

Thinking of Oneself as a Computer

Sally Pryor

I have been an enthusiastic computer artist/ animator/programmer since the early 1980s. I am fascinated by the new forms of artistic expression; communication, simulation and extension of the senses made possible by computer graphics and animation and by related phenomena such as virtual space, interactivity, artificial intelligence and networking. As an ex-biochemist, I am also hopeful about the potential applications of these phenomena to the task of building a bridge between the arts and sciences, although I realize that this goal will not be achieved overnight.

In this article I explore my interest in the somewhat disembodied landscape surrounding the human and the computer, a landscape in which the computer is increasingly used as a metaphor of the self. This interest began in 1989 as a result of pain, heaviness and weakness that developed in my right arm and hand—all symptoms of repetitive-stress injury (RSI) caused by excessive use of the computer keyboard.

THE HUMAN/COMPUTER CONNECTION

If you neglect your body it will revenge itself by making you lose your mind.

—Guillemette Isnard

For cerebral people who are more involved with what is happening inside their heads than inside their bodies, the computer provides the opportunity to be even more mind-oriented. Aside from the arms, hands, eyes and brain, it is almost a nuisance to have a body when one is working with a computer. It gets in the way of the mesmerizing interaction between the screen and the mind, unreasonably

demanding food and attention, stiffening one's back and shoulders when one just wants to keep working.

Earlier in my life, I always dreamed of having a computer-graphics studio at home. Now that I have the studio, there have been many times that I have completely ignored all bodily sensations during marathon computer sessions. Probably my most squalid moment was being force-fed by my partner while still sitting in front of the screen!

The computer provides a very seductive way to extend one's abilities and senses—enabling the production of slick-looking documents with very little typing ability, the recollection and digestion of large amounts of information, the visualisation of mathematical formulae and scientific processes, etc. I find, as an artist, that I can make images with the computer that I could not or would not consider making with traditional media. I am also fascinated by the process of envisioning the new art forms that are possible with computers, for example, art that interacts with the viewer in a meaningful way. The development of the computer seriously threatens the idea of the art object as a unique, financially appreciating artifact.

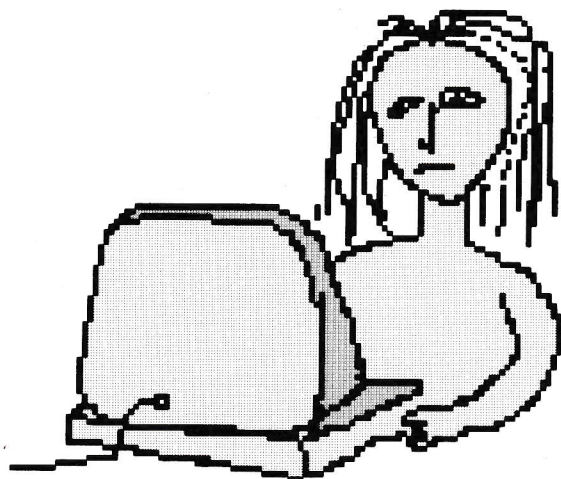
Despite the real, sensual pleasure that I feel from the images I make, I cannot help noticing how unsensual computers and their interfaces are. The senses of smell, touch and taste are barely represented in these hard, grey, plastic boxes and input devices. An interesting exception to this trend is Allison Druin's [1] *Noobie*, a huge furry creature that children squeeze and touch in order to communicate with the computer.

The kinesthetic body, which is absent in the current computer interfaces that are based on keyboard or mouse, may well enter the picture when virtual space becomes readily available. While wearing body suits and gloves, one's entire body moves to interact with the synthetic world seen in special glasses. In this way the computer can provide a kind of virtual prosthetic device for the body: for example, one's arm movements might result in the image of a DNA

ABSTRACT

Having developed symptoms of repetitive-stress injury after years of enthusiastic computer programming, animation and art making, the author uses her experience of this injury to explore what she terms the 'disembodied landscape' surrounding the human and the computer. She discusses the idea that the computer is becoming the new metaphor of the self and links this concept to mind/body, self/other, reason/emotion and male/female dualisms.

Fig. 1. *Man-Machine Interface*, inkjet print, 6 × 7 in, 1989.



