist would have been faced with when working with a computer in 1969 and the situation today. Before the microprocessor had been invented, the artist wanting to utilize the computer technology as his media for creation, would have had to work within an institution, with scientific programming languages that took years for computer scientists and programmers to master. The artist would have to work within the parameters of those languages relying on the understanding of the programmers to translate his or her idea into a functional entity within the computer environment. This assumed that the artist had somehow convinced the relevant powers of the merit of expending valuable and expensive resources in this way. The cost of computer and programmer time could then have quickly run into the thousands or even millions of dollars, given the size, complexity and rarity of the machines available.

The advent of the microprocessor brought little relief at first. The earliest machines available to the general public were limited in capabilities and memory, with very little direct interface with the outside world. Imagine a computer without a monitor, keyboard, disk drive or other storage system, nor an operating system to deal with the user's directions, and you can visualize the earliest microcomputers. These were generally referred to as "hobby computers" since you could do little other than input a simple program in that lowest of computer languages — machine language — and watch for the results to appear in the binary numbering system, on the row of little lights that adorned the front of the box that was

your computer.

Thus, you might input, by setting your eight data switches up or down:

00100001 (assume up = 0, down = 1)

to address 0 by setting the eight address switches to:

00000000

and pushing the "STORE" button.

The result of this operation would have been to store your first instruction, which in this case would be to load a pair of registers (temporary storage areas within the microprocessor itself,) with a still-unspecified memory location wherein resides one byte of information to be processed.

Assuming you had the requisite steadiness of hand and clarity of vision and there were no power failures, you could thus input a complete program into that not-so-little box in front of you. But it would take considerable time to accomplish; nor would the results be likely to set the world alight with their originality.

01000000 to address 00000001
00000000 to address 00000010
01111110 to address 00000011
00100011 to address 00000100
10000110 to address 00000101
00100011 to address 00000110
01110111 to address 00000111
11000011 to address 00001000
00001000 to address 00001001
00000000 to address 00001010

Now all that remains is to push the "EXECUTE" button that causes a jump to memory location 0000 — the start of your program — and with pounding heart and shaking hand you would have done it. Instantaneously, a totally meaningless combination of lights would appear on the data display and you might realize that you had forgotten two vital bits (make that bytes) of information that were absolutely essential to the computer for it to carry out its task.

So it's back to the switches and:

00000001 01000000
00000010 01000001

"EXECUTE"!

Success! 00000011 would appear on the data lights, making you a master of machine language. In completing this maneuver successfully, you would have programmed your computer to store and add:

1 + 2 = 3

From this simple, but not so silly little scenario, it is easy to see why not many artists became involved directly in high-level technology, before the user-friendly microcomputer, and why those that did had first to educate themselves, or to possess a prior education in the field. It is also easy to see why so much of the early work done seems to have expressed a preoccupation with the technology itself. First, the capability to go beyond the most direct manifestation of the technology either did not exist or was unavailable to all but the largest, richest and the most powerful. Secondly, the obsession with the inner workings of the machines necessary to accomplish anything at all was bound to have a profound influence on the end result of the process, the work of art.

Unlike many others, Turing understood both the internal workings and the visual potential of this infant technology. But he could not foresee the social implications that would be evident almost forty years later.

> From its beginning some 20 years ago, Computer Art could be seen as developing in directions that paralleled those found in Non-Figurative Art in traditional media, especially when the latter is conceived as an 'active surface' on which real things happen... not removed from the world by being a representation of it, governed by special laws of 'likeness'.[2]

Today, interest in the inherent properties of electronic media has gone beyond fascination with its pure capabilities. No longer is it enough to present fascinating visual or aural effects or to mesmerize with high speed or low-cost information transmission. With FAX machines turning up in every second office and cellular telephones in thousands of cars, with world-wide computer networks only a phone call away for most of us, artists have turned away from the tool as a direct subject to examine broader relationships.

Excitement over the electronic media as a tool that can more easily and effectively perform traditional artistic tasks has also waned as its limitations have become more apparent. The realization that you cannot do an oil painting with a computer any more than you can program a computer with a paintbrush has led to a more realistic assessment of the capabilities and limitations of the electronic media. Most artists have progressed beyond the point of examining the medium as a tool to examining its effect upon society.

