

WRITINGS:

1993~

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WIREHEAD - an electronic way to Synchronicity

WIREHEAD represents a new kind of man-machine interface. Although it smacks of Cyberpunk, our idea has its root in Eastern iconography, in which great revelation shows us an alternative way to re-interpret this changing world even in the context of computer technology. The networking world is becoming increasingly similar to the realm of spiritual communication. After all computers are networked in the future, what we should really expect next is the direct connecting of our brains to communicate with each other. As the image below shows, it is a highly spiritual stage of mind.

WIREHEAD as an artistic expression is part of a series of DTI's art works using brainwaves to manipulate data including images, sounds and other digital signals in / from / to computers. In recent years, DTI has created and exhibited art works such as BRAINWAVE RIDER (1993, Tokyo, Minneapolis), VIRTUAL HAZE (1994, Helsinki) and SYNCHRONICITY (1995, Luxembourg). While all of those works and WIREHEAD utilize brainwaves, each one has different focus. What distinguishes WIREHEAD from the others is its network connection.

WIREHEAD delivers brainwave-driven commands to two wire-connected locations, London and New Castle, at Ex Machina. It can connect simultaneously any number of places where the necessary devices and networks are available, such as telephone lines and communication satellites, or other electronic communication systems including ham radio.

WIREHEAD and its system analyse the user's brainwaves, which reflect the state of his/her brain. If the brain metaphysically means the mind, then WIREHEAD can analyse your mind and send its signals to remote places.

When your mind rings a bell over here, it should ring some bells on the other side of the world as well.

Ex-Machina, London, 1996

"Synchronicity" in the computational age

"There everybody believes in ghosts, here everybody believes in vitamins."

C.G. Jung, 'The Difference Between Eastern and Western Thinking', "Psychological Commentary on The Tibetan Book of the Great Liberation" 1

It was several nights before my mother died from cancer that I had an unbearable pain in my back. The pain seemed to come from within my spine. At that time, neither I nor my mother knew that she was suffering from cancer and that her backbone was afflicted with the disease. I myself was in pretty good health, and there was no obvious reason for my suffering from this sort of pain. One day, my father told me that my mother had cancer, and I interpreted without a doubt that the pain I had experienced that night was "transmitted" from my mother.

I have been interested in synchronicity for a long time. However, my interest in synchronicity is not particularly rooted in psychoanalytic or occult thinking. On the contrary, I have been interested in it as a function of the brain and from the viewpoint of programming synchronicity.

In the field of Artificial Life, experiments seem to be still at the early stage that creates life forms like insects or amoebas. If the prime rule in Nature is survival of the fittest, is synchronicity the result of evolutionary progress? Or, is it true that human beings have already lost the instinct, inspiration or foresight that wild animals innately possess?

On the other hand, Artificial Intelligence (AI) studies are figuring out the brain's cognitive functions and comprehensive faculties, namely, the human pattern of response to the environment. There is still plenty of room for us to understand a cognition based upon the five senses.

C. G. Jung found synchronicity to be a characteristic of the Eastern world. In the age in which he lived, the East was a mysterious world spiritually different from the West. However, there is no big difference between the East and the West these days. I suppose California might be the most spiritual place in the world, where people commonly take in both vitamins and oriental spirituality in the same dose. In fact, many people's belief in the power of vitamin C might be related to the result of evolution, as the human being is a rare animal which cannot metabolically synthesize vitamin C in its body. (This lends an ironic note to the quotation from Jung which I mentioned at the beginning.)

However, I am somewhat concerned about what Jung pointed out about science and religion in the same thesis mentioned above: "There is no conflict between religion and science in the East, because no science is there based upon the passion for facts, and no religion upon mere faith; there is religious cognition and cognitive religion."

Right now, the East is the only area in the world displaying vivid economic growth. There, materialism is flowing in and the relationship between the material and the spiritual is becoming twisted.

In the first half of 1995, it seemed that Japan was thrown into a chaotic hell. After the earthquake in Kobe

in January, a nightmarish incident was allegedly perpetrated by a religious cult, Aum Supreme Truth, in March. (As of May 12, their connection to the poison gas released in the Tokyo subway on March 20 has not been conclusively proven, due to incomplete evidence.) Japan, where the rigid Confucian morale tradition that prevails in society is collapsing gradually, seems to be descending into a dark world.

The case went beyond common sense and shocked the nation with its bizarre circumstances. Besides the massacre and its accompanying details, what really astonished people was the cult's brain washing. Generally, brain washing refers to a tool of ideological education for controlling belief. The Aum group uses various methods, not only mental and spiritual but also medical, i.e. the use of drugs with mind-controlling effects. However, what surprised people was the use of electrode-equipped headgear. These transmitted electric waves to users' heads, who were told that the waves carried the brain wavelengths of their Guru. In appearance, the headgear resembles brainwave detectors used for medical purposes such as electroencephalograms, and also the headgear interface for controlling computers through brainwaves used by my artistic group, DTI. Our headgear is capable of both detecting brainwaves and carrying brainwave data.

Generally speaking, old people cannot understand why Aum uses devices so unusual to religious discipline. But it is natural for many young people, who know of the existence of brainwaves and understand how they reflect the mind's condition. Most members of the cult are in their twenties; for them, brainwaves become an indicator for their degree of accomplishment in the sect's disciplines, although achievement of the Guru's spiritual level through the headgear is a myth that has been created by the sect leaders. Actually the gear is used as a tool to collect money: 10 million yen to buy the gear and one million to rent it for a year, say some sources.

The intentionality of machine and computational psychology

Spirituality and materiality mix well in the electronics culture. Anyone using computers is apt to notice this fact. Even with no computer experience, most people realize that monetary information, such as stocks and fortunes, is indicated by only numeric data. The majority of people, however, still believe in the banking system, which just may be the most virtual entity in the world.

In Buddhism, deliverance from the materialistic world is considered the supreme virtue. Here is a picture which C.G. Jung took from a Chinese text on Taoism titled Hui Ming Ching:

This picture represents the supreme stage of meditation. Jung's concern as a psychologist lay with consciousness. But the picture reminds me of the current state of the electronics culture. Also, the image's portrayal of direct connections with the brain appealed to me as one of the themes underlying my artistic expression.

Virtual reality technology has made it possible for us to move freely in a space that can be described as existing but not existing. This sort of space used to be possible only within the thoughts of Eastern philosophy or religion. It allows the realization of almost any psychic experience: out-of-body experiences, teleportation, etc.

This sort of thing has been discussed extensively within the electronics culture. But, it may be more than just fashion.

At every step, the choices we make depend on what we have become. Our sciences, arts, and moral skills do not originate from detached ideals of truth, beauty, or virtue but stem partly from our endeavors to placate or please the images established in earlier years. Our adult dispositions thus evolve from impulses so infantile that we would surely censure them, if they were not by now transformed, disguised, or - as Freud said - "sublimated." 2

Thus said Marvin Minsky, a pioneer of Artificial intelligence, in his famous *The Society of Mind*, chapter 17.11 "Intellectual Ideals", which begins with the words of Buddha.

Thoughts concerned with spirituality used to belong to the counter-culture, but have become natural within the electronics culture as well. The computer goes beyond the concepts ordinary people hold regarding machines. John von Neumann, the genius mathematician who promoted the creation of the first digital computers in the late 1940s and designed the von Neumann architecture which we use even today, thought the machine would multiply by itself in the future. The distinction between machine and life was banished in theory and the basis for Artificial Life and Artificial Intelligence was birthed.

However, the von Neumann architecture in the computers of today, which makes no inherent distinction between program and data, is getting old. It is expected to make way for a new architecture capable of parallel processing or super parallel processing, which can behave more human-like or "brain-like".

When we regard machines within the context of intelligence, the dividing line can be drawn between thinking machines and non-thinking machines.

If you are familiar with arguments that have been submitted in the AI field, such as the Chinese Room argument, you know that the point of contention is whether machines can think or not, or in other words, whether they can have intentionality or not.

The Chinese Room argument was submitted by University of California at Berkeley philosopher John Searle in 1980. His argument is considered one of the most famous philosophical arguments proposed within the past twenty-five years. The scenario of the Chinese Room goes as follows:

Imagine a non-Chinese-speaking person sitting in a room with a long list of rules for translating strings of Chinese characters into different strings of Chinese characters. When a string of Chinese characters is slipped through a slot in the door, the person consults rules, produces a new string, and slips the results back out through the slot in the door.

If the incoming strings actually comprised questions, then a particularly clever and efficient set of rules could allow the person in the room to produce outgoing strings that comprised answers to the questions.

Outside the room, there is a Chinese-speaking person who slips in questions. From the point of view of this person, the room would seem to contain an intelligent person who is reading the questions and coming up with answers.

Searle argued that no matter how sophisticated a machine's programming, the machine could never be said to think or to have intentionality. Simply put, Searle says the Chinese Room represents a computer which just receives inputs and responds according to programs to produce outputs.

AI researchers made objections to his argument. The computer architecture that Searle targeted is the linear one of von Neumann. However, a highly sophisticated AI program on a parallel architecture computer would not simply process a list of rules in a simplistic fashion, but rather would consider many different types of rules in parallel, deal with conflicts among rules, make guesses concerning rules, recognize relationships among rules, and construct new rules, much as the human brain does.

In the same line, the AI side recently submitted an interesting argument: the Korean Room argument by William J. Rapaport, a scholar at the Department of Computer Science and Institute for Cognitive Science at the State University of New York in Buffalo. The story Professor Rapaport submitted in his article *Syntactic Semantics: Foundations of Computational Natural-Language Understanding* is as follows:

Imagine a Korean professor of English literature at the University of Seoul who does not understand spoken or written English but who is, nevertheless, a world authority on Shakespeare. He has established and maintains his reputation as follows: He has only read Shakespeare in excellent Korean translations. Based in his readings and, of course his intellectual acumen, he has written, in Korean, several articles on Shakespeare's play. These articles have been translated for him into English and published in numerous, well-regarded, English-language, scholarly journals, where they have met with great success. 3

The argument question is this: Does the Korean scholar understand Shakespeare? Professor Rapaport thus described his point:

. . . unlike the Chinese-Room Argument, the issue is not whether he understands English; he does not. Nor does he mechanically ("unthinkingly") follow a translation algorithm; others do his translating for him. Clearly, though, he does understand Shakespeare - the literary scholarly community attests to that - and, so, he understands something. Similarly, Searle in the Chinese room can be said to understand something, even if it isn't Chinese. More precisely, an AI natural-language-understanding system can be said to understand something (or even to understand simpliciter), in so far as what it is doing is semantic interpretation. (Of course, it does this syntactically by manipulating the symbols of its semantic interpretation.) We can actually say a bit more: it understands natural language, since it is a natural language that it is semantically interpreting. It is a separate question whether that which it understands is Chinese. 4

"Brain-like" AI computing is closing the gap lying between the human brain and the computer.