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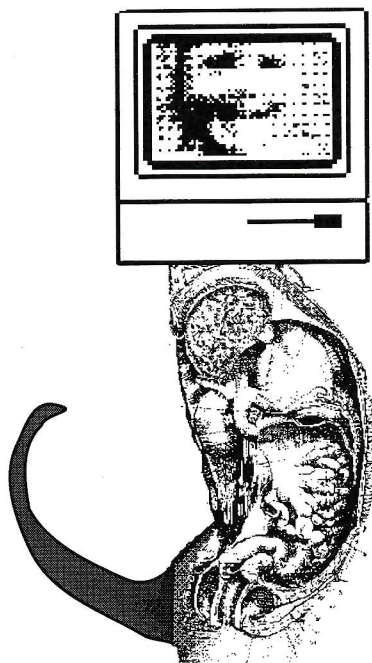


Fig. 2. *Cyborg 3*, laser print, 10 × 8 in, 1990.

helix being split apart by probes. The possibilities here are fantastic.

But what about the use of computers to communicate with one another? 'Reach out and touch someone' intones the phone company—and we forget that we cannot actually do that with a phone call. Text takes the place of person-to-person interaction; the same is true for communication through computer networks.

Timothy Leary suggests that we could use virtual space to do all sorts of things with one another, such as a game of tennis between people in two different locations [2]. In fact, he says that the only difficulty with virtual space will be the exchange of bodily fluids—a humorous remark that draws attention to the absence of direct corporeality in virtual space. Why has the concept of virtual space been so eagerly received in popular culture? And why are we so captivated by the idea of a process that bypasses direct information from our bodily senses?

I had just been an artist-in-residence working on a project I really believed in: using computer graphics as a way to introduce girls and women to the computer. I had run out of money and was working again as a commercial 3D computer animator, flying high-tech logos that were all form and no content. My shoulders were hunched, my hands suspended tensely over the keyboard, ready to two-finger type another command the second the previous one was completed (Fig. 1). A

few keys had to be bashed to make them function. In my spare time I made images, working intensely with the mouse grasped tightly in my right hand. To unwind I drowned myself in a sea of T.V.

THE COMPUTER AS METAPHOR

Computers are our symbol, our logo.

—Phillip Davis and
Reuben Hersh

Throughout history there has been an intimate relationship between the latest technological advances and the metaphor of the self. This is somewhat of a 'chicken-and-egg' relationship—it is hard to say which comes first, the technology or our view of ourselves.

The Greeks lived in a technology based on craft, and they likened the person to a clay vessel. In the seventeenth century the advent of clocks enabled René Descartes to compare a sick man with a badly made clock. Since then machinery has continued as a metaphor of the self in a way that is largely subconscious: people speak of being rusty or sharp, broken down, running on empty, etc.

Today, as the boundary blurs between technology and the body, people seem to be shifting almost unconsciously from this mechanical model of themselves to a model based on computer technology (Color Plate B No. 2). I have noticed this trend among scientific and technical people in particular. The computer metaphor is used increasingly to explain or model human biological processes: for example, references to information that is supposedly 'hardwired' in DNA, references to the idea that biological organisms are really information-processing devices and references to the mind as merely a complex pattern of information in the brain. Computer metaphors are often used for the brain—it is sometimes referred to as 'wetware' and often considered to function just like a computer. I have even heard references to the 'wiring diagram' of the brain.

Recently, a computer programmer told me that he was feeling off-colour by saying, "My software is okay but I think my hardware has problems". In Denmark a young man became psychotic after many 12- to 16-hour days at his computer, an illness described as a 'computer syndrome' [3]. Apparently, he was hospitalised with insomnia and

anxiety after he began to 'think' in programming language: "Line 10, go to the bathroom, Line 11, next". He told doctors, "There is no difference between the computer and man". While this may appear to be an extreme example, I have caught myself jamming my finger, thinking 'UNDO' and *expecting* this reversal to happen. I know I am not the only person who has begun thinking of myself as a computer.

One morning I woke up and decided to do something about how increasingly tense my shoulders felt, so I arranged to have a massage. The masseur unlocked some of my frozen muscles and sent me to an osteopath, who, in the course of his work, commented that the tendons in my right arm were like those of a sheep shearer. Coming from a farming family, this comparison did not alarm me (actually I felt proud!) until he said that the reason shearers drink so much is that they are in so much pain. It was then that the pain, heaviness and weakness in my arms, wrists and hands were correlated with tendinitis; I paid attention when there was a medical label. It enabled me to take sick leave from work and to permit myself to rest. I have not flown a commercial 3D logo since; I became a teacher instead.