Traditional video — if you can call a twenty-year old medium traditional — has slipped comfortably into a niche it carved out for itself somewhere between filmmaking and television. It has maintained its distinct identity, by ignoring or avoiding the issues that surrounded it in its early stages. Still today, some artists see the medium of video as the means of exploring avenues of personal expression quite outside the well-travelled roads of both film and television. Tom Sherman, a video artist and one of Canada's foremost theorists on the electronic media in the arts, points out one of these paths:

> For those still interested in developing personal narrative as a form, video as a medium and the computer, which complements and controls it, offer the individual artist the means to document one's own personal, private reality with the preferred tools of authoritative organizations. Video is the ultimate technology for behavioural surveillance and the computer's vast memory and information processing capabilities, linked with telecommunications, provides technical compatibility with all record-keeping bureaucracies. These ubiquitous technologies of memory facilitate the disclosure of personal beliefs and the detailed documentation of lifestyle and routine.[3]

Since the major impact upon society of the electronic media is in the area of communication, it is not surprising that artists who use electronic media to examine aspects of human relationships frequently focus on themes involving communication. Again, the whole spectrum is covered, from those artists who focus on the inherent properties of electronic communication such as telecommunications, to those who deal with the effects of those communications technologies and those who use aspects of these technologies to examine human relationships in ways not possible without the availability of the technological tools.

Television, for example, possesses the "unique ability to

transport audio-visual information in real time through actual space, allowing face-to-face communication between humans or events physically separated by continents and even planets." [4] Video artists are discovering these and other properties of television, as well as the distinction between it and the video medium in its pure form.

The earliest investigations of video artists centered on the qualities relating to the spontaneous, personal and uncensored immediacy of the medium as a recording vehicle, or on the potential for electronic manipulation of the image commonly referred to as synaesthetic video. Both of these directions related closely to experimental filmmaking of the sixties and seventies. Indeed, many of the significant video artists of that era came from a background in experimental filmmaking.

Today, although both of these directions are still important facets of video art, other properties more closely involved with the socio-political aspects of the medium as used in television, are coming to the fore. Video is no longer separate from the world of broadcast, and as artists increasingly find their work becoming part of broadcast or cable television, they are becoming more aware of that side of the communication equation. As Sherman pointed out, the developing interaction between video and the computer is beginning to establish new parameters for both media as it becomes increasingly difficult for artists to separate the many tentacles of the communication octopus.

BRIEF EXHIBITION HISTORY

A number of important exhibitions have been devoted to the theme of art and technology over the past thirty years. The major exhibitions focused primarily on mechanically-based technology and aesthetics closely tied to Constructivism, Futurism, and Dada. Two important exhibitions were presented in New York in 1968, *Some More Beginnings* at the Brooklyn Museum and *The Machine* at the Museum of Modern Art. The latter was a chronological examination of the machine in art from the beginning of the century, while the former was broader in scope, "related to the theme of merging art and technology". [5] In London at the ICA, the exhibition *Cybernetic Serendipity*, devoted to movement in art, was held in the same year.

In Canada, most of the exhibition activity has taken place in the smaller public galleries, particularly the artist-run centres and those affiliated with educational institutions. Few major survey or analytical exhibitions have been devoted to this field. The largest to date was the exhibition *The Artist as a Young Machine* at the Ontario Science Centre in 1984. This exhibition involved more than 100 exhibits by artists, computer scientists, and corporations. Although it presented a broad cross section of work by those involved with electronic technology at the time, the emphasis was on hands-on participation and the immediate interpretation of the individual works. Understandably, the nature of the Ontario Science Centre precluded an analysis of the larger aesthetic and art-historical issues of the art presented.

Other, smaller exhibitions have been more focused and narrower in scope. Notable have been the *Art is Communication* exhibition at A Space in Toronto in 1985, *Guerilla Tactics*, also at A Space in 1986, and *Siting Technology*, organized by the Walter Phillips Gallery in 1987. All of these exhibitions attempted to define some of the ways in which artists today approach and use technology. By confining the investigation to a smaller segment of the field, they were able to avoid the "technological exposition" quality which so often pervades the large-scale exhibitions.