ART, a computer-based model of how the brain works, developed by Stephen Grossberg and his group at Boston University's Center for Adaptive Systems, is said to be eerily brain-like in function.

David H. Freedman, the author of *Brainmakers*, describes ART as follows:

ART learns as the brain does, by studying examples, picking out patterns, and drawing its own conclusions. It

has components analogous to those of the human brain; when one of these components is disabled, ART's resulting impairment resembles that of people who have had brain lesions in the corresponding brain section. As Grossberg puts it, ART is "a microcosm of cognition." More formally, ART is an artificial neural network. 5

ART seems to be a well-developed model of an artificial neural network. ART stands for "adaptive resonance theory." It is said that an ART neural network system consists of four main components: a short-term memory to evaluate input patterns, a long-term memory to store categories, an attentional subsystem to focus attention on important features of input patterns, and a reorienting subsystem to keep the long-term memory from learning irrelevant patterns.

There are many interesting ongoing AI projects and efficient neural network systems in the world. Among these, lately I am interested in the "brainwaves" of artificial neural network systems.

100 billion neurons exist in the human brain and they are constantly exchanging signals among themselves. And brainwaves are electric waves emitted by the brain.

As I mentioned briefly earlier, my group DTI (Digital Therapy Institute) has created works of art that utilize brainwaves.

Brain Wave Rider, which was shown at the ARTLAB exhibition in Tokyo and FISEA in Minneapolis in 1993, is a vehicle with neither engine nor wheels. You travel through a computer-produced landscape on the monitor by changing the frequency of your brainwaves.

Virtual Haze, which also uses brainwaves and has been shown at ISEA'94 in Helsinki, is a shoot'em-up pitting you against the computer. You try to blast enemy UFOs by changing your brainwaves; failure to do so lets the computer counter your attack.

What I found interesting in the story about ART is the existence of "brainwaves" in the system. Freedman explains:

"Even more intriguing, recordings of electrical activity in the brain suggest there are specific "waves" of activity during recognition and memory formation that seem to correspond to the sequence of signals employed by ART. Neurobiologists have noted that a brainwave known as "N200" accompanies a perception in their part of the brain that provides short-term memory, answered by a "PN" wave from long-term memory, apparently corresponding to ART's bottom-up and top-down signals; when the brain is struggling with recognition it issues "P120" waves to short-term memory followed by "P300" waves to long-term memory, apparently corresponding to ART's mismatch and reorienting signals. In fact, this might in a sense be considered a case of life imitating ART, since ART was established before the pattern of interaction of these brainwaves was identified." 6

If our brainwaves and computers' waves could be identified clearly, and if both could possess some sort of compatibility with each other, the relationship between human and machine would enter a new stage.

We could exchange data with machines in novel ways which should be completely different from the current ways (typing on keyboards, clicking "mice" etc.) Moreover, via networks like a future version of the Internet, we would be able to send our own memories to some place or directly transfer human memory to some memory storage device. In other words, we could upload and download our own memory data freely.

Technological developments always makes the mysterious real. With the appearance of TVs, people acquired the power of telepresentation.

Sooner or later, we are going to acquire the power of telepathy, and Synchronicity will become as commonplace as a weather forecast for the local area.

Kunstforum, 1995

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The reality of the psyche in Buddhist thought: from: 'Psychological Commentary on The Tibetan Book of the Great Liberation', edited by J.J.Clarke, 'Jung on the East', (London:ROUTLEDGE,1995) pp.205

2. Marvin Minsky:

The Society of Mind: 17.11 Intellectual Ideals,(New York:Simon & Schuster,1985,1986) pp.184

3.4. William J. Rapaport:

Syntactic Semantics:Foundations of Computational Natural-Language Understanding:from: Thinking Computers & Virtual Persons: Essays on the Intentionality of Machines: edited by Eric Dietrich(San Diego: Academic Press, 1994) pp.254-255

5.6. David H. Freedman:

Brainmakers, (New York:TOUCHSTONE,1994) pp.62-63, pp.90-91

Kunstform, November - February, 1995, Germany

The Dromology of the human brain and man-machine interface

Digital Therapy Institute

Brain Wave Rider is a game machine controlled by your brain.

You, the player, command the "vehicle" you are riding by changing the state of your brain activity. You can make it go faster and slower, shoot missiles and fly up to the sky.

BWR reads the player's brain waves, changing the speed of the vehicle as it moves forward in the computer-generated "landscape." The brain wave data we are describing here are called EEG (=Electroencephalogram) in the medical field and have been used for generally measurements of brain activity. In the BWR, we use the IBVA (Interactive Brainwave Visual Analyzer) to detect and analyze brain waves via Macintosh computer. IBVA is a multimedia biofeedback system produced by Psychic Lab, Inc.

Standard brain wave classification recognizes four kinds of waves: Alpha, Beta, Theta and Delta. The BWR displays "symbols" corresponding to each brain wave type, and transmits the vibration of the "engine" to the player's body through the body-sonic board and the body-sonic chair. Sound comes from the speakers attached to the helmet and the chair. In addition, the flashing LEDs placed in the goggle synchronize with brain wave frequency.

The brain wave types correspond with the following displayed symbols:

Alpha wave: missile launch.

Beta wave: meteorite attack.

Theta wave: explosion of substances in the brain.

Delta wave: psychedelic patterns

Eye movement: flying image. (Eye movement signifies ocular muscle signals with lower frequency than the brain waves.)

Through these symbols, the player can visually recognize the waves his brain is emitting.

The most outstanding feature of the BWR's man-machine interface is that it uses the brain wave as a trigger, causing physical change without physical action.

Without button-pushing or other physical action, the player can control the computer graphic image, sound and vibration via meditation or mental calculation, i.e., by changing the state of his brain waves.

At the "Psycho-scape" exhibition organized by ARTLAB, an artistic organization backed by Canon Inc., DTI set up two BWR systems.

The players first sit down in the cockpit, put on the headband with brain wave detection sensors, and finally on the helmet and goggles.

Their brain wave data is analyzed by two computers (Macintosh). One more computer (NEC PC-9801) reads the analyzed data and controls the devices for the sound and CG images.

The goggles LEDs flash in synch with the players brain wave frequencies, fed to the eye apparatus by the computers.

If player A should emit a higher-frequency wave such as Beta while player B emits a lower-frequency wave such as Delta, B could be influenced to accelerate by A's brain waves and A could be influenced to slow down by B's brain waves, as the brain tends to be influenced by the frequency of light or sound.

As we have mentioned before, the speed of the video image changes according to brain-wave frequency: higher-frequencies make the speed faster, and lower frequencies make it slower.

If both players emit higher-frequency waves they can travel as if flying, while they will seem to crawl if both emit low-frequency waves. When only one player drives one BWR, he can attempt to control the vehicles speed freely.

If two experienced players skilled in controlling their brain waves drive two BWRs simultaneously, they can fly forward together at very high speed; they also may constrain or interrupt each other's speed.

2. Vehicles and images of space

If you were to participate in a voodoo ceremony, you would be able to feel the energy emanating from worshipers in the transcendental state as a shock wave penetrating the real world from the spiritual world. Even if you had no previous knowledge of the ceremony or were just taking photographs of the goings-on, you would feel it.

In many religions, the energy coming from "the spiritual experience" may be thought to be something far removed from ordinary brain activity. However, as yet we do not have any means of precisely measuring the values of this energy.

The energy released in such a ceremony would make the surrounding people feel it like an explosion, without producing a physical change that would destroy the ceremonial situation (even though small animals were sacrificed). Or rather it would make individuals feel implosion in their bodies in the form of spasms and fainting, just as images implode in their brains. Stage props, such as ornaments, patterns and incense, merely play the role of the fuse for implosion.

DTI's activity began with the measuring of brain waves of a Chinese Qigong master in the state of Qigong mental healing, studying the various subliminal effects on the five senses of audiovisual stimulation, and looking at other aspects of brain activity. In the end we have tried to grasp things generally thought of as properties of spiritual activity - religion, mental healing, art appreciation etc. - at the materialistic level, as signals and data. The BWR was born through a reversal of these activities.

Paul Virilio contributes his short essay "The Last Vehicle" to Dietmer Kamper and Christoph Wulfs Looking Back on the End of the World. In the essay he describes vehicles thus:

"Also the advent of a final generation of vehicles, of means of communication for distances that have nothing in common with those associated with the revolution of transport anymore - as if the conquest of space confirmed the conquest of the mere images of space. If in fact the end of the nineteenth century and the beginning of the twentieth experienced the advent of automotive vehicle, the dynamic vehicle of the railroad, the street, and then the air, then the end of this century seems to herald the next vehicle, the audiovisual one, a final mutation: static vehicle, substitute for the change of physical location, and extension of domestic inertia, a vehicle that ought at last to bring about the victory of sedentariness, this time an ultimate sedentariness."

The description of "the last vehicle" that Virilio portends surely applies to the BWR. "The victory of sedentariness" is at the heart of the BWR, which the player commands without moving even a finger.

It is natural that the BWR correlates with Virilio's vehicle theory, as BWR is an interactive system using audiovisual equipment, computers and computer graphic images for landscape simulation. Thus the player can move through a multitude of images of space," all from the same physical location.

In religion, vehicles signify an important means of linking this world with the spiritual one. Vehicles and their images frequently play a part in religious ceremonies.

In the case of ceremonies performed on land, vehicles are hauled by animals such as horses, cows, elephants, or people during the ceremony; generally they are retired to some sort of garage afterward. The Chinese peoples of South East Asia, who maintain traditional customs more than the mainland Chinese, burn paper effigies of money, houses, cars and so on as gifts to the dead during funerals. The vehicles cannot depart from this world if they are not burned.

Usually, vehicle denotes a means of transportation over land. Space transport is labeled space ship or space vehicle. Once a vehicle leaves the land, its categorization is not clear. There are innumerable vehicles and ships flying through the sky in the world of religion and myth.

On the other hand, in the case of certain rites performed on the water, ceremonial ships sail for a very short distance in this world and then pass into the other. They transcend the boundary of the real world and the images of space.

At the "Shaara boat" ceremony held on the last day of the Bon festival in Nishinoshima Mita in the Oki islands, people build a straw boat, decorated with small colored flags attached to ropes stretched from the mast and bearing the Buddhist sutra "Namuabidabutsu, and send the boat out with heaps of offerings to the sea. Some children actually climb aboard the Shaara boat as a second boat tugs it out to sea, until the ceremonial boat starts sinking. Then the boat heads for the other world with spirits of ancestor on board.