MIND/BODY DUALISM

*Matter is a word, a noise. . . .
Matter is spirit named.*

—Alan Watts

What does it mean to think of oneself as a computer? To me the conception reflects the Cartesian mind/body dualism: the mind is equated with software and the body is equated with hardware. According to Elizabeth Grosz, "With rare exceptions in the history of [Western] philosophy, the mind and body have been conceived in isolation from each other, functioning as binary or mutually exclusive terms. The attributes of one are seen as incompatible with those of the other. In, for example, Descartes' influential writings, the body is defined by its extension, that is, its capacity to be located in, to occupy space. By contrast, the mind is considered as conceptual, based on Reason" (Fig. 2).

Thus, to Grosz, the mind is considered conceptual and nonspatial, and the body spatial and nonconceptual. She continues, "Subjectivity and personhood [is identified] with the conceptual side of the opposition while relegating the body to the status of an

object, outside of and distinct from consciousness. . . . This binary opposition is commonly associated with a number of other binary pairs: culture and nature, private and public, self and other, subject and object. . . . Mind becomes associated with culture, reason, the subject and the self; while body is correlated with nature, the passions, the object and the other. . . . Excluded from notions of subjectivity, personhood or identity, the body becomes an 'objective' observable entity, a thing. . . . The fact that the body is the point of origin of a perspective, that it occupies a conceptual, social and cultural point of view cannot be explained on such a model" [4].

It is very difficult to get a clear understanding of tendinitis and RSI. The area is controversial and heterogenous. Many claim that it is all in the mind and that there is no observable damage to the body, although The Lancet [5] has reported an Australian study in which muscle biopsies of RSI sufferers showed striking abnormalities in both muscle tissue and cells. It is clear that emotions such as boredom and stress are intimately involved in the development of RSI; however, bad ergonomic design and lack of regular movement also are very important. The trance state that seems all too easily to develop when using a computer freezes the body's position and the blood can't flow freely to nourish tissues and remove waste products. Repetitive movements and (I suspect) extensive use of a mouse only make things worse.

AN ALGORITHM FOR THE SELF?

Your body is a burden. It is simply meat.

—Troy Innocent and Dale Nason

The mind/body dualism equates the mind with the self, defining the mind as conceptual but not spatial; the body is equated with the 'other' and is defined as spatial but not conceptual. When we apply a computer metaphor to this idea of dualism, we end up with the body as hardware and the mind as software.

What does this mean? To me this metaphor reflects the idea that one's subjectivity or sense of self could be reduced to software, a set of instruc-

tions that could operate independently of the body. Understanding oneself is then a problem of coding, of finding the right algorithm. The body, defined as hardware, would be replaceable, possibly redundant.

This idea is seductive and has been received enthusiastically in various circles—most notably in parts of the artificial intelligence community, in 'cyberpunk' science fiction and, increasingly, in popular culture. "Your body is a burden", according to Troy Innocent and Dale Nason in their *Cyber Dada Manifesto*, "it is simply meat . . . all physical and emotional feelings can be chemically simulated . . . be totally efficient . . . the end of the world is coming but it's the beginning of the perfect techno world" [6].

Hans Moravec [7], in his book *Mind Children*, speaks of a postbiological world in which the human brain is freed from its mind (and body) and loaded into self-improving, thinking machines that he calls 'mind children'. He talks of our "uneasy truce between mind and body" and recommends that "human thought [be] released from bondage to a mortal body". The essence of himself, he says, is "the pattern and process going on in his head and body, not the machinery supporting that process . . . the rest is mere jelly" (Fig. 3).

'Jelly', 'meat': these are not terms that imply respect. The body seems to take the blame for all perception of vulnerability, need and mortality. According to Alan Watts, "We have been taught to neglect, despise and violate our bodies and put all faith in our brains" [8]. The assumption seems to be that the real 'self' is composed of the thoughts in one's head, and that if we can leave our bodies behind, we will never have to feel pain again. If only this was true!