These small steps slowly take us toward an understanding of the nature of electronic art in its many manifestations. It is hoped that this exhibition can make a contribution toward that understanding.

NOTES FOR HISTORY:

1. Glenn Howarth Letter, Paul Petro & Geoffrey Shea ed. *Art is Communications*, Toronto: A Space, 1985. pp. 28-29.

2. John G. Harries, "Personal Computers and Notated Visual Art, *Leonardo*, 14, #4 (1981), pp. 299-301.

3. Tom Sherman, *The Value of Privacy*, Unpublished paper, Ottawa: (1988), p. 8.

4. Gene Youngblood, *Expanded Cinema*, New York: E.P. Dutton, (1970), p. 337.

5. Nancy Paterson, "Art and Technology: The New Ecological Era" Paul Petro & Geoffrey Shea ed. *Art is Communications*, Toronto: A Space, 1985, p. 15.

— DALE AMUNDSON, 1989

BEYOND ELECTRONICS

WORKS INCLUDED IN THE EXHIBITION

SECTION I
MAIN / ACCESS GALLERY

DIANA BURGOYNE
NEW WORK

GERHARD GEHRMANN & CHRIS HAWKES
IT'LL ALL COME OUT IN THE WASH

JUAN GOMEZ-PERALES
CONSENSUS

DAVID ROKEBY
VERY NERVOUS SYSTEM

SECTION II
GALLERY ONE ONE ONE

ALAN BOUCH
TRIODE TANGO

LAURA KIKAUKA / NORMAN WHITE
TFR (THEM FUCKIN' ROBOTS)

NELL TENHAAF
GRAMATICA

SECTION III
GALLERY ONE ONE ONE

MARSHALORE
EXPRESSIONISM

TOM SHERMAN
EQUIDISTANT RELATIONSHIPS

ARTISTS' STATEMENTS

DIANA BURGOYNE
NEW WORK

Making myself, technology, and the viewer interact so that the viewer becomes the performer and, as a result, changes the environment is an important aspect of my work. By placing the viewer in a position of control, I take him or her out of the passive role into a very active one... setting up relationships which raise broader questions about human co-existence with each other and technology.

CHRIS HAWKES & GERHARD GEHRMANN
IT'LL ALL COME OUT IN THE WASH

This video installation will form yet another attempt on our part to play in the gap between popular culture and the elitism of artistic interpretation. Our inspiration this time comes from the shared ritual of people laundering at a laundromat. We hope to contrast the mundaneness of this activity with a rich folk art of invented reality, drawing on melodrama, the popular romance novel, comic books and commercials for narrative style and imagery.

It goes like this:

First we create a semblance of an actual laundromat, we people it with a viewing audience ensconced in laundromat foyer chairs and present them with a series of television sets mounted into front-loading washers and dryers. Behind the seated audience and outside the "laundromat", there is viewing space for another audience for whom the first audience will form part of the installation. By transposing the verisimilitude of a familiar concrete reality into an art context which fails to conform to that reality, we hope to set the stage for drama unfolding on the monitors.

So what will this captive audience passively view? Melodramas! Melodramas from the minds of the denizens of the laundromat! A series of fantasies unfolds as the characters invent each other while the reality of their existence plays on through the laundry process. Based on loose visual cues gleaned from his or her laundry and mannerisms, each character authors a romanticized existence set against the present tense of the laundromat. The multiplicity of views provided by the six monitors will allow us to overlap and layer the narrative to its ultimate conclusion — a clean, folded wash.

JUAN L. GOMEZ-PERALES
CONSENSUS

Technology has become an increasingly comfortable component to our culture's daily life. In accepting new levels of technology, however, it is necessary in many situations to go through a "process of familiarization". This practice is not unlike the social act of getting to know one another in an interpersonal relationship. The more "exotic" the level of technology, the more formal and complex the process becomes. With a lot of "small talk" patience and understanding, the seduction becomes addiction and we look for more.