Voodoo also uses a boat for the ceremony of Agwe, God of the Sea. Each voodoo divinity is expressed as a symbol called a "vever." Agwe is represented by a sail boat with the word Immamou. The boat used for the ceremony of Agwe depicted in the documentary film and book, Divine Horsemen: The Living Gods of Haiti, produced by documentary film maker Maya Deren, resembles the boat of the Oki islands. This boat is also decorated, and disappears with its burdens of offerings to the sea. In this case, Agwe first makes his appearance by transmigrating to the priests performing the ceremony on the boat, then

the boat heads for the world of Gods.

Both the Shaara boat and Agwe's boat leave the shore to sail for a short distance on the ocean, moving in the images of religious space after they sink and stop their physical travel. These boats share a point in common with the BWR as vehicles moving in the images of space.

3. Landscape

If you have driven a car in the U.S.A., you have probably noticed the warning on the rear-view mirror saying, "Caution: Objects in this mirror may be closer than they appear." It is necessary to be prepared for every contingency in the land of product liability.

Jean Baudrillard quotes this same warning at the outset of the first chapter, "Vanishing Point," in his book *America*. He used the warning to express the emptiness of America, as he started his motor trip from the vast desert and discovered the rear-view mirrors warning.

The landscape on the monitor of BWR was created through popular AMIGA landscape simulation software such as "Scenery Animator" and "Vista Pro." These pieces of software may be of limited business use, but they are elaborate programs which let you easily enjoy traveling through computer-generated landscape simulations. The detail of the images is evident when you look up through the leaves in a digital tree to see blue computer sky beyond.

Interestingly, the software makers produce pre-generated data letting you reproduce and travel through, in three dimensions, the grand views of America: the Grand Canyon, Yosemite National Park, and so on. Now a new series of data, jumping off the American continent, take you as far as the extraterrestrial landscape of Mars.

Baudrillard's *America* tastes of a road movie, passing through the desert and talking about people and towns. But, this road movie belongs to the video age of the 1980s.

"We'd need the whole film of the trip in real time, including the unbearable heat and the music. We'd have to replay it all from end to end at home in a darkened room, rediscover the magic of the freeways and the distance and the ice-cold alcohol in the desert and the speed and live it all again on the video at home in real time, not simply for the pleasure of remembering but because the fascination of senseless repetition is already present in the abstraction of the journey".

Where the trip in the computer landscape differs from that of the road trip is that Baudrillard actually ran through the real America. His trip was not simulacrum. Objects in his mirror just looked smaller, that's all. His trip becomes simulacra only when recreated on video. Medium, in this case the computer and the video, make the difference.

Baudrillard thus says in his book *Simulation*, "Abstraction today is no longer that of the map, the double, the mirror or the concept. Simulation is no longer that of a territory, a referential being or a substance. It is the generation by models of a real without origin or reality: a hyperreal. The territory no longer precedes the map, nor survives it. Henceforth, it is the map that precedes the territory - PRECESSION OF SIMULACRA - it is the map that engenders the territory".

The computer-generated landscape is a simulacrum, unlike the real landscape Baudrillard describes in *America*, as it can take infinite forms never seen before. It is "a real without origin or reality: hyperreal." The only person who can experience this hyperreality is the one operating the computer to generate the

landscape. With the BWR, a rider can travel through hyperreal landscape at hyperreal speed, all controlled by his brain waves.

4. The brain and speed

Taking a ride on the BWR, you ostentatiously put on the helmet, like an old time race car driver. However, what is the significance of speed to the brain controlling the speed of BWR?

The chapter "Education and Development" in Marvin Minsky's book *The Society of Mind* starts with the question by Parent: "If those younger children take so long to acquire concepts like conservation of quantity, can't we help speed up their growth by teaching such things earlier?"

The question interests us in that parents seem to only hope to speed up the processing speed of their children's brains. A Japanese expression for cleverness translates literally as "the rotation of the head is quick, and English has its share of speed-centered phrases such as "quick-witted" or "a nimble mind."

Both examples reveal that importance is placed upon speed of the brain. According to a U.C. Berkeley study in 1985, Einstein's brain had four times more "oligodendroglia" - helper cells that speed neural communication - than the brains of eleven merely gifted people.

Fast processing speed is all-important to computers. No matter how someone may insist that "great talents mature late" with regards to man, he will still choose a computer based on how fast it is. The Chinese word for computer translates as "electric brain." It goes beyond the original English meaning - "that which computes" - to suggest "Artificial Intelligence" as the most developed form. The fact we should not forget is that the computer is an extension of the human brain, so that man will keep seeking a fast brain in the future as well. The human brain will never slow down.

The value of experiencing the BWR is knowing the fact that you can effect a physical (speed) change by varying the state of your brain waves. Usually one has no chance to observe his own brain waves (barring EEG exams after suffering a head injury.) Even more so, nobody thinks of changing his own brain wave to effect physical change in an environment. However, as you drive the BWR you gradually master changing your brain waves. Which may not be as immediately useful as mastering, say, tax evasion, but it is still a real expansion of ability.

Supplement

One of Marvel Comics super-heroes, Weapon X, is a mutant with fearsome combat skills honed through training with a battle-simulator helmet which creates virtual combat scenes. His fictional helmet resembles BWR's in both form and function: by donning it one can acquire new talents. When you discover new ways of using your brain, the possibility of mutation will be open to you.

William S. Burroughs, expounding upon his thoughts in his dialogue "The Job," quoted from *The Living Brain* by Gray Walter: "The rhythmic series of flashes appear to be breaking down some of the physiologic barriers between different regions of the brain. Then Burroughs pointed out that the consciousness-expanding experience can be induced by flicker - that is, rhythmic light flashing in the retina at the rate of from ten to twenty-five flashes per second, creating characteristics of consciousness-expanding drugs.

BWR's helmet can be both audiovisual apparatus like that which Burroughs used for his consciousness-expanding experience, and a talent-acquisition trainer like Weapon X's helmet.

reference:

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6. Newsweek, June 28, 1993 "The puzzle of Genius"
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1993

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Revised version:

"Brain Wave Rider: A Human - Machine Interface" LEPNARDO, Volume 28, NUmber 4, 1995

Decisions at the speed of electronic circuitry

The robots of writer Isaac Asimov seem to derive from some analogy with pet animals. In particular, the response to humans of Robbie, a robot appearing in *I, ROBOT*, reminds me of a big dog who sometimes bites his keeper. But if Robbie follows some rules, the Three Laws of Robotics in this case, he will be admitted as a family member.

In the real world, machines' recognition ability seems to not even reach the animal level. Without human assistance, machines are not yet given rights to judge things by themselves, even in the most advanced technological area such as computer-aided military technology. However, it is not a dream that someday machines will feel, become jealous, joke, read minds, and do whatever else people do.

When we at DTI made the work *VIRTUAL HAZE*, the second work in our series of art works using brainwaves, our biggest concern was how to make a computer react to various brain states through the sensing of brainwaves — in other words, the process of reading minds. However, I didn't want to think of it as 'mind reading,' as I thought it was something different from 'brain reading'. Mind is not a physical entity but the brain is. The brain accumulates knowledge, experience, etc. as data. Comparing the brain to a computer, the mind could be seen as an image on the monitor. It is a phenomenon resulting from processing by brain hardware.

It is, however, not clear how we distinguish mind from brain terminologically. The field of psychology takes up mind as its subject, describing the brain without clear definition. This is typical not only of psychology. Even in Marvin Minsky's *THE SOCIETY OF MIND*, an element called 'agents' is used to explain how mind is formed. Although the book describes how the mind functions, Minsky doesn't define the boundary between mind and brain either. Presumably, the distinction is not important to him in the context of his theory, which contends that minds are like societies which grow from the child stage to the adult. In chapter 1.2, 'THE MIND AND THE BRAIN', Minsky names some predecessors: psychologists producing theories about child development, like Sigmund Freud and Jean Piaget; mathematicians on the mechanical side who 'began to reveal the hitherto unknown range of what machines could be made to do' like Kurt Gödel and Alan Turing; and Warren McCulloch and Walter Pitts, who began to merge these two streams and 'showed how machines might be made to see, reason, and remember' in the 1940s. Minsky also mentions research into the science of Artificial Intelligence (on which he is an authority) starting in the 1950s, which was 'stimulated by the invention of modern computers.' These descriptions may reveal how Minsky constructed the context of his theory. Or some one already can sense how he develops the theory in early pages of the book, as simply as a formula, like 'Freud+Turing+Artificial Intelligence=THE SOCIETY OF THE MIND'. I am left to wonder why he entitled the chapter *THE MIND AND THE BRAIN* without delving into the difference between them.

In DTI's art works, the brain, not the mind, plays roles including that of joy stick, interface, processing unit, etc. Naturally the brain is a multi-purpose control unit; what we mainly focus on is the extension of its control function. We have tried to extend this function beyond the body with two art works in the past. You can make physical phenomena happen by changing your brainwave frequency, if you get accustomed to controlling it.

With *BRAIN WAVE RIDER*, the first work to use brainwaves, you control the speed, accompanied by sounds and vibration, of a vehicle racing through a computer-graphic landscape. The speed changes according to the frequency; higher frequency gets you faster speed.

The second work, *VIRTUAL HAZE*, is a war game; you can shoot down enemy UFOs by producing

beta waves, or warp to another stage without fighting if you achieve alpha waves. Otherwise you will be shot by enemies if you don't concentrate on the battle, as one of the computers used for this game is capable of reading the state of your brain and judging whether you are really willing to fight. If you don't concentrate on fighting, the computer will counter your attack, this time with an infrared ray gun. Machine versus human.

Similar technology is applied to some safety devices for operating machines or vehicles. These devices analyze brainwaves, and shut down operation for the drowsy operator if they detect brainwaves of a lower frequency at certain times.

This sort of relationship between man and machine will be expanding in fields where 'decisions at the speed of electronic circuitry' are essential. The biggest need lies in the military field, where quick decisions give strategical superiority — 'move faster, kill better, and live longer than the enemy.' An article in the September 1994 WIRED, 'Cyber-Deterrence,' reports on the 194th brigade of the US Army, which is literally a high-tech army: 'at the high end of the lethality spectrum, the Americans had top-of-the-line M1A2 Abrams main battle tanks, each carrying an information system that collected real-time battlefield data from airplanes, satellites, and unmanned aerial vehicles. At the low end were the "21st Century Land Warriors" (also called "warfighters" but never "soldiers" or "infantry") who came equipped with day-and night-vision scopes mounted on their M-16s, video camera, and 1-inch LED screens attached to their kevlar helmets. The 486 computers in their rucksacks were wired to radios that could send voice or digital-burst communications to a battle command vehicle coordinating the attack through a customized Windows program.'