I had seen myself primarily as a brain attached to a stick figure—a kind of semi-intelligent robot. I thought my body's function was to carry my mind around; my arm's role was to execute my ideas. Food was just a fuel to keep the whole thing going. I felt beyond the body, superior to people caught up in what I privately called the 'Jane Fonda syndrome': obsessively working out at the gym, dieting, sculpting, painting and improving their bodies so that they met the current standards of desirability. Sport seemed foolish too: just another way to be intensely competitive with others.

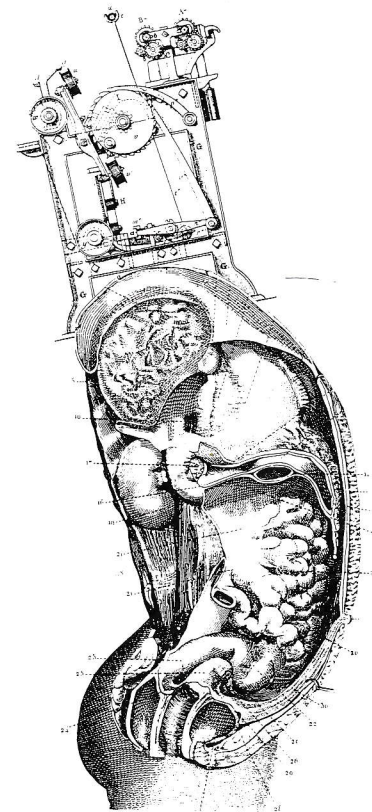
A CORK BOBBING IN THE OCEAN

He said I treated thoughts as if I generated them myself but in his view they were like animals in the forest.

—Philemon (fantasy character of Carl Jung)

If the concept of an algorithmic self denies the body's role in subjectivity, what else could be omitted? In his early twenties, Descartes had a series of three dreams that changed the course of both his life and modern thought. While asleep, Descartes was visited by the 'Angel of Truth', who, in a blinding revelation, revealed a secret that would "lay the foundations of a new method of understanding and a new and marvelous science" [9]. Descartes embarked on a quest to understand how the mind works, inventing analytical geometry in order to derive a mathematical model. This task proved more difficult than he had anticipated, and he never finished his treatise. He also never returned to the source of his inspiration. His writings do not mention the role of dreams, revelations or insights as the foundations of thought.

Fig. 3. *Cyborg I*, photocopier print, 10 × 8 in, 1990.



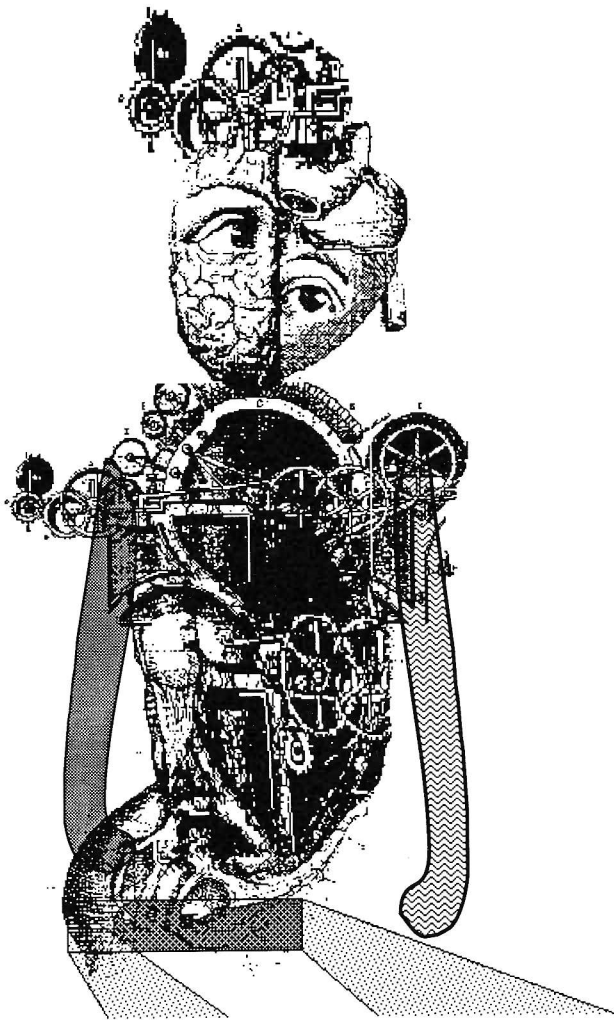


Fig. 4. *Cyborg 2*,
laser print,
10 × 8 in, 1990.

