

## Chapter IV Japanese Culture and Digital Culture

### 1. Introduction

In this chapter, I will discuss the ways in which traditional ideas and ways of seeing can be found embedded in contemporary Japanese digital art and entertainment. Among the major themes that I will be dealing with are (i) the concept of art, (ii) the concept of originality, (iii) Japanese perception of image and space, and (iv) the notion of life.

By analyzing the themes mentioned above from both a historical perspective and in relation to contemporary works on the fields of art and entertainment, certain specific features of the Japanese digital culture, little understood until now, will be highlighted and explained. Especially analysis on Japanese vision/representation tradition is done in detail, as I believe it will bring a key to understand the above themes.

This chapter has three major aims:

- Proposing models and concepts for explaining Japanese digital culture in relation to the traditions embedded in our ways of seeing the world. In a way, my aim is to make these ways of seeing, which often go unnoticed in our daily lives, visible, to explain their cultural significance and to trace their relationship to contemporary media creations.
- To question widely shared notions associated with the rapid growth and the assumed global nature of cyberspace, by demonstrating that cultural differences are still involved behind the everyday issues that many people take for granted.
- To offer ways to a better understanding and more effective adaptation of technology in the fields of media art and entertainment. I will claim that integrating more ample cultural perspectives into the works applying digital technology will enrich them and hopefully give rise to more meaningful ways of interaction between humans and technology.

There has been quite a lot of discussion about the cultural elements underlying such genres as games or animation. However, there is an urgent need for a more integrated approach, which will also take into account the "inter textual" relationships between the different genres. My analysis is meant to contribute to a rising awareness about the interplay between similarity and difference in cultural contexts, particularly in relation with digital media. Establishing a truly global community will not be possible without becoming aware of the cultural constraints that surround our lives and actions (often unnoticed). It is equally important to understand the ways in which these constraints are reflected in the so-called digital content. This issue is becoming more and more important with the constant spreading of the Internet.

Finally, any piece of media technology becomes effective only when it is received by users. Since the ways a person receives a piece of information are bound and conditioned by his/her cultural background, analyzing the ways a user sees the world is an important precondition for designing more effective modes of interaction.

## 2. Historical Aspects

### 2.1 "Reality" Changes

When Japanese officials made their first tour to Europe prior to the opening of its border, they were surprised by the realism of European paintings. They had never thought that paintings could be so real.(1) The Japanese idea about painting had developed in a different direction than the western one.

"Discoveries" of new ways of vision have taken place both in the East and the West at the moments when different cultures have come together. For example, in the 18th and 19th centuries, the Europeans were fascinated by the "ombres Chinoises" (shadow theatre) brought from Asia. (Fig.1) The idea of using shadows for storytelling did not take place in Europe before it was imported from Asia, even though shadows as a physical phenomenon had always existed, and had already been realized in the form of images in ancient Rome. It has been claimed that Europeans did not think of using shadows for entertainment or art, because shadows had been regarded as something negative and even evil in the Western tradition.(2) Also silhouettes achieved great popularity in Europe in the 19th and early 20th centuries. The exact beginnings of the silhouette are not known, but it is believed to have been inspired by the ombres chinoises and Chinese paper cutting. (3) Nowadays, silhouettes have become an established part of traditional European culture. It would be difficult for Europeans today to imagine that their ancestors could not even think about using shadows to represent figures.



Fig. 1 Ombres Chinoises (shadow theatre) in a Victorian household, from London Illustrated, late 19th century



Fig.2 Japanese perspective drawing anonym.

On the other hand, the Japanese were enchanted by perspective drawings, when they were first brought from Europe in the 18th century by the Dutch. (Fig.2) (4) Shading was also a novelty in painting at that time, and was often used to achieve what was considered to be an "exotic" effect.(5) From our way of seeing the world today it is difficult for us to imagine that our ancestors did not even think about drawing realistic images with correct perspective and shadings.(6)

These examples show that the way we see the world changes, because it is bound to the knowledge we have, as well as to our historical background. Yet the essence of the traditional system of perception may remain active long after it has become practically invisible, if it is closely related to the basic elements of the culture. In other words, such a system of vision, when embedded in culture, may attain a different outer appearance, yet continue working according to the same principle as before.

The issue of Japanese vision will be discussed later in this chapter in more detail.