Paul Virilio talks about the central electronic-warfare administration in chapter 1, 'Military Force IS Based upon Deception,' of his book WAR AND CINEMA: The Logistics of Perception. The administration is based on "the so-called '3Ci' (control, command, communication, intelligence)" which attends "in real time to the images and data of a planetary conflict." The book was written in the days of Ronald Reagan, whose Star Wars project, a space-based anti-ballistic-missile system relying on lasers and mirrors, was slated for establishment by the year 2000. The project never came about due to the end of Cold war and the budget shortage. However, '3Ci' has survived the Gulf war and following conflicts over the world, and has been inherited by military units like the 194th brigade.

In the same book, Virilio says 'weapons are tools not just of destruction but also of perception - that is to say, stimulants that make themselves felt through chemical, neurological process in the sense organs and the nervous system, affecting human reactions and even the perceptual identification and differentiation of objects'. Military technology becomes more and more perceptual and seeks decisions- making at the speed of electronic circuitry, which should be far faster than the human brain.

'By tracing the history of the modern war machine at each one of these levels (weapons, tactics, strategy and logistics) we will be able to understand the role that computer technology has come to play in the automation of the commander's task,' Manuel De Landa points out in his War in the Age of Intelligent Machines.

However, technologically we are still at the beginning. With the exception of some examples like pilotless aircraft and unmanned tanks, which are intelligent enough to select and destroy their own targets, it is said that the role of machines is still at the "advisory" level and not the "executive" level. But the evolution will certainly take place.

What will happen when machines replace human commanders? De Landa comments interestingly: 'the efforts of military institutions to get humans out of the loop have been a major influence in the development of computer technology. The birth of autonomous weapons systems, of war games played by automata, of production systems that pace and discipline the worker, all are manifestations of this military drive. But. . . even though humans are being replaced by machines, the only schemes of control that can

give robots the means to replace them are producing another kind of independent "will" which may also "resist" military domination'.

With our VIRTUAL HAZE, as I mentioned before, the computer reads brainwave and counters attacks if it detects its enemy's failure to concentrate on the battle. This sort of thing may be applied to real military technology.

Prior to the start of replacing human commanders with machines, the latter already are available to collect any data regarding soldiers. This may include physical data, even brainwaves, of soldiers. The WIRED article envisions: 'In a real war in the near future a video camera would record the body damage. In this case the medic popped the disk into a portable PowerBook to discover that his victim had a sucking chest wound. The image was digitized and transferred via a radiolink to a triage unit in the rear, where a doctor talked the medic through the treatment of the wounded soldier.' If said soldier were to get receive a head injury, it would be natural to transfer his brainwave data to the rear. Soldiers' physical data become a military secret on the battlefield.

As De Landa says in the above-mentioned article, will independent will be able to resist military domination? I have been wondering about this since I saw the computer precisely counter my attack in our art work. I think that in order to evade the counter attack from the computer, I may have to implant some device into my brain to change the brainwave frequency so as not to be detected. But, are cyberpunkish ideas like BRAIN IMPLANTS or WIREHEADS the best solution?

Notes:

1. ISAAC ASIMOV "I, ROBOT" BANTAM SPECTRA
2. MARVIN MINSKY "THE SOCIETY OF MIND" Simon & Schuster
3. PAUL VIRILIO "WAR AND CINEMA, THE LOGISTICS OF PERCEPTION"
translated by Patrick Camiller VERSO
4. JAMES DER DERIAN "Cyber-Deterrence" WIRED September, 1994
5. MANUEL DE LANDA " War in the Age of Intelligent Machines"
ZONE BOOKS

Burda Academy, 1995, Germany

Living on the network - Synchronicity of human brain and materials

From the early stage of computer research, computer scientists have predicted that in the future computers would function as the human brain does.

Accomplishments of Artificial Intelligence research lead us to recognize that the difference between a computer and the human brain is indistinguishable at the functional level. We now realize that the activity of the human brain could be recorded in a computer and its network in digital form. In a way, all 'spiritual' activity in your brain, including 'memory', 'thought' and 'will' could be processed and saved as data.

What we at DTI present at TELEPOLIS is intended to represent a new relationship between the human brain and materials. Its concept may go beyond thoughts – for example, the simple things we believe such as "tomorrow is the first day of the rest of your life", or our hopes for physical longevity. Because your spiritual activity could be kept as data even if your physical part were to disappear. "Living on the network" could take on a whole new meaning.

Brain waves are under scrutiny by researchers everywhere. Some of the latest reports say that brain waves can be used for controlling equipment if certain types of brain waves can be achieved, or for communication without speech. (These particular technologies are still at too early a stage to have any practical application.)

At the UCLA Medical Center, for example, brain wave data are uploaded to a LAN for reviews of patients' brain waves by the Department of Neurosurgery. In addition, the LAN is connected to the Internet, allowing a review of patients' vital signs and brain wave patterns from anywhere with Net access.

In a future art project, an object glows in a water-filled tank in the center of a room. It moves from time to time, like a living creature. Cables run from the creature to a computer. The computer contains brain wave data which make the creature move. The creature responds to the recorded brain waves as if controlled by a brain. Also, it opens a communication line when another computer detects certain brain waves. The system allows observers to transmit their own brain waves to the creature when they place sensors against their foreheads while touching a monitor. The observers can make the creature move, and initiate a phone line connection without any physical action, if his or her brain waves are controlled properly. If these brain wave data were recorded to the hard disk of the computer, the same action could be repeated over and over.

The above is just a system analyzing and responding to brain waves as electromagnetic waves; it unfortunately doesn't really understand the contents of the brain wave data. We can not see the contents of memory, thought, will and other spiritual activities of the brain at this stage. However, even this might be possible someday.

20th century visual art was not able to totally free our recognition and aesthetic values from seeing. Many artists – Dadaists, Surrealists, Marcel Duchamp and countless more – have tried to surpass those limitations, but none have succeeded. Most artists haven't recognized that the eye is an unstable optical sensing organ connected to the brain, which is a mechanism making use of electrical and chemical reactions. But, for us, it is not necessary to stick to aesthetic values in the art context because what we are approaching is a totally new shift in cognition. It's totally different.

TELEPOLIS, Luxembourg, 1996

The Brain in the Techno-Landscape

In Stanley Kramer's famous movie "On the Beach", an American submarine captain played by Gregory Peck picks up unidentified telegraph signals that might indicate survivors of a nuclear war that has already destroyed most of the world, and goes up to San Diego from Melbourne with his crew to check it out. The signals contain no message, but occasionally create words like "King Lear" and other random, non-syntactical "words". Has someone survived to try to contact others? You can probably guess the truth. It was just a Coca-Cola bottle caught against a window shade, accidentally placed on a telegraph machine. The bottle was tapping against the machine in the wind.

When I think of artificial intelligence, this movie always comes to mind. It makes me imagine myself riding on a submarine, looking for something indicating intelligence. Or maybe it's not just imagination. We experience similar events in our daily life related to unidentified intelligence. But what is intelligence anyway? As seen in "On the Beach", we tend to fall into a psychological trap in which we believe non-intelligent "things" to be intelligent.

'We might make mistakes. We might endow mindless things with minds, or we might ignore a mindful thing in our midst. These mistakes would not be equal. To overattribute minds - to "make friends with" your houseplants or lie awake at night worrying about the welfare of the computer asleep on your desk - is, at worst, a silly error of credulity. To underattribute minds - to disregard or discount or deny the experience, the suffering and joy, the thwarted ambitious and frustrated desires of a mind-having person or animal - would be a terrible sin.' -- Daniel C. Dennett, *Kinds of Minds* (1)

Daniel Dennett, a philosopher and cognitive scientist, defines a "mind-haver" as different from a mindless thing. From his book "Kinds of Minds": "When I address you, I include us both in the class of mind-havers. This avoidable starting point creates, or acknowledges, an in-group, a class of privileged characters, set off against everything else in the universe." So distinguishing mind-having from mindless is an "avoidable starting point" for us.

Computers may become electronic brains

Sherry Turkle, a sociologist and MIT professor, reports on young children's recognition of computers, especially whether or not they think computers are alive or intelligent. Psychology such as Jean Piaget's traditionally says children between three and eight start understanding about what is alive and sentient through their interactions with objects around them. This situation has drastically changed since the advent of the computer in the home. Now children play with computers which can speak, sing and cheat at tic-tac-toe. Through interaction, computers make children think of them as having a sort of intelligence. Turkle comments, "Children today contemplate machines they believe to be intelligent and conscious yet not alive." (2)

Once just machines for computing, computers are becoming something different from what we now call a computing machine. As Turkle's study shows, more people have started thinking computers are intelligent. In

Chinese, the word "computer" is expressed as "electronic brain", pronounced "dian-nao". The Chinese expression for computer may be the most appropriate from here on out. (Actually, "diannao" was originally a slang term. A formal expression of the computer in Chinese is "jisuanji", which also literally means "computer = computing machine". This is a good example of imagination on the street overcoming formal academic thinking. As Nicholas Negroponte of MIT's Media Laboratory says in his book "Being Digital", now is the time for "street smarts on the superhighway".)

In fact, computers nowadays don't have much intelligence, and most adults don't think of their PCs as more intelligent than their colleagues. (But some of them may consider computers to be more useful than their colleagues:-) In the future, computers with intelligence may be available in the home. Reuter reported on a Bill Gates speech in Detroit as follows:

Tuesday April 29 2:59 PM EDT Microsoft's Gates Sees More Computer Interaction (By Todd Nissen)
DETROIT - Microsoft chairman Bill Gates, in town to make a \$2 million cash and software donation, said the biggest changes on the horizon for computers will be how they interact with users. Gates said personal computers that can understand the context of spoken words and interpret facial expressions hold the potential for more significant advances than the lower prices and faster speeds that will also occur.

Microsoft has sold operating systems for PCs not only to offices and schools but also to homes all over the world. Everybody acknowledges that Bill Gates has been the best sales person in the history of computer business. His speech above indicates the way our computers are heading. "Personal computers that can understand the context of spoken words and interpret facial expressions" in our home should be very useful. We might be able to replace many non-intelligent home appliances, or even pet dogs and cats, with those computers. For the moment, the majority of people's concerns regarding computers, like yours, center around clock speeds, multimedia performance etc. Drawing on Bill Gates' comments, in the future your concerns will shift to how your own computer cleverly responds to what you say, how it says something funny to make you laugh when you're looking gloomy.

Bill Gates' words sound a bit out of place, though. What his company has done for the computer market is just the sale of MS-DOS and Windows, and those OSes have pushed manufacturers to produce computers with "lower prices and faster speeds". But now he seeks "the potential for more significant advances than the lower prices and faster speeds." In the context of computer development, the advent of smart computers is very natural, and computers are already headed in this direction. Also, computers will change their appearance. As Negroponte says, we might even live in a computer in the future. If so, might we live in an intelligent "home"?