DAVID ROKEBY
VERY NERVOUS SYSTEM
PREDICTING THE WEATHER

("Very Nervous System" three cameras observe the movements of people in a room, relaying their images to a computer. The computer analyzes these images and translates the results into sound using a digital synthesizer.)

Whenever the weatherman makes a mistake, we feel betrayed. It is his job to predict the weather and he fails over and over again. It seems as though any experienced farmer can tell you as much about the next day's weather as the meteorologists can, armed with their satellite photos and Cray supercomputers.

I am always being asked if the response of my sound installations is predictable. "Will a specific movement always create the same sound?"

(I remember huddling in a tent in the pouring rain during the tail end of a hurricane on Prince Edward Island while being informed by the local radio station that the skies were clear and the sun shining.)

The source of our anger and sense of betrayal runs deeper than damage to our shoes due to unexpected rain. We seem to feel the same resentment toward accidental death. We have learned to expect a life devoid of surprises. Such things shouldn't happen in a properly organized, rational society. We write letters to our government representatives.

(I used to get a bit defensive, quickly explaining that it is next to impossible to repeat a movement exactly...)

It is as though a sacred trust is broken or an inviolable right infringed every time events elude our understanding and control.

...Imagine and unchartered planet...the atmosphere is more intimate than earth's and we personally affect the weather. (Some people run through my installation as though they were afraid of getting wet.)

We seem to be victims of a kind of intellectual materialism. Just as we as a society have come to accept the financial yardstick as the measure of value, we have accepted logical proof (ergo predictability) as the only yardstick for measuring truth.

The computer program, which interprets motion and translates it into sound, makes perfect "sense" at the foundation level. That level of sense is, however, not completely accessible through the experience of the piece. It is obscured by its own complexity. Any attempt to understand the work only rationally is automatically doomed to failure.

Money and logic are removed from subjective reality and therefore can serve as incorruptible media of translation and communication. We reduce our lives to functions of the lowest common denomimators and in the process, lose contact with both the subjective reality of the individual, and the integrated reality of the whole. The active ingredients of life slip through our fingers. All we have left are facts, and a basic mistrust of anything we can't pin down.

(It seems that the more intent one is on controlling my installation, the less predictable the response becomes...)

This "noise" of information becomes nonsense; the surprises and accidents multiply. Dazzled and dispirited by the impossibility of absolute understanding, we begin to behave irresponsibly, paying little attention to the results of our actions. Still the mind is tantalized by apparitions of order. One gets not sleep...

(How can I be expected to act responsibly if I don't know what is going to happen?)

With my computers, cameras and synthesizers, I present a synthetic reality which can be physically explored. The phenomena through which the underlying principles of this "reality" are articulated are the sound events. The phenomena are instigated by and related to various aspects of the dynamics of the movements of the "explorer".

Or else we condemn, then ignore reality as a sloppy manifestation of eternal and unchanging laws, doubting the

weather instead of the weatherman. ("The Soviets are controlling our weather.")

Though the behaviour of this installation is complex enough to resist absolute analytical comprehension, it is integrated enough to create a strong though veiled and overall impression of orderedness and relatedness.

Absolute prediction and control of very complex situations is not possible, and partial control often disastrous. (The universe chooses its own ways of returning to equilibrium.) We must learn to accept this fact without abdicating from the responsibility for the results of our actions. Refining awareness of the ways in which we affect our physical and metaphysical environments is the only way to avoid increasing the apparently chaotic and cataclysmic behavior of the universe. (Weather is becoming interactive like acid rain.)

(Imagine exploring the body of a new lover...)

A certain flexibility is required, an ability to move with grace back and forth between informed intelligence and naive perception.

The question of unpredictability, and the sense of chaotic confusion seem to disappear simultaneously at the point at which one suspends one's disbelief and begins "exploring to discover" rather than "exploring to confirm".

How does one best function within a situation one cannot hope to understand entirely?