## 2.2 Concept of Originality in Japan

The merging of computers and telecommunications has opened up new possibilities for art-making. This has not only provided new ways for the artists to present the products of their imagination by means of still and moving images; it has also made it possible to share imagination among artists and lovers of art. Digital data can be copied and transmitted without loss of quality. The ideals of Dadaism, Surrealism and FLUXES have finally found an appropriate technical infrastructure.(7)

This possibility is important enough to change the traditional concept of making and appreciating art.(8) Copyright is an example of a traditional issue facing requirements for a radical transformation in the network environment. Similarly, after the advent of digital technology the concept of originality has been undergoing a process of transition. This is related to the art historical account, which was presented in Chapter I.

However, these concepts, which have been regarded as the universal agreement among civilized societies, were developed from the point of view of the Western way of seeing the world.

The Japanese idea of originality has often been put on trial by the Western culture, especially in relation to the copyright problems raised by the massive production of illegal copies of texts, illustrated materials, video packages and "brand" products. This is truly a problem. However, to understand why such illegal copying business is commonplace in Asia and widely accepted by consumers without a feeling of guilt, we should think about the psychological factors behind the phenomenon, presumably related to the cultural background. When investigating this issue from a historical perspective, it can be understood that Japanese might have a different tradition, a different way of thinking about originality or copyright, one that differs from the internationally accepted idea. (On originality and art, see Chapter II.7.)

Man-yo-shu, the oldest official Japanese book of songs edited by the Emperor's Court, appeared in the ninth Century. It includes many poems from anonymous ordinary people, created all over Japan, even in the countryside far from the capital, during that century. The book includes love songs from different provinces, poems created by soldiers missing their families, etc. This "democratic" attitude results from an approach toward making and appreciating art, which is totally different from the Western idea of fine art. This issue is related to the discussion in Chapter I, and will be analyzed further in a later part of this chapter. (9)

This book of songs already demonstrates that in our traditional poetry, citing from other

people's poems is considered a virtue, not a robbery. Citing other people's lines and referring to them, or effective use of proper nouns, are a common practice in the occidental literature as well. But the Chinese and the Japanese developed such practice into a system.<sup>(10)</sup> There were even series of official books (serving as dictionaries of literature) that were published both in the medieval China and in Japan for such a purpose. Such a system is based on respect and honor. That is, for a poet, having his/her work cited is an honor. It could be considered as a proof that his/her poem was good enough to be cited, and popular among other poets. On the other hand, citing someone's phrase serves as a proof of his/her knowledge and intelligence. Besides, it adds richness to the content of his/her poem, which means a lot in the case of such short poetry as Waka. Of course, the audience/the readers were supposed to share the same knowledge to be able to fully understand the rhetoric. Copyright problem do not arise, because anyone who fails to recognize others' phrases cannot be taken seriously as a poet. In short, a system of honor functioned well, instead of a copyright system, in a society where literature was not a business. This might be associated with the way the Net developed when it was still a smaller community, based on freeware and shareware, along with other forms of generous exchange of information.

From a different perspective, it can be regarded that creating Japanese poetry has involved creating a form of database, which can be still observed in the making of Haiku. It might be also part of the Japanese culture to "borrow" ideas (as borrowing a landscape in designing a garden) from others, in order to create a richer poem or a more impressive garden. <sup>(11)</sup>

It is not a mere coincidence that young Japanese artists now feel so much at ease breaking western rules (or myths) of originality by means of digital technology. For them the Net is a tool for integrating different imaginations, or even different egos. Open your mind and enjoy art with other people, they insist. Presenting the products of one's imagination is one way of making art; exchanging imaginations and collaborating with others is another. Here the idea of making art exists within the idea of communication. Merely finishing an artwork is not the main goal.

This practice is related to the long history of Japanese culture from the collective "linked poems" created together by several poets already hundreds of years ago to the collaborative wall paintings in today's elementary schools, familiar all over our country. As the digital technology has matured and become commonplace, the artists have begun to introduce Japanese traditions into new forms of art-making.

### **2.3 Signed by Artist - Notion of Originality /Identity**

"Signed by artist" is a common phrase used in the art market. It means that the piece is original, and authorized by the author. Such authorization has been considered an essential part of artmaking. However, with digital technology and the Internet changing the way and the meanings of art making as well as the role of artists, such an idea of authorization is going to change. Here I will briefly analyze a few art projects from this perspective. These art projects were discussed in more detail in the previous chapter and will be raised later in this chapter.