Meaningful Mechanical Life

In the future, if you wish, most of your organs could be replaced with artificial organs: artificial heart, artificial stomach, artificial womb... We might gradually become cyborgs. But will we be able to replace our brains with something else? The answer might be "no" because of the definition of a cyborg. Cyborgs differ from robots. Robots are basically mechanical entities in any form. Androids look like humans and are indistinguishable from them; they are sometimes genetically engineered organic entities but they do not combine organic with non-organic parts and basically are robots.

On the other hand, cyborgs are basically humans with mechanical interchangeability. "The idea of human interchangeability with machines has been pushed even further by those who imagine that humans and machines are merging to form a new hybrid entity: a cybernetic organism, or cyborg", says Claudia Springer, an author of "Electronic Eros: Bodies and Desire in the Postindustrial Age". In the book, she quotes the definition of two types of cyborg by David Tomas, an artist and anthropologist at the University of Ottawa: "the post-organic...classical (hardware-interfaced) cyborg and the postclassical (software-interfaced) transorganic data-based cyborg or personality construct." She continues saying, "the first type combines the organic human body, which either preexisted as a person or was genetically engineered, with nonorganic mechanical or electronic implants or prostheses. The second type has no organic form but consists of the human mind preserved on computer software. When fictional characters load software directly into their electronically wired brains, they also qualify as cyborgs." (3)

A number of my artworks, such as "Brain Wave Rider" (1993, Tokyo and Minneapolis), "Virtual Haze" (1994, Helsinki), "Synchronicity" (1995, Luxembourg), and "Wirehead" (1996, London), can be interpreted in the context of the "postclassical (software-interfaced) transorganic data-based cyborg." Through the artworks, the audience can manipulate computer-generated images and sounds through electrodes on their heads. In particular, the title "Wirehead" directly derives from the idea of "electronically wired brains." Programs for the artworks can reflect the audience's mind by identifying brain waves; however, my "computer software" does not yet approach the human mind. It could take another 100 years easily to accomplish this idea. Already some computer scientists are trying to make programs which simulate our minds, though most research is still at a very early stage and no one can predict when programs will function as "minds". Before we can create such a program, computers or machines might come to have a "mind" or become a "mind-haver" by themselves!

(When Marvin Minsky, a MIT professor considered one of the founders of the field of artificial intelligence, was asked how long before we can create a HAL (the computer in "2001: A Space Odyssey", written by Arthur C. Clarke and filmed by Stanley Kubrick), Minsky replied as follows: "If we really work hard - and smart - we can have something like a HAL in between four and four hundred years. I suppose if we're lucky, then, we can make it by 2001!") (4)

Stories about cyborgs are not only the stuff of science fiction novels but will relate to our future life style.

'Cyborg imagery can suggest a way out of the maze of dualisms in which we have explained our tools to ourselves. This is a different dream of a common language. It means both building and destroying machines, identities, categories, relationships, spaces, stories. I would rather be a cyborg than a goddess.' -- Donna Haraway

Cyborgs have already influenced many areas in the cultural field. In 1983 Donna Haraway wrote "the Ironic Dream of a Common Language for Women in the Integrated Circuit: Science, Technology, and Socialist Feminism in the 1980s, or A Socialist Feminist Manifesto for Cyborgs". The manifesto's influence has been felt in some areas of the feminist movement since. She said:

"I want to examine 'women in the integrated circuit' in relation to two universes of science and technology: communications technologies and bio-technologies. These are the crucial tools recrafting our bodies. These tools embody social relations in a particularly powerful way for women world-wide."

Technologies, media, and science have been dominated by men. But now women might be able to use them as tools to liberate themselves. This is, however, not only a matter of feminism. "Cyborg imagery" might lead all of us to a meaningful mechanical life.

Who draws the landscape in the brain?

Landscape painting in the East differs from that in the West. One of the greatest inventions in Western landscape painting was the 3-D perspective that the Eastern painting lacks. In Eastern landscape paintings, on the other hand, landscapes are expressed on the basis of empiricism. If you look at Eastern paintings, especially old Chinese and Japanese paintings, you can see, for example, mountains and villages which are not visible from the one viewpoint in the same composition. The painter draws according to his experience or someone's experience, so that the paintings represent the accumulation of experience.

It seems to me that landscapes in computer-generated Virtual Reality are landscapes lying between the Eastern and Western modes. They are based on empiricism and perspective at the same time. The VR image is naturally one of "perspective", one of the important visual elements of reality, but you can also choose someone else's perspective view. For instance, if you choose the view of 8 year-old child, you can see the landscape from his perspective. Also the child can see from your view in the VR world. You can share the experience with him. However, the VR image can let you go beyond this point, and experience the perspectives of creatures with views completely different from a human's. Some of them, like a jellyfish, only recognize light and shadow. Or you may be able to realize the so-called "bird's-eye view" is not how a sparrow sees the world at all.

Technology is changing both our view and the landscape at the same time. The parallax also will shift all the value systems of our visual culture. When Impressionists began their painting style influenced by the spectrum analysis of light, one of the latest scientific findings at that time, it was a revolution in art history. Now we might be in the midst of another revolution in art history. The 20th century was the movie century. No other form of artistic expression can steal this claim from the movie, the age's most representative art form. What will appear in the 21st century? It is a difficult question. But what I can say here is that some point always can be found in "the man-machine interface." The words 'man-machine interface' may remind some of just a keyboard or a mouse or another cyberpunk device from William Gibson's novels. However, in my modest opinion, the man-machine interface in some form will play a role as tools for new artistic expression. My brainwave-detecting helmet might be a very early model of the new art tools for drawing landscapes in the brain.

NOTES:

- (1) Daniel C. Dennett, *Kinds of Minds*,(BasicBooks,1996): 4
- (2) Sherry Turkle, *Life on the Screen*,(SIMON & SCHUSTER,1995): 84
- (3) Claudia Springer, *Electronic Eros: Bodies and Desire in the Postindustrial Age*, (University of Texas Press,1996): 19-20
- (4) David G.Stork, *Scientist on the Set:An Interview with Marvin Minsky*,(The MIT Press,1997): 30

The text was written for a book for LIQUID VISIONS (Lucerene, Switzerland). 1997

Smart, Friendly and Personal - an Agent for All of Us

Computer science -- it's the alchemy of the modern age. This is what makes the field so attractive to inquisitive young minds. "The Fetishism of Commodities", a key concept behind "alienation" in Marxism philosophy, may never change in future society. Marx said that "price, taken by itself, is nothing but the monetary expression of value. The values of all commodities of this country, for example, are expressed in gold prices, while on the Continent they are mainly expressed in silver prices." (Karl Marx, Capital). In the 1970s, the international monetary system lost its convertibility with gold. Since then, our paper money has been scrip guaranteed by nothing more than mutual agreement. In the 1990s, money is losing even more of its materialistic roots. "Electronic money" is taking the place of conventional money. Values are expressed in digital data; manipulating digital data via computers has become integral to the basis of value formation. The old saw "Time is Money" needs an upgrade to "Processing Speed is Money"; the processing speed of computers becomes the most essential part of value formation.

Agent technology has become one of the hottest areas of computer science, in response to a number of factors (but predominately business needs). Computer scientists, today's alchemists, don't produce gold but rather programs that "live" in the digital habitat. Agent technology will develop at an accelerated pace for next decade or so. We have a need for agents to process tasks in our daily life. We'll use agents to check schedules, answer the phone, receive and send e-mail, gather information on our interests, monitor stock markets, secure our homes, and so on. In other words, we're going to depend upon agents to be our secretaries, our messengers, and our guards. So we need these agents to be smart. They'll need to grow in intellect in response to our needs.

Agents are developed "bottom-up", in contrast to the conventional "top-down" approach of designing Artificial Intelligences. Learning is a very important process to agents. Artificial Intelligence applied to business uses so far leaves us with an impression of inflexibility. They show intellect in given tasks but are not so smart in newly-experienced situations. Most Artificial Intelligence programs are built upon the expert system, which seeks to store the knowledge of medical doctors, lawyers, engineers and so on. AIs have been used in power plants, hospitals, transportation systems, etc. Pursuant accidents have made us aware that expert systems aren't always trustworthy. (This is a sci-fi standby, and we see it again in "Jurassic Park", where so much trouble begins with a computer system under-counting the park's dinosaurs. The story plays on our worries about computer systems.) Too many experts know their expertise is flawless. They're wrong.

Already agent programs are at work on the desktop and on networks. Each agent has unique tasks and behaviors. On desktops we see operating system agents and application agents; on the Internet, Web search agents, Web server agents, information filtering agents, information retrieval agents, notification agents, service agents, and mobile agents; and on intranets, collaborative customization agents, process automation agents, database agents, and resource brokering agents.

"MExA = Mind Extension Agent" - Cheerful communication between mind-havers and mindless machines

"When I address you, I include us both in the class of mind-havers." - Daniel C. Dennett, "Kinds of Minds"

An agent I am currently developing is called MExA (=Mind Extension Agent). MExA is created for use by man the "mind-haver". It is a speech-recognizing, brainwave-reading, speech-enabled, information-searching and learning

agent. (Speech recognition is currently limited to English.) MEXA's current job is to entertain users culturally. It selects programs and information from the Internet (or an intranet) for its users, guided by man-machine interaction utilizing brainwaves and voice. It talks, tells jokes and selects Web pages containing information that it deems appropriate for the user.

But I really expect MEXA to help bridge the gap between man and machine. The computers we use every day are not so human-friendly; they certainly don't seem to be making friends with us. We don't include them in our "class of mind-havers" yet. (Of course, the definition of "mind-haver" varies by individual.)

" "We left Houston at dawn, headin' down the road - just me and my truck." Strange. If this fellow thinks his truck is such a worthy companion that it deserves shelter under the umbrella of "we," he must be very lonely. Either that, or his truck must have been customized in ways that would be the envy of roboticists everywhere. In contrast, "we - just me and my dog" doesn't startle us all, but "we - just me and my oyster" is hard to take seriously. In other words, we're pretty sure that dogs have minds, and we're dubious that oysters do."

- Daniel Dennett, "Kinds of Minds"

As Dennett says, it's odd how the truck driver treats his mindless vehicle as a worthy companion on the road. We give minds to dogs but not oysters. "Some think it's obvious that a ten-week-old fetus has a mind, and others think it's obvious that it doesn't." (Dennett) So what about computers? Some surely think of their computer as a collaborative colleague, yet most consider it just a machine. We're nowhere near creating a computer like HAL in "A Space Odyssey". Marvin Minsky says of "HAL's Legacy": "I am still a realist: If we work really hard-and smart we can have something like a HAL in between four and four hundred years. I suppose if we're lucky, then, we can make it by 2001!"

MEXA is no HAL. It has no intelligence, and only responds to a user's voice and brainwaves. (It's worth noting that even HAL described himself as an intellect-less mimic of man's behavior.) However, MEXA can record the user's voice and brainwave patterns so that future versions could draw upon these data when communicating with man.