ALAN BOUCH
TRIODE TANGO

Triode Tango is an attempt at observing technology as a dynamic factor of non-utility. Recognizing that often the end result of technology is not a tool of physical function, *Triode Tango* explores the less obvious factors of technological impact. This exploration leads from the rudimentary aspect of information storage in the form of units resembling cells, to conglomerate structures forming a whole organism.

Technology is a function of human function. With human function dispersed through technology, there exists a corresponding shift in perception. Matter in its minute forms become synonymous with bits and bytes. Conglomerate units function as a whole organism. Information storage has become the dominant adaptation strategy in *Triode Tango*. Conglomerate forms lend themselves to functional complexity. The result, conglomerate forms conjugate with cells leading to increased complexity. Borders between technology and biology are blurred, machine is a unit of animal. Biology is modified by technology. Technology is generated by biology. *Triode Tango* depicts the single unit and the conglomerate unit as a mutual function of biology and technology. This recognizes the blurred borders of technology and biology and suggests any separation of the two would have to be an arbitrary decision, that technology functions beyond appendage and works on the heart of the organism.

LAURA KIKAUKA / NORMAN WHITE
TFR

TFR or *Them Fuckin' Robots*, is the result of an artistic collaboration between two friends, Laura Kikauka and Norman White. It commemorates five years of intensely shared revels and revelations.

The work consists of two robots which simply make love. The action is both simple and complicated because love-making is really a complex activity. Cycles within and between two beings lock and unlock: heart, gut, lungs, muscles, and genitals.

It would have been easier for the artists to have made two machines which crank away blindly like oil derricks or sewing machines, but this would hardly have done justice to human sex. Instead, they have tried to endow their machines with the ability to sense each other's moods, responding more or less in kind — sometimes leading, sometimes following, sometimes both lost in frenzy or daydream.

To ensure that the two partners come together as individuals, born of different backgrounds and inclinations, Laura and Norman built their respective machines separately and without consulting each other. They agreed upon only a few fundamental guidelines:

(1) that both sculptures were to approximate full human scale;
(2) that Laura would build the female, and Norman the male; and
(3) that they would use a certain two-part electro-mechancal device to represent the sex organs.

Created in separation, the two robots also have separate "lives": they plug into the wall separately and have no wires crossing between them. At best, each machine can only guess the other's current state of arousal. And yet, of course, TFR aspires to be a single sculpture. The underlying duality only heightens the importance of that oneness.

NELL TENHAAF
GRAMATICA

Gramatica is an installation composed of two slide projections with a voice-over. In one corner of the room is suspended a 6' x 8' fabric screen, on which appears a slide-dissolve sequence. On an opposite wall, a single slide illuminates a tableau depicting the allegorical figure *Gramatica*, or "Grammar as a memory image".

The slides in the dissolve sequence show several rooms in a house reconstructed by means of a three-dimensional computer animation program, simulating movement into and through the space of the house. It appears transparent, a green wire-frame against black background. This computer drawing was constructed from the plans for a house designed by the philosopher Ludwig Wittgenstein for his sister in the 1920s.

The projection sequence also includes a slide of a figure captioned "Human image on a memory locus". This illustration suggests that the architectural model can be viewed as a memory space. It is taken from the same source as *Gramatica*, that is, a sixteenth century treatise on the "Art of Memory" called the *Congestorium Artificiose Memorie* of Johannes Romberch.

The third and final element is a photograph of Wittgenstein with some of the schoolchildren he taught in a small Austrian village in the early 1920s. The cycle of the projection is 12 minutes.

In the installation, symbolic systems shift and collide in several different ways. The house that is explored as an intangible three-dimensional model is as cool and precise as Wittgenstein's philosophy. In contrast, the photograph of Wittgenstein with his schoolchildren is a very human point of entry for the viewer. The voice-over narration tells of Wittgenstein's unsuccessful plan to adopt one of his brighter male students to provide him with the improved social status offered by education. The viewer's disembodied movement through the house thus becomes a metaphor for the attempt to come to terms with tightly structured and hegemonic systems of knowledge, which are both seductive and exclusive. Wittgenstein's own struggle with fixed ideas is evident in

his propositions about language games, in which the emphasis shifts from essence or truth to the everyday flux of grammar.