RENGA ("linked image"), an art project realized by artists Toshihiro Anzai and Rieko



Nakamura since 1992, is directly related to the kind of traditions I have described. By taking the idea from the Japanese traditional culture, but using a digital medium, the project shows a way of enhancing our creativity. Renga and Tactile Renga have been discussed in earlier chapters. Here I briefly overview the project in relation to the topic of this chapter.

The idea of Renga sounds simple, but in fact it fully utilizes the features of digital technology. In real life one would hesitate to "modify" someone else's original painting. But here, on the Net, there is no original or copy. One finds out that modifying the image created by someone else (or, more typically, as a result of a preceding collaborative process) does not mean deleting or neglecting a part of it; the act of modification requires an understanding of the nature of the image; much imagination is also needed to open a new landscape within the existing image. (12)

A Renga session took place in the late spring 1996 in Beijing in collaboration with an old Chinese calligraphy artist. The most significant thing was that after the first exchange of images the old artist gave up signing the image he had painted - signature is usually considered an important part of calligraphy. He understood that his imagination had become a part of the collective image. It was a new experience for him, and he enjoyed it.

Technically speaking Renga is a simple system. However, the simplicity also helps its function. The visual goal of Renga is to produce a series of images as a result of collaboration, but what the users learn through the process is even more important. By confronting one's own and someone else's imagination in such a visible manner, the participant may begin thinking about the nature of one's own imagination and the role communication plays in its functioning.

"Mega Diary", produced by the artist Kazuhiko Hachiya, started on a communication network sponsored by NTT, in the "room" next to that of Renga. (13) As I have described in Chapter II.11, one hundred participants "opened" their diaries on the network for a hundred days, to virtually share their lives with others.(14)

Participants (mostly students) came to know each others' lives in detail during three months. Sharing a diary among close friends is a common practice among Japanese school kids - this may sound odd from the point of view of the Western idea of the diary as something very personal, private. Hachiya extended such a practice over the network, among people who don't know each other in the real world. The idea was to mix one's daily life with others' lives and to remove psychologically the boundary between one another. After a hundred days the participants came to feel like a big family. A truly virtual community or family was formed on the Net by sharing (at least to a certain extent) one's privacy with that of the others, as a real family would do. This project, which helped Hachiya to conceive his PostPet, will be analyzed later together with his other projects.

Questions can be raised. One may ask, whether such collaborative approaches are directly related to the collective tendencies which are considered typical of the Japanese society and also problematic. In fact, collaborative approaches in creative processes and education seem to be more common in Japan. Activities such as collaborative wall paintings as part of art classes, or the exchanging of diaries among friends, which is common among kids at elementary schools or high schools in Japan, seem generally rare in the West. In Japan they seem to arise from a common

shared cultural background. However, young artists use the traditional concepts with playfulness, aiming to break the boundaries between people and to establish better modes of communication. Every country has its traditions. In the era of global telecommunications we should look for positive ways to respect and enjoy different cultural backgrounds.

### **3. Japanese Culture and Interactive Art**

#### **3.1 Being Japanese and Being Universal**

On the field of contemporary media art, interactive art has been considered a particularly international phenomenon. The artists engaged in creating experiences involving audiences in simultaneously emotional, intellectual and physical interactions or "dialogues" with their artworks often seem real cosmopolitans. They spend their time traveling and working in labs in Japan, Europe or the USA. They often show their works at exhibitions and conferences in almost any part of the world. Information about their achievements is spread by international word-of-mouth or via the Internet. Successful interactive artists have become well known figures, at least in media and techno cultural circles. The established art world still seems to have some reservations towards them, but that is likely to change gradually.

In recent years Japan has produced an impressive number of contributions to this expanding field. Japanese artists have not only shown their works in their homeland; they have been active wherever something seems to be happening. Consulting the most recent catalogs of Siggraph or Ars Electronica is enough to provide ample evidence. Japanese media artists have tackled with many of the same issues as their occidental colleagues. Often, however, people seem to observe a certain "surplus" in their works, something which gives them a very distinctive mark. Whether we label it "Japanness" or something else, trying to define its character remains an exciting and -- someone might say --- next to impossible task. What is "Japanness" anyway? How do we distinguish it from features we might label as "international"? The following notes about the works of some prominent contemporary Japanese media artists should be taken as a first step towards answering these questions.