on the road. The RSI experience frightened me because I realised how vulnerable it is and how many of the things I enjoy (like making art) require the use of my hands. Clearly, my attitude has got to change. And it is changing, slowly, although I feel tremendous resistance to paying attention to the stories and secrets of my body. I have chosen a form of exercise, Middle Eastern belly dance, that intrigues me despite its appropriation by titillation. My mental interests are irrelevant in class; I get a fleeting glimpse of a completely new sense of myself moving fluidly through space. Of course, I still do not practise between classes; I am still more likely to read a book or watch T.V. I have set up my computers now so that I can use the mouse with my left hand. This works quite well, but I hope it does not just mean I will ruin that arm too.

THROWING THE BODY OUT WITH THE BATH WATER

The cyborg is our ontology.

—Donna Haraway

What else might the concept of an algorithmic self omit? Elizabeth Grosz believes that “patriarchal oppression justifies itself through the presumption that women, more than men, are tied to their fixed corporeality. . . . [Women] are considered more natural and biologically governed, and less cultural, to be more object, and less subject than men. Women’s circumscribed social existence is explained—or rather rationalised—in biological terms and thus rendered unchangeable” [12]. Thus, the feminine is allocated to the other/body/emotion/object side of these dualisms and hence would implicitly be omitted from an algorithmic concept of the self (Fig. 4).

For Descartes the body differs from material objects—including machines—only in its degree of complexity. Thus, he links the body not only with the other, the animal and the passions but also with the machine. But surely machines and emotions are a bit incompatible?

Descartes was very interested in automata and apparently possessed a mechanical doll or automaton named Francine [13], which probably used clockwork mechanisms to move and make sound. Very little is known about this doll, except that it was named after (and possibly built to resemble) a well-documented illegitimate daughter from

Instead, he gave all his attention to formal, logical procedures that begin at zero.

We are talking here about the unconscious. According to Robert Johnson in his discussion of Carl Jung, “When we say ‘I’ we are referring only to that small sector of ourselves of which we are aware. . . . Jung compared the ego, the conscious mind, to a cork bobbing in the enormous ocean of the unconscious. . . . He concluded that the unconscious is the real source of all our human consciousness—our capacity for orderly thought, reasoning, human awareness and feeling. . . . The disaster that has overtaken the modern world is the complete splitting off of the conscious mind from its roots in the unconscious. All the forms of interaction that nourished our ancestors—dream, vision, ritual and religious experience—are largely lost to us, dismissed by the modern mind as primitive or superstitious” [10].

An algorithm for the self could only include the parts of ourselves of which

we are aware—the conscious mind—and would have to omit the unconscious, an idea that we can only indirectly grasp, if at all. The unconscious expresses itself through the body and in symbols rather than in verbal or abstract forms.

We constantly hear about the quest to develop artificial intelligence and rarely hear anything about developing, say, artificial dreams, compassion or imagination. The reason for this focus, according to Moravec, is that “computers are at their worst trying to do things that are most natural to humans—seeing, hearing, manipulating objects, learning languages and commonsense reasoning. . . . It is comparatively easy to make computers exhibit adult-level performance in solving problems on intelligence tests or playing checkers and difficult or impossible to give them the skills of a one-year-old when it comes to perception and mobility” [11].

I have had an extremely naive attitude toward my body. I have treated it like I treat my car: I do the minimum required to keep it

whom he was unhappily separated. Apparently, the doll acted as a sort of travelling companion and met its end on a sea voyage when the ship's captain discovered it in a packing case and angrily threw it overboard.

So, Descartes ('I think therefore I am'), in his private life, linked the body, the machine and the emotions through an association with the female, specifically, a female robot. I must admit that there is some question whether the story of Francine is merely a myth. But even if this is the case, as a metaphor, the story is powerfully expressive.

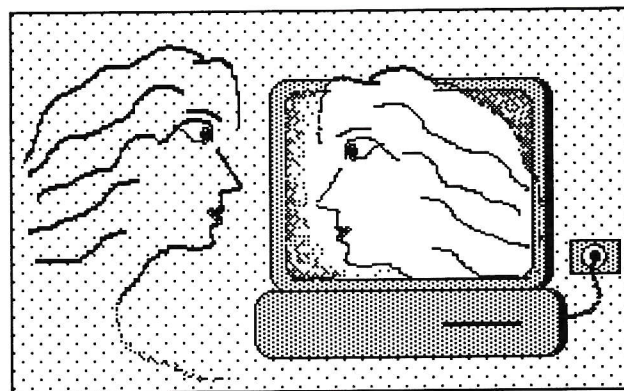
Francine's modern equivalent in popular culture is the female cyborg: part organism, part computer. Very few representations of female cyborgs fail to fill me with alarm. A common image is of a *Playboy*-style woman's body and posture, rendered in the sleek perfection of chrome. I cannot relate this image to my own experience as a female. A recent advertisement for computer-graphics software consisted of such a cyborg, detailed breasts lovingly rendered in chrome, with the text 'I ROBOT, YOU BOSS'.

Sherry Turkle pointed out that computers can act as automated companions who provide "the illusion of companionship without the demands of friendship" [14]. One of my students, Carmel Kremmer, asked further, "Could it be that computers are being designed as silent, powerless, co-operative substitutes for women—in the workplace, in the home, in bed, even?" [15].

Is this an extremist view? Increasingly, I am unsure, but I do agree with Ann Game and Rosemary Pringle [16] that "computing is in fact no more unisex than *Playboy*. . . . We have to be clear about what is going on at the symbolic level and speak out about it".

I am under pressure at the moment and very busy. I even missed my regular dance classes. My right arm is particularly tired and my back aches. I now know several things I could do to help (such as going to a class, mental visualization exercises, etc.), but I'm so busy that I'm mostly ignoring it. Today I feel frustrated and ridiculous. I worked on this paper for four hours straight yesterday and now my back is very sore. I tell myself I will do the right thing and take breaks every forty-five minutes today: when I do, I am shocked at how fast the time goes. We make a big effort at the university to encourage students to be aware of ergonomics and taking frequent breaks from the computer. But I still see them hunched over their screens and keyboards, mesmerised, hours

Fig. 5. *Women, Art and Technology*, laser print, 2.5 × 4 in, 1989.



seeming like minutes. When I say something, they sit up guiltily, but I know that they do not believe it could happen to them. And why not, neither did I.

RETURN OF THE ANGEL

Data, data everywhere and not a thought to think.

—Jesse Shera

I have identified three areas that would be omitted from an algorithm of the self: the body, the unconscious and the feminine. I am sure that these are intimately linked; I am also sure that this list is incomplete. I know that I have a blind spot; I just do not know where it is.

I have focused on Descartes because he is the *man* who defined the centerpiece of our scientific and technological culture, the Cartesian coordinate system. Leola Jacobs postulates that the paradigm of technological knowledge assumes a rational, Cartesian, sex-neutral and disembodied subjectivity [17]. Could it be that the concept of the self as software provides the ultimate Cartesian, sex-neutral, rational and disembodied subjectivity? Could it also be that the algorithmic self offers the ultimate refuge from animality, the unconscious and even the feminine? Perhaps it is appropriate that *Time* magazine named the computer 'Man of the Year' for 1982?

For all of these reasons, the concept of an algorithmic self frightens me. I think it is vital that we invite the body, Descartes's Angel of Truth and Francine back in from the cold and re-integrate them into our conception of ourselves and our model of the computer. This is particularly important so that we do not merely replicate and reproduce current values in the defining technology of the future. We need to be aware that computers are not a neutral tool, that they arise from and

embody the values of a cultural and philosophical context. It is time to ask whether the computer reflects a discourse of disembodied, abstract reality, a discourse of power and control over the other, the object, the emotions and, ultimately, the feminine (Fig. 5).

As I said earlier, there is a 'chicken-and-egg' relationship between the latest technology and our model of ourselves. So not only do we make computers and then explain ourselves in terms of the new technology, but we also see ourselves in a certain way and create new technology in that image. So what does this tell us about the way we see ourselves?

I referred earlier to the concept of virtual space. Timothy Leary's joke about bodily fluids is funny, but it also highlights the fact that virtual space can be seen as representing a retreat from direct experience of the senses, from each other and our environment. Is this a solution to the problems of modern life? Perhaps the violent reaction to computers that one sometimes receives from people outside the field is a response to this remoteness, to this abstraction, to the idea of reducing the self to an algorithm, to a piece of information in a giant data base?

So the question remains, what can we as artists, scientists and technologists do to return these missing babies to the bath water? What should we do? What responsibility do we have as people with a privileged (although this privilege can seem marginal) access to the defining technology of our age?

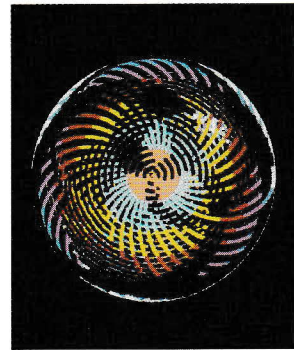
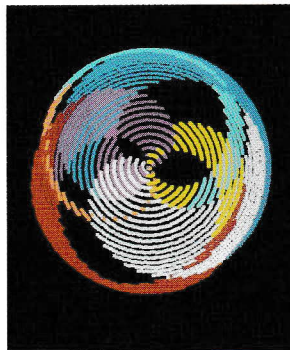
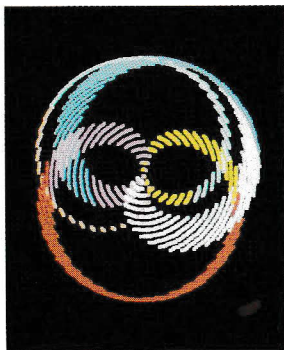
Addressing the crucial need for a holistic point of view, Therese Bertherat and Carol Bernstein remind us that "our body is ourself. It is our only perceptible reality. It is not opposed to our intelligence, to our feelings, to our soul. It includes them and shelters them. By becoming aware of our body we give ourselves access to our entire being—for body and spirit, mental and

physical and even strength and weakness represent not our duality but our unity" [18]. And Donna Haraway observes, "The machine is not an 'it' to be animated, worshipped or dominated. The machine is us, our processes, an aspect of our embodiment. We can be responsible for machines, 'they' do not dominate or threaten us" [19].

I am starting to feel a bit spacey sitting here at my computer working on this paper. It is so easy to capture my thoughts and to work with them: editing, moving them around, making images, picking up writing from other documents, etc. I am utterly involved in this process. My body, when I remember to notice it, begins to feel stiff, even so I must FORCE myself to stop work for a while. But first I will type this text, then add something else, then change something else. . . .

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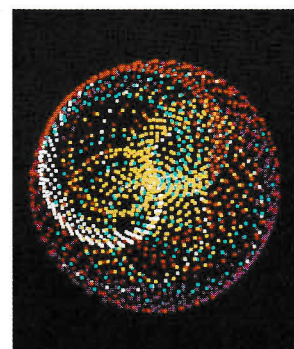
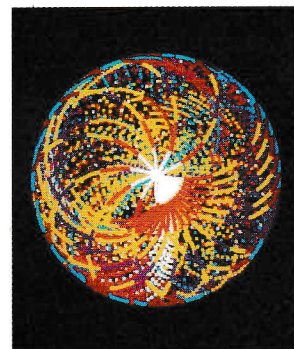


COLOR PLATE B

No. 1. (left to right, top to bottom) John Whitney, Sr., sequence of eight sample frames from a computer-graphics composition representing steps in a dynamic process. Order dissolves to disorder and then resolves to a different order. This presents a visual metaphor for the consonances and dissonances and for the resolutions common to musical experience. The action—like a musical figuration—refers to nothing external to itself. About one second of such figurative action transpired between each frame in this illustration.



No. 2. (left) Sally Pryor, *Thinking of Myself as a Computer*, inkjet print, 1989 (from a photo of the artist by Claire Thompson).



No. 3. (below) Stelarc, *Amplified Body, Laser Eyes and Third Hand*, Maki Gallery, Tokyo, Japan, 2 March 1986. Through use of optic fiber cables and collimating lenses, laser eyes pulsed in phase with the ECG, scanning the space and scribbling on the walls around it, with the EEG sounds orbiting the body. EMG signals from flicking of the fingers and flexing of the arm activated the neon installation.