The *Gramatica* tableau proposes an analogous shift in point of view. It proposes a concept of language that appears to us as both arcane and magical. Gramatica is surrounded by objects and animals that compose her "visual alphabet", decipherable only to the initiated, suggesting an alternative kind of knowledge. As an ensemble, the elements in the installation extend the language metaphor to address the question — who controls the important shifts in knowledge within a patriarchal context? *Gramatica* embodies the mysteries of language that were, in her time, threatened by the deritualized coding of print technology. This pre-print image can also be taken as a post-print allegory for a new way of conceptualizing memory and language. The model of the house represents a mode of conceptualizing that can be called a virtual memory space. It offers a simulated perceptual experience with its own internally ordered logic, implying mathematical rigor even as it denies the possibility for any real or absolute reference point. It describes a shifting, multiple language that is guided by the absence of any dominant point of view. What emerges is that post-print technologies contain their own interpretive rules, to be integrated with those we already know.

MARSHALORE
EXPRESSIONISM

After a production hiatus of several years, Marshalore is presenting the second in a series of video installations. The first, *Album,* was presented as part of *Video 84*, the international video conference held in Montreal. Working with three people — Rene Blouin, Kate Craig and John Plant — three distinct videos of video personages, were created as the participants talked about their lives and their identities. A random computer programme served to orchestrate the monologue, dialogue, or conversation; synchronicity unfolding as one tape started the instant another stopped, frozen; a shifting, flowing human montage.

In this second piece, *Expressionism*, a single video chronicles the movement of the same participants. It is juxtaposed with a video of a random graphic programme: small coloured dots slowly fill the screen forming rauschach, pointillist abstractions. Like in Album, the installation itself is informal and reminiscent of home. The ensemble creates layers of shifting passage through which we, the viewers, weave the intentional and the random.

Expressionism

"an artistic and literary movement originating in Germany at the beginning of the 20th century, which sought to express emotions rather than to represent external reality..." — *Collins Dictionary*

"a theory or practice in art of seeking to depict not objective reality but the subjective emotions and responses that objects and events arouse." — *Webster's*

expressionnisme

"tendance...qui s'attache à l'intensité de l'expression. //Caractère d'intensité et de singularité expressives..." — *Larousse*

"sur le plan technique, l'expressionnisme évdua sans perdre son principe: une vision subjcative du monde..." Sadoul, — *Petit Robert*

TOM SHERMAN
EQUIDISTANT RELATIONSHIPS

The title of my piece is *Equidistant Relationships.* In my ongoing investigation of person-machine relationships I have been struck by the way these relationships have consistently distanced the individual from society in a number of ways. Whenever there is a formal representation of a person-machine relationship, the representation renders the pertinent information to be equally distant from the observer (the audience). With format technology, the video playback equipment (or computer, film or slide screen), being standardized, puts the audience in a comfortably distant position. While video technology has an immediate, relatively fresh presence as a generic information source, there is still too great a distance for an adequate involvement by participating observers. As an artist, I have been disappointed by this distancing effect.

As computer technology has offered the potential for interactivity, a number of artists have moved towards the production of artworks which offer limited, direct involvement by the audience. In essence, this is an attempt to eliminate the distance at the moment of representation. Artists, as they represent their own involvement with media technology, try to shorten the response-time for the audience to their technology-mediated work.

I have tried recently to close this gap through experimentation with first person narratives — I have begun to focus on my relationships with technology by speaking and providing images to the machine itself. For the moment I have stopped trying to contact an audience through the machine. The audience seems much better equipped to look into the relationship from the position of the machine itself.

In "Exclusive Memory (1987)", I speak and provide images to a machine — a computer-based, video-sensing robotic entity of my own creation. The audience viewing this relationship observes me providing an experience-transfer to my machine in a conversational monologue. My machine can apparently understand natural language in real time, although so far it has remained passive. Passivity is of course a characteristic of the video viewing experience. Viewers of "Exclusive Memory (1987)", originally a six-hour monologue with my machine, find themselves in a rather direct, intimate relationship with me, because I do not try to reach an intelligent audience through a machine, but in this case, a video/audio recorder.