#### **3.2 Universal Nature with a Japanese Outlook**

Masaki Fujihata has no doubt been one of the most versatile Japanese media artists in recent years. He first became internationally known with his computer graphics in the early 80s. Digital art was still in its infancy at that time, and computer graphics was practically the most experimental medium for representing an imaginative world by an artist. In his animation works and still images Fujihata depicted subjects such as mandalas or Japanese soup bowls and chopsticks twisted in 3D spaces. (15) The images unmistakably referred to Asian traditions, but

what Fujihata represented was not necessarily meant to be culturally specific. Rather, such culturally charged objects provided him with a playful and free-floating means to explore and extend the dimensions of the then brand new digital realms. Such feature can be observed with his Light on the Net project which I discussed in Chapter III .

Today Fujihata is mostly known for the highly conceptual interactive networked installations he has created at the ZKM in Karlsruhe, Germany and in Japan. (16) In the Mt. Fuji Project (1993) Fujihata took as his starting point a highly charged cultural icon, the Japanese sacred mountain. However, instead of elaborating on its national connotations Fujihata took a surprising approach: he wanted to "draw" a digital map of the mountain by climbing it successively from different sides and recording the trails by means of GPS equipment carried by the climbers. (Fig.3) This "performance" resulted in a kind of subjective mapping of the mountain, which was in the actual installation made available for the users to explore interactively. By doing so Fujihata distanced his project from the national meanings associated with Mt. Fuji and used the mountain as a kind of medium to a subjective measuring of space. Simultaneously he experimented with state-of-the-art technology to explore the ways in which it changes the temporal-spatial continuum. The emphasis was both personal and global. (17)



Fig. 3 From Mt Fuji Project by Masaki Fujihata



Fig. 4-5 Virtual spider by Seiko Mikami and its virtual DNA visitors to the web are asked to manipulate DNA.



Fig.6 Images Play Sound, Sound Plays Images, by Toshio Iwai

In later pieces, like the different versions of the Global Interior Project, the visitors/participants become the interface to communicate with a virtual realm. The relationship between the real and the virtual, and the role of our mind as an active interpreter of that relation, are central issues in these works. Visitors travel in the virtual worlds and meet others as avatars. Fujihata has also looked for suitable metaphors for global communication, such as small (physical!) doors opening and closing in relation with network activity. These might evoke those coin locker doors one often encounters in Japan (in stations or public baths, for example), yet here again Fujihata's goals are mainly internationally oriented. Fujihata aims at abstracting the real world and projecting these abstractions to virtual worlds. When a door opens, the visitor sees a Lego model of the virtual world currently being visited. The online activity is visualized in conceptual and rather complex ways which are not always easy to understand at first, but gradually lead to a deepening understanding of the issues at stake.

Seiko Mikami, based in New York, is another artist who has developed an original approach which distances itself from the Japanese cultural heritage. Her works deal with issues of genetics and the body. She has shown interest in the physiological processes taking place inside biological bodies. By amplifying and modifying these digitally she has created impressive and evocative environments. In her Molecular Clinic Mikami created a system to manipulate the genetic code of a virtual spider on the Web, while in the installation World, Membrane and the Dismembered Body a visitor was invited to enter a darkened, absolutely sound proof space and listen to the amplified soundscape of one's own body. (18) (Fig. 4,5)

### **3.3 Japanese Elements in Universal Appearance**

#### **3.3.1 Between Art and Entertainment: Toshio Iwai's works**

On the other hand, Toshio Iwai has also been very active internationally -- he won the prestigious Golden Nica award at Ars Electronica in Linz, Austria in 1997 together with the composer Ryuichi Sakamoto -- and yet his approach and attitude towards art (and media, as well as entertainment) retains many traces of the Japanese culture. This, in fact, is clearly one of the reasons why his works have been considered so new and refreshing outside Japan. (19) (Fig.6)

It may not be internationally known that Iwai brought a major change to Japanese children's TV programming in the early 90s. By that time he was already known for his creative way of mixing digital technology with much older moving image technologies (such as zoetropes and flip-books) in his installation works. *Time Stratum II