Why have MEXA use brainwaves? EEGs are used as input data to investigate man's "mind". Other possible inputs include event-related brain potentials (ERP), electromyograms (EMG, a measure of muscle activity), pupillometry (a measure of changes of pupil size), electroculography (EOG, a measure of eye movement), electrodermal activity (EDA, changes in electrical activity at the skin surface), heart response, blood volume, and blood pressure. Then there are measures like respiration, oxygen consumption, salivation, skin temperature, and gastric motility. In addition to speech recognition, the use of face recognition should be considered in the future.

These body signal analyses and readings are inputs to be processed by the computer technology. These data are used in some fields such as Psychophysiology. But there are cultural reasons to use these too. The technological developments born of computer engineers aren't always keen on cultural awareness!

For example, the Unicode developed mainly by computer engineers in Western countries may not fit non-Western cultures if it restricts their use of language. People in China, Japan, Korea and Taiwan use Chinese characters (along with home-grown characters in Japan and Korea). The Taiwan government has formally recognized about 50,000 characters. Most Western countries use alphabets containing far fewer characters. Ignoring these differences, Unicode unwittingly tries to simplify real-world cultural traits in its zeal to simplify digital text processing.

Even the ways of using "yes" and "no" may differ among cultures. A native speaker of English asked "Don't you like apples?" might answer "No, I don't like apples". But in other languages including Japanese, the answer would be "Yes, I don't like apples".

Existing computer technology is far from enabling linguistic communication between machine and man. For us to understand each other, computers are going to have to climb higher up the intelligence ladder. And when they gain those smarts, the use of physical input data might help machines understand their mysterious organic partners.

A technological archetype of MExA was originally developed for "News_agent(x)" (1997) exhibited at ISEA97 in Chicago. News_agent(x) was my first work in a series of agent-based interactive art works. The following text was written for ISEA97 to describe the basic concept of News_agent(x):

News_agent(x)

Stock markets, wars, power struggles, environmental problems, murders, and more -- we always try to find out what's behind the headlines on television news or what's to be read between the lines of newspaper articles. It's easy to see that there are many causal relationships lying under the surface of the daily news. All the small particles of cause interact with each other, to become social phenomena at the final stage.

Evening news programs on TV can work toward family ties, providing a time for sharing common subjects with other family members. Yet 24-hour news programs like CNN or BBC Satellite can turn us into world news addicts. We can hardly stop watching news programs. They bring dramatic spectacles to our homes in real time, as do music and sports channels.

News seems to influence our feelings, thoughts, behavior and attitudes in everyday life. All of human activity reflects the mechanical, materialistic elements which form the world. This is the traditional sociological viewpoint, but it is being turned upside-down. We should now start interpreting society through the methods of biology. Social structure needs to be seen as a biological system rather than a material system. Applying this interpretation to news, the reflection of our social structure in all of our activities is based on biological reasons, since individuals' activities can be understood in the context of biological rules.

The latest theories in financial analysis -- as well as other fields -- derive largely from biological findings. (Theories based on "complex systems" are a good example.) Darwinian competition, too, is being applied to those theories.

For ISEA97, I would like to set up a closed circuit information flow, a virtually-created "news program", which consists of TV images, newspaper articles and financial market reports. A "favorability" score indicated by the audience's brainwaves will categorize news contents. Brainwave data, in this case, depicts the audience's subconscious. In between the human response and news factors, there would be an agent which indicates the audience's state of mind. There would be 4 degree of "favorability" in responding to news: very favorable, favorable, neutral, and unfavorable. Depending upon the "favorability" indicated by measured brainwaves, the agent would modify the news and financial market reports that it calls up. The more the audience indicates favor, the more the agent "grows", like a biological entity. If the agent grows to a certain degree, it starts breeding. The agent has a life span, so that it will have to mature within a given period of time. Otherwise it cannot bear descendants.

The result of the whole process above can be output as a graph in a financial report. The audience can see various types of news and find out how their minds relate the news factors at the same time a computer detects how an audience's brain is behaving.

News_agent(x) worked only locally as part of an installation artwork at the ISEA97 exhibition site. As an installation artwork -- although an unfinished one -- it represented my concerns about man and machines, information, and culture.

MExA (=Mind Extension Agent) carries on all the functions of News_agent(x), is able to retrieve information from networks, and has the other functions mentioned above. At the current stage of development, it doesn't differ from the ordinary software agents you see on your desktop or on some Internet sites. However, it's still developing. It will be learning as an intelligent agent program and will communicate with other agents too. News_agent(x) is an interface agent custom-selecting news by corresponding with users' brainwaves. By contrast, MExA is an entertainment agent -- with an additional focus on promoting communication between man the mind-haver and mindless machines. In the future, studies using MExA may cross-develop with other scientific and cultural fields such as Psychophysiology, Biology, Psychology, Ecology, Anthropology, Philosophy and Medical studies.

bodyfuture - Say "good bye" to the terrestrial body

Launching spacecraft is an everyday event seen on the TV in morning news shows. In a story on Mars exploration, a CBS newswoman asked, "Now, are we going to Mars?" as if she was talking about going to Manhattan or Florida. Few are bewildered by this kind of things. Given the biological and nonbiological evolution to come, almost every form of fashion is trivial. Fashion appeals to us only when we are attached to our bodies that have evolved within the confines of terrestrial ecology. We have already set out for the direction toward abandoning the terrestrial way of being. The old astronaut John Glenn returned to the space not because of the countdown to "space travel for everyone" in the near future, but because of the striking similarity between aging --physiological decline of the human body-- on the earth and the degeneration of muscles and bones in the space. There's a great concern about the fact that our bodies -- our long companions -- are not spaceworthy. We are pressed to decide when and how we should have done with our bodies, which are going to be useless.

Human beings are still on the way of evolution. The enormous length of time required for biological evolution is beyond the perception of ordinary people. On the other hand, human "history" is nothing but millennia. The makeup of our minds have hardly changed in the last 30,000 years. The people who lived in caves and hunted for their day's games are not much different from modern "civilized" people with respect to the mental elements. The only difference maybe the ability to understand vaguely the status of our unchanged self.

The last fashion is for us the people feeling shame for the second time since expulsion from the paradise. It provides us a guise to conceal our bodies, and also an attire for the ceremony of departure from the gods and spirits associated with terrestrial ecosystems.

Some entities in our neighborhood continue to evolve at a great speed incomparable to that of living organisms. They are machines. Mathematician von Neumann, the father of computers, stipulated that machines can self-reproduce and satisfy basically all requirements for living organisms. The processing capacity of the central processing unit, sitting at the center of the machine's brains, is growing exponentially. The capacity of machines will soon match the human brains and then excel. As Hans Moravec, who created the Robotics Institute at Carnegie Mellon University, said, machines are our future "mind children."

Marshall McLuhan saw the extension of the human body in the way media developed in the latter half of the 20th century. However, his discourse of extension applies only to the body undergoing the short transient phase from that time to the near future. Nowadays, 30 years after McLuhan, our focus is gradually shifting from extending the body to breaking out of the body. To separate the consciousness from the body means putting an end to the historical controversy about "body and mind." Somewhere in the future, human beings will have to decide whether they should upload their consciousness into machines, or they should surrender the role as the master of the world to machines that are superior to them.

This is not a cyberpunk story. Felix Guattari, already in 1987, foresaw that the subjectivity of machines would not be placed under the reorganized subjectivity on the part of human beings, but there would be the subjectivity of machines created anew. Unfortunately, his heart stopped beating before he told this in detail.

Let's talk again about more physical (nearer to the body) things. The life span of human beings will soon be twice as long as it is. We have much to do, and we must do it making use of our bodies that are going to be useless. Given such missions, the parts of the body losing functions may need to be supplemented mechanically or biologically,

and this notion, if you think over it, is taken for granted by many. If you acknowledge this notion, you should be able to understand the themes that must be developed in arts and fashion in the coming age of apprehension for "the Storm and Stress," waiting for the demise of the terrestrial body.

Mapping of the human genome allows us to understand what programs are the basis for the constitution of our bodies. The completion of the whole process of this decoding is now a question of time. After all, we'll have another trifling thing to worry about, dragging the burden of the "obsolete body" (Stelarc).

When their DNAs are compared, chimpanzees and human beings are virtually similar. Despite this fact, many unenlightened people, imprisoned in the darkness of the body, want to emphasize the absolutely insignificant differences in the color of the skin or hair or in gender. At the same time, some people try to create human sperms of murine origin. Conventional values are being challenged by extremely radical technologies. Feminism, as well as antiracism, seems to suffer difficulty in forming a common front because of ideological conflicts among the groups that once pursued a common cause. Our conceptual understanding of self still impedes the insight that our body is not much different from a computer bought at a shop, in the sense that it is an assembly of separate parts. The situation resembles the belief in the concept of a state or nation as communal illusion, and this also will undergo a process of deconstruction in the same way as the globalization in economy and politics is gradually annihilating international borders and even nationalities.

The use of fashion to dress our obsolete terrestrial bodies for whatever the best of beauty may be based on the same mental logic as the Neanderthal men mourned the death of their peers with the offering of flowers. It is difficult to tell at present whether this mental logic should survive the future process of the replacement of subjectivity. Only one thing is certain: We someday have to say "good bye" to our terrestrial bodies.

bodyfuture, text for "bodyfuture" installation, 1999

National Museum of Modern Art, Kyoto, Metropolitan Museum of Contemporary art, Tokyo

Hell Hawaii

"Hawaii, a paradise on Earth" -- the words carry a nice ring, especially to commercial and political interests. What most people don't know is that today's image of Hawaiian paradise was built atop the ruins of the land's independence. The Hawaii Monarchy was illegally overthrown by American businessmen on January 17, 1893. A century after the overthrow of the Kingdom of Hawaii, on November 23, 1993, President Clinton signed Public Law 103-150, the "Apology Resolution" aimed at native Hawaiians.

But no "resolution" could reverse what befell Hawaii and its native history.

To swarms of Japanese tourists Hawaii is a paradise -- if paradise is nothing more than a beautiful resort, that is. They swim, surf, fish and play golf in the emerald islands, while for the most part remaining ignorant of the history of Hawaii and even the history of its Japanese immigrants.

Originally Japan and Hawaii maintained a good relationship. Around the end of the 19th century, King Kalakaua even proposed a royal marriage between his princess niece and a Japanese prince, but unfortunately the Japanese declined. (But in modern times, tracking the year-end Hawaiian holidays of Japanese movie stars and pop singers is a topic of intense interest for Japanese New Year's television programs.)

Talk of the US - Japan relationship as it relates to Hawaii naturally centers on the state's unfortunate role as the starting point of the two nations' Pacific ocean clash in World War II. The American "Remember Pearl Harbor" stands as a rallying cry to counter the Japanese "No more Hiroshimas".

One apocryphal story holds that the US military knew of the coming Japanese attack without sending notice to Pearl Harbor, as the Japanese military's coded communication was easily deciphered by the US intelligence service.

It was an information war from the beginning. Can we see here the roots of the US government's keen sensitivity to the export of American PGP technology?

"American businessmen" took over Hawaii

Mention of Hawaii and businessmen brings to mind Elvis Presley's dad in "Blue Hawaii", with his stereotypical "wealthy mainland executive" lifestyle.

Elvis played the rich kid in the movie, always looking fancier than his native Hawaiian and Japanese Hawaiian friends. The attitudes of dad and his son in this movie struck me as colonialistic.

Knowing how American businessmen took over Hawaii is important in understanding the history of the land. In January 1893 Queen Liliuokalani, the last successor to the throne, was preparing to proclaim a new constitution to restore the crown's power.

A group of armed American businessmen occupied the Supreme Court, declared the monarchy overthrown, and announced a provisional government, led by Sanford Dole, son of a pioneer missionary. A contingent of US sailors came ashore, ostensibly to protect the property of US citizens, but instead of guarding the property they claimed to protect, the troops marched on the palace and aimed their guns at the queen's residence. Realizing the futility of opposing US forces, Liliuokalani opted to avoid bloodshed and stepped down.

The US president at the time was Democrat Grover Cleveland, who had just replaced a Republican administration and clearly favored the queen.

Cleveland ordered the US flag to be taken down and Liliuokalani restored to her throne. However, the provisional government was firmly in power and turned a deaf ear, declaring that Cleveland was meddling in "Hawaiian affairs". Although Cleveland initially favored reversing the situation, he also knew that the American public's sense of justice was none too keen on the matter and that ousting a government of white Americans in favor of native Hawaiians wouldn't be of any aid to his own political future.

Consequently, the president's actions were largely limited to rhetoric.

The history of Hawaii points out some dangers in the American way of business, especially in today's Pax Americana digital world.

Immunology and independence

Descendants of the native Hawaiian peoples who lived in the islands at the time of their European "discovery" in 1778 by British explorer Capt.

James Cook are still seeking real independence. However, it is said that the number of "pure Hawaiians" is 9000 today, less than 1% of the islands' population. While the sugar industry boomed in the middle of 19th century, Hawaii's native population was in decline, largely as the result of diseases introduced by foreigners.

Hawaii is a chain of islands floating in the middle of the ocean; the diseases were brought in from the outside world. Hawaii's immunological isolation led to a horrible tragedy. Today we panic upon learning of Ebola Haemorrhagic Fever, yet as an epidemic it's limited to small areas only.

What native Hawaiians experienced was an influx of epidemics throughout their homeland.

Being a Hawaiian today is largely a matter philosophical, spiritual, intellectual and emotional ties.

There are an estimated 200,000 people -- about 20 percent of the state's diverse population -- who claim descent from the first inhabitants of the islands.

Tokyo used be a Mecca for Hawaiian music. And now it has us with our "Hell Hawaiian music".

Hawaiian music is not as popular now in Japan as it was in the old days. The post-WWII era brought a big Hawaiian music boom, back when Hawaii was the dream destination of honeymooners.

The existence of many Japanese immigrants in Hawaii (ethnic Japanese make up 21% of the population, the same ratio as Caucasians) also spurred sympathetic feelings in Japan. The island sound caught the ears of many a young Japanese music lover. The popular singer Teruko Hino was known as the "Queen of Hawaiian music".

(I've just recently found out that she's a friend's mother!)

I don't play our music happily because we know that Hawaii is not a paradise, but a hell.

Also, our music is culturally, immunologically and digitally different from native Hawaiian music.

It is a new music, "Hell Hawaiian".

I strongly recommend you visit the site "Hawaii - Independent & Sovereign Nation-State"
<http://www.hawaii-nation.org/hawaii-nation.html/>) to better understand Hawaii and its history

A Game for Love and Fascism

The story of Giacomo Puccini's opera "Tosca" provides an exercise in game theory. Tosca is a beautiful singer and her lover Mario a painter, arrested by the police for having sheltered an escaped political prisoner. Mario is sentenced to death. To rescue him, Tosca has to negotiate with the police chief, Scarpia, who lusts after Tosca. Scarpia offers a conditional deal: he will save Mario's life only if Tosca becomes his lover. Tosca agrees to the deal and Scarpia orders blanks to be substituted for the firing squad's bullets. However . . .

Game theory looks at how an individual makes decisions based on instrumental rationality. John von Neuman -- mathematician, Hungarian immigrant and pioneer of the modern computer -- developed the discipline together with his colleague, economist Oskar Morgenstern. (Von Neuman is also well known for his crucial mathematical contributions to the Manhattan Project to develop atomic weapons during WWII.)

While playing poker and observing the role of bluffing, von Neuman became interested in the general problem of what to do when your best choice depends on what other persons think you might do. He and Morgenstern defined game theory as any interaction between agents that is governed by a set of rules specifying the possible moves for each participant, and a set of outcomes for each possible combination of moves. Game theory can be applied to decisions of all kinds -- crossing the road in traffic, negotiating disarmament, raising prices, giving to charity, joining a union, producing a commodity, having children, and so on.

Among various "games" studied, the Prisoner's Dilemma is perhaps the most fascinating for many social scientists. The name comes from a particular illustration of the interaction of two people. The story behind the game is this:

Two people are picked up by the police for robbery and placed in separate cells. They each have the option to confess to the crime or not. The prosecutor tells each the consequences of the combined decisions made by the two prisoners. If both "confess", the judge, having no doubt over their guilt, will give each 3 years each in prison. If both do not confess, then conviction is still the result, but the doubts in the case make the judge err on the side of leniency, handing down sentences of only 1 year each.

Here's the catch: the prosecutor also notes that he can intercede with the judge on behalf of one prisoner when that prisoner confesses and the other does not. The judge looks kindly on such action: it helps to make the prosecution's case, and thus earns the confessing prisoner a suspended sentence of no jail time. But exemplary punishment of five years is meted out to the prisoner who does not confess, as his plea of not guilty has wasted court time.

According to the rules of game theory, a strategy is "dominated" if it is never an optimal strategy no matter what strategy the opposition chooses. Conversely, a strategy is "dominant" if it is the optimal strategy (i.e. it maximizes a player's utility pay-off) regardless of the opposition's choice of strategy. And when an outcome results from strategies that agents have good reason to follow, game theory defines that outcome as an "equilibrium".

If we assume that each prisoner only cares about avoiding prison time, then confession becomes the dominant strategy for each player. The result of three years in prison for each prisoner is the equilibrium.

Each prisoner knows that the best thing to do is to confess -- and yet that choice yields the paradoxical result of

making each worse off than he would have been had he chosen "don't confess" and thereby by spending only one year in prison.

On Being Nice

The Prisoner's Dilemma, originally conceived in the 1950s, has spawned numerous games, each uniquely different from the original. The popularization of the computer has allowed the study of repeated games, which extend the scope of game theory considerably.

In the 1970s, political scientist Robert Axelrod organized a tournament of computer programs employing strategies to "win" a Prisoner's Dilemma situation. The winning program was Tit-for-Tat (TFT), submitted by Anatol Rapoport. The TFT program cooperates on the first round, and on every subsequent round mimics the other player's previous move. Thus, if the other player cooperates (defects) in the n th round, TFT will follow (defect) on the $(n+1)$ th round. This strategy is very simple -- proving that simplicity is not necessarily a disadvantage. TFT achieved the highest average score among a field of far more complicated programs.

Axelrod pointed out that TFT contains two elements in its strategy. These can be described with the words "nice" and "forgiving". The biologist Richard Dawkins also introduced the Tit-for-Tat strategy in his book "The Selfish Gene". He agrees with Axelrod, noting that many wild animals and plants are engaged in ceaseless games of Prisoner's Dilemma. Niceness is a technically important strategy, according to Dawkins: "If we translate the colloquial meaning of 'nice guy' into its Darwinian equivalent, a nice guy is an individual that assists other members of species, at its own expense, to pass their genes on to next generation. Nice guys, then, seem bound to decrease in numbers: niceness dies a Darwinian death. But there is another, technical, interpretation of the colloquial word 'nice'. If we adopt this definition, which is not too far from the colloquial meaning, nice guys can finish first."

The strength of the 'niceness' strategy was only realized using by computers for repeated games. Repeated games gave us new views into game theory, biology, and computer science, all at the same time.

Fascio on Networks

Fascism today will not be the same as fascism in the past. Fascism derives from the Italian word "fascio", which equates to "bundle" in English -- for fascism bundles people up like straw. We now have the grandchildren of old fascists trying to "bundle up" people in Austria, to oust foreigners from the homeland. These Austrian fascists, following the way of the old-time fascists, have so far been enjoying power in a coalition government. Their fortunes seem rooted in local causes, such as reaction against the former government and people's xenophobia.

However, their time could be short. "Bundling" is an old idea in today's information society. Information flow is essential to our society -- that is, to the global flow of information, materials, and people, borderless in every dimension. At any given time, the equivalent of the entire population of the USA is moving around the world, in the form of refugees, tourists, business persons, and exiles. The fascism idea is just a backlash against this situation.

Our life itself depends on information flow in DNA. Mutation from a normal gene to an oncogene can be caused by some extremely subtle change in this flow. For example, the human bladder carcinoma oncogene and its precursor, the normal human ras gene, are outwardly very similar. Both are five thousand DNA bases long -- identical in all bases but one, where the sequence GCC GGC GGT changes to GCC GTC GGT. That single replacement of one

G by a T in the bladder carcinoma cell DNA is a very subtle difference in an information flow -- which leads to drastically different results.

We'd do well to realize that fascism today is also a malfunction in information flow -- not only in a political context but also in technological, economic, and cultural contexts. Another characteristic of fascism as totalitarianism is monitoring. The slogan "BIG BROTHER IS WATCHING YOU" from George Orwell's "1984" is hardly an original citation, but "1984" has played an amazing role as a prophecy for certain realms of politics in the twentieth century. Many people think of monitoring as specific to totalitarianism, whether fascism or communism, but it's specific to organizations in any form: the state, company, school, hospital, union, etc. The e-mail system at work is recognized as company property these days; a system operator in the employ of the company might be reading your e-mails. In the early days of Internet use at offices, some employees tried to sue employers for invasion of privacy after they found managers reading their e-mails. Yet monitoring of e-mail on a company-owned mail system has become almost the norm. It's common sense in the business world.

However, common sense can lead you into a trap on the national and international stage. Monitoring exists not only in totalitarian countries but also in "free" nations. Echelon is known as a spy system designed and coordinated by the US National Security Agency (NSA) to monitor everything from e-mail to satellite communications. Shared by five English-speaking countries -- the USA, England, Canada, Australia, and New Zealand -- Echelon is a global network of computers that automatically search through millions of intercepted transmissions for pre-programmed keywords.

It is suspected that Echelon has been used not only for national security purposes but also for spying on large-scale business projects in the private sector, for perceived impact on national welfare. Is this a new type of fascism? A system like Echelon literally "bundles up" cables used for communication -- a network fascist, if you will. At least with e-mail, you can encrypt messages using a program like PGP (Pretty Good Privacy) to keep your messages for intended eyes only.

Conclusion

Getting back to Tosca's story: how does this opera end? The bad outcome reads as follows. As they embrace, Tosca stabs and kills Scarpia, deceiving him. She expects that her negotiations with Scarpia will let her reclaim her lover Mario and escape -- but alas, Scarpia also defected! The bullets were real. The opera ends in tragedy as Tosca leaps to her death.

You may wonder what the game theory aspect of "Tosca" has to teach us, or how it applies to Austrian politics. Theoretically speaking, the fascist situation is not so much an instance of a Prisoner's Dilemma game, but another classic game: Hawk - Dove. So the instrumentally rational decision for people and artists is to maximize democratic freedom, and obviously to not compromise with fascists. Those bad guys cannot finish first.

My favorite ending for the opera also strays from serious game theory. Most audiences today want happy endings. They want Disney. In Tosca by Hollywood, a sympathetic soul would aid Tosca in escaping with Mario. The credits would roll as Tosca and Mario embrace. Kiss, kiss.

Watch out! This might be another type of totalitarianism, attacking our sense of aesthetics.

Essays for a web-zine,
"TELEPOLIS"

Lives in your pockets and girls in your memories

Personal computers are everywhere from New York offices to Buddhist temples in Tibet. They normally sit on or under our desks. Our computers are still in the early stage of development, so we give them places like the top of the desk or below it. In the future, computers will look different from the one before you. It may not even be called a computer any more. Or, as Nicholas Negroponte of the Media Lab at MIT writes in his book BEING DIGITAL, we may live inside computers in the future.

While we're not yet ready to start living inside our computers, already many female Japanese students feed the cats and dogs that live in the girls' PDAs (=Personal Digital Assists). Girls give them food and pet them every day. These digital animals respond like real animals and sleep in their owners' pockets. On the other hand, some young boys prefer girls found in computer games to real girls. They feel that real girls don't quite meet their tastes, whereas so-called "Anime" girls are controllable. ("Anime" in Japanese is derived from "animation" originally, but has come to refer to Japanese cartoon characters even outside Japan. If you type "Anime" into search engines on the net, you'll find sites concerning "Anime".) Even some adults are trying to raise babies in computer simulation games, without having had raised real ones. If they raise the game's girl baby the right way she becomes a little sweet angel when she reaches 17. But raise her wrong, and the user is stuck with a 17-year old bitch. The borders between real life and electronic life in computers is becoming more and more vague. The meaning of "real" is changing.

Naturally, business people aren't overlooking these changes as a business chance. Japan's largest entertainment talent agency, Hori production Co., and a major advertising agency, Hakuhodo, have been working hand in hand to develop the world first "Virtual Idol." Developed under the code name "DK96", she is 16 years old, good at singing and dancing, and speaks a couple of languages because, the explanation goes, she was born and grew up nearby an American military base in a Tokyo suburb. I personally don't understand this part of the plot. How does growing up near a military base make her multilingual? Her family hangs out with GIs there?

Always this sort of story comes with a lot of "media hype". However, it sounded more real when I heard the two companies were spending big money to take advantage of the latest video capture systems to simulate her movement smoothly on a computer. She is apparently a product of recent computer technology and the TV game business.

In a text for the History of Sexuality, the French philosopher Michel Foucault quoted Artemidorus' Interpretation of Dreams. Foucault was interested in the way of Artemidorus interpreted dreams involving sexual intercourse. Artemidorus states as a general rule that women in dreams are "symbol of things that will happen to the dreamer, so that the character and disposition of the woman determine what will happen to him." For instance, to the conventional triad of wife, mistress, and prostitute, Artemidorus adds the unknown women one encounters. His analysis is varied by what she is. In this case the dream's value for the future depends on the social "value" of the women it represents.

Virtual idols and Anime girls are new things in human history. We haven't started seriously thinking about their social value yet. Also almost no one has defined their positions in the history of sexuality yet.

However, young kids have sexual feelings of sorts and may dream about those artificial girls. Because these girls are saved not only in computers' memories but in biological ones as well.

Ying-Yang Theory for Movies and Computer Games

Here in the year 1997, it is time to start objectively speaking about this century in the past tense. Were there any big changes? Socially, yes. How about art in the 20th century? What was the most representative artistic expression of the century? Naturally it was the movie! The 20th century was the movie century. No other form of artistic expression could steal this claim from the movie, the age's most representative art form. TV was just a medium. Its cultural influence was tremendously big, but it didn't create art of its own. (Maybe some byproducts, like video art, which was created in a similar context. But, this was not mainstream.)

The movie is already over 100 years old. Its lifespan is a representation of this century, with all the events we experienced recorded mostly on film. Also, the movie has reigned as the king of entertainment in most places around the world. Hollywood has been active as the biggest image factory on the earth, not only in this century but in all of history. No past civilization has had the capability to mass-produce visual and musical images on the scale of Hollywood. This factor made the United States of America the most culturally influential country of this century. Hollywood's immense cultural influence may be thought of as the "footprints of the gods" in the future, if past civilizations left their "fingerprints of the gods" elsewhere throughout history.

Japan was not much of a movie nation compared with the US, despite a handful of great movie directors such as Ozu, Mizoguchi and Kurosawa. Recently "Japanimation", a general term for Japan-made cartoon movies, is popular around the world. This is a unique culture coming out of Japan. However, it is still culturally a shadow, Ying, of Hollywood. If Mickey Mouse is Yang, Akira is Ying.

We should now take note of a new ripple in this Ying-Yang situation, a small pebble stone thrown into the waters surrounding the movie. This pebble is the computer game. The movie is 100 years old, while the computer game is fairly young. It is still primitive and simple. However, we see that games are becoming more and more movie-like. The new generation of computer games is not simple like early games -- "Space Invaders", "Pac-man" and the such. The new games are capable of having everything a movie has: a story, visual and musical spectacles, and so on. In addition-- and this is a very important point -- a computer game has interactivity. The movie was a one-way communication, so to speak. The computer game makes two-way or multi-way communication possible. And games will be increasingly networked. Then they may finally go beyond the movie in influence.

Movies will presumably become more game-like, while computer games become more movie-like. Movie theaters are becoming smaller and closer to a personal space; they will finally disappear. The "audience" for an interactive feature won't be able to resist taking part in the plot, so producers will have to plan for changeable parameters allowing manipulation of characters and actors. Also, the "audience" will be able to take part in a movie as "avatars". Soon all the features of the computer game will be brought into the movie.

Somehow this scenario will affect the future of the entertainment business. Sony's movie business in the US is not in good shape. On the other hand, the company is expanding its business in the computer game industry. Its expansion surpasses other rival makers such as SEGA and Nintendo. Now SEGA is going to form a new company with BANDAI to work together against Sony.

We should not dismiss one more very important thing. Computer games and their production system are more independent than the film production system. Anyone who has a computer can start game production. The decade of the 1980s was the time of independent film producers, but most of them are gone. Computer game production is different, as a big Hollywood-like production system is not so suited to game production. The world is changing. After Yang has fully permeated the world, Ying is showing itself. Ying rises in the wake of Yang.

Japan's new capital in the 21st century

Centralization vs. Decentralization

In this age of networking, social structures throughout the world have become more decentralized. People will depend on, and live on, the network as it will free them from centralized culture, economy and politics. (You may be one who feels this way.)

In the past, centralization was a strong engine for the formation of a nation. Without centralization, the modern nation would have never evolved. Conversely, we are now in the middle of a decentralization process. Offices everywhere are experiencing a wave of "down-sizing" of old business systems consisting chiefly of main frame computers. Decentralization in the office replaces these main frames with networks of workstations and personal computers. Local networks lead in to linking up with the Internet, and the Internet now expands beyond the borders of nations. The structures of nations and the appearance of cities will have to change in the next century. Without this change, nations and cities will become defunct. This process may already be in progress.

When "Tokyo - the Megalopolis" appears in movies such as the "GODZILLA" movies or "A-ni-me" (Japanese cartoon movies) like "Akira", it is always destroyed by monsters or nuclear wars. It can be amusing to see the image of a devastated Tokyo. It is especially amusing when a monster destroys new landmark buildings. Just as new buildings have been built every year in the real Tokyo, they have been destroyed in the movie Tokyo by monsters. Watching these scenes of collapsing buildings is a way to release stress after office or school hours. Some workers may see their offices fall and break into pieces. However, enjoying such things was just light vandalism before the earthquake hit Kobe city in January 1995. The earthquake literally brought the ruins of a modern city into the real world. It changed the scenario for the future plans for Japan. The earthquake made the government seriously advance a relocation plan for the capital. However, the earthquake is not the only reason for the relocation.

On December 14, 1995, a governmental committee looking into the relocation of the national capital proposed that the new capital should be within 60 to 300 kilometers--or one to two hours by train--from Tokyo. In addition, some other conditions are mentioned in the proposal. An International airport with direct flights to the U.S. and Europe should be located within 40 minutes of the capital, but the new capital should not be too close to other large cities. Also, the proposal mentions that the capital should be built in an area with an adequate water supply and that is unlikely to be damaged by a large magnitude earthquake. The proposal recommends that construction on the capital city should start before the end of the century and that it should be ready to convene sessions in the new Diet building by 2010. Since estimates of the cost of construction are as high as 14 trillion yen, several municipalities are vying to have the capital located in their particular city.

The relocation plan is generally welcomed in the financial sector. The opinion from this sector believes that a relocation will resolve the stagnant economy. However, many people criticize the proposal for various reasons. Criticism hasn't formed a strong consensus yet. But, the main stream of criticism derives from the deep distrust of the bureaucracy. The majority of the people believe the worst things originate in the bureaucracy.

Historically speaking, Japanese learned construction technology from Ancient China. The old cities of Japan like Kyoto and Nara were built using the most advanced construction technology which had come from

China. Bureaucracy crossed over the China sea into Japan along with the culture and technology. The construction of those old cities was a great symbol for the nation. Japanese ministries are still referred to in a way of reminiscent of ancient times and so may account for the reason bureaucrats still dream of a centralized nation. The most progressive factions of the opposition groups insist on decentralizing the governmental functions. However, while centralization and bureaucracy have a 1400 year history here, decentralization has just begun.