The work *Equidistant Relationships* in this exhibition builds on my initial narrative device in two ways. First, I have recorded a second session of conversational monologues, this time involving other individuals in the input process. Second, there is a response from the machine. The machine entity does not return speech in my natural language, but it makes choices and performs within the parameters of its own particular "behaviorial" limitations. I have constructed this response by recording machine vision at the Robotics Laboratory of the National Research Council in Ottawa. This machine response is a simulated machine-determined visual 'monologue'. In other words, I have constructed a second video track which represents the machine's response to human input. The combination of these parallel monologues will offer the audience of this installation a dual channel message or confrontation which I hope will lead to a new understanding of person-machine relationships.

ARTIST BIOGRAPHIES

ALAN BOUCH

Alan Bouch was born in Winnipeg in 1959. He received his B.F.A. from the University of Manitoba and studied Technological Studies at the Ontario College of Art in 1985. He lives and exhibits in Winnipeg, where he has set up his own holography studio.

DIANA BURGOYNE

Diana Burgoyne was originally from Calgary. She received her B.F.A. at the University of Victoria and obtained an M.F.A. from UCLA. She has exhibited and performed across Canada and in the USA. Most recently she exhibited in *Machinations*, a show travelling throughout Quebec. In the fall she will be an "Artist in Residence" at the "Exploritorium" in San Francisco.

GERHARD GEHRMANN

Gerhard Gehrmann attended Steinbach Regional Secondary School in Manitoba and graduated from the University of Manitoba with a B.F.A. (Honours). He has extensive experience in all aspects of video production and has produced numerous independent videos, including *What's This All About,* produced in collaboration with Chris Hawkes, which was selected for screening at *Images88*, showcase of recent independent Canadian film and video, at Factory Theatre, Toronto in 1988.

JUAN GOMEZ-PERALES

Juan Gomez-Perales was born in Madrid, Spain in 1957. He currently lives in Montreal, Quebec, where he is an Assistant Professor in the Sculpture Department at Concordia University. He has a B.E.S.(Arch.) and a B.F.A. (Hons.) from the University of Manitoba and a M.F.A. from the University of Victoria. He has exhibited widely throughout Canada and elsewhere, including the National Museum of Art in Lima, Peru.

CHRIS HAWKES

Chris Hawkes is a graduate of Pierre Radisson Collegiate in Winnipeg. She has a B.A. in Art History from the University of Winnipeg and a B.F.A. (Honours) with First Class Honours from the University of Manitoba. She has also studied Advertising Art and has worked as a free-lance Graphic Designer and for the Canadian Government. Her extensive experience in video production includes *What's This All About*, produced in collaboration with Gerhard Gehrmann, which was selected for screening at *Images88,* showcase of recent independent Canadian film and video, at Factory Theatre, Toronto in 1988. She is also a co-ordinator, technical advisor and instructor for W.A.I.V. (Women Artists in Video).

LAURA KIKAUKA

Laura Kikauka was born 1963 in Hamilton, Ontario. Rrrrg... she dislikes traditional biographies, but knows they serve a practical purpose. From 1966-1980 she lived in Burlington, Ontario, her father (an artist) and mother (philosopher-cook) were a strong influence on her. They claim that they did NOT steer her into the arts. Instead, they gave her the advice "Do it, only if you can not help it!". She had her first solo exhibit of drawings and paintings at the age of 12. She undertook studies at the Art Gallery of Ontario as part of the Scholarship Program from 1979-80. In 1981 she was accepted into the Ontario College of Art (Photo-Electric Department) as an "advanced standing" student. On graduation, in 1984, she received the Lieutenant Governor's Medal, Joan Chalmer's Scholarship, and the Toronto Star Award. Kikauka has shown her work internationally and travelled throughout North America, Europe and Africa. She currently divides her time between workshops in the city of Toronto and in the country, near Markdale.

MARSHALORE

Marshalore is a cross-disciplinary artist living in Montreal. She studied at the Art Students' League in New York and is currently at the Universite de Montreal. In the 1970s she was active in the artist-run milieu in Quebec and the rest of Canada: member-director of Vehicule Art, co-founder of Vehicule Press and PRIM video. Her writings have appeared in such diverse publications as *Parachute*, *Musics* and *Insight*, the poetry anthology. Her video and audio tapes, installations and performances have been presented throughout Europe, North America and Japan.

DAVID ROKEBY

David Rokeby was born in Tillsonburg, Ontario in 1960. He graduated from Ridley College as Head Boy in 1978 and completed one year at Trinity College, University of Toronto, in philosophy and visual art. He graduated from the Ontario College of Art in 1964. He has since exhibited and participated in performances throughout Canada and in Europe and the United States, most recently at the *Festival des Arts Electronique* in Rennes, France and at the Centre George Pompidou in Paris.

TOM SHERMAN

Tom Sherman was born in 1947. He currently lives and works in Ottawa, Ontario. He received a B.F.A. from Eastern Michigan University, Ypsilanti, Michigan in 1969. He has been active as a video artist, writer, lecturer, arts consultant and curator since 1971. His work is represented in collections throughout Canada, including the National Gallery of Canada. He has exhibited throughout North America and Europe and has written for such diverse publications as *Parachute*, *LAMP Media Journal* and *Journal for the Communication of Advanced Television Studies* (London, England).

NELL TENHAAF

Born in 1951 in Oshawa, Ontario, she currently lives and works in Montreal, Quebec. She received a B.F.A. in 1974 and will receive an M.F.A. in 1989 from Concordia University, Montreal. Tenhaaf has exhibited in solo and group exhibitions in many cities across Canada since 1979. She worked as an arts administrator at Powerhouse Gallery, Montreal, 1977-1983, represented Quebec in ANNPAC/RACA, 1981-83 and is on the Board of Directors of Artexte Information Centre, Montreal. She is a part-time teacher at Concordia University and has written articles and reviews for several Canadian art publications.

NORMAN T. WHITE

Born in Texas, U.S.A. in 1938, Norman White spent most of his early childhood in and around Boston, Massachusetts. His early interests included drawing, fishing and experimenting with his chemistry set. He also liked devising and breaking codes.

From 1955 to 1959, he attended Harvard College, majoring in Biology, with the initial intention of becoming a fisheries biologist. By graduation, however, he had decided he was better suited to the challenges of art than those of applied science. He moved to New York City, travelled extensively in the Middle East and settled later in London, England. In 1967

White moved to Toronto. In 1969, he exhibited his first major electronic work, *First Tighten Up on the Drums*, at an Experiments in Art and Technology (EAT) exhibition in New York entitled *Some More Beginnings*.

In 1975, he designed and installed a large light mural (*Splish Splash Two*) for the Canadian Broadcasting Corporation's new offices in Vancouver, British Columbia. His work has been exhibited throughout Canada, the United States, Great Britain, Germany, Switzerland and France.

Exhibition Curator
Dale Amundson

Editor
Sarah Yates

Main / Access Co-ordination and Installation
Stephen Phelps, Al Rushton

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Ryan Takatsu

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BEYOND ELECTRONICS

FINAL EXHIBITION CATALOGUE INFORMATION

Due to the nature of the work in this exhibition, it was not possible to produce the formal exhibition catalogue prior to the installation of the works, as it was deemed essential to photograph the actual installations. The final publication will be 48 pages with 9 pages of colour photographs of the work exhibited, along with curatorial, background and historical material developed out of this preliminary publication.

Orders may be placed in advance for the catalogue at a pre-publication discount by completing the form on this page and mailing it, along with a cheque or money order for the appropriate amount to:

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University of Manitoba
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Orders received prior to the April 15 closing date for part three of the exhibition will be eligible for a 25% discount on the purchase price. The catalogue will be mailed to you immediately upon printing.

The final catalogue will include a computer floppy disk with additional bibliographical, biographical and historical information, along with writings and other material by the artists in the ***BEYOND ELECTRONICS*** exhibition in standard text form.

The following disk formats are available:

— IBM / MS DOS - 5 1/4" double sided, double density (360k)
— CP/M 80 - 8" single sided standard format
— AMIGA 500
— APPLE][c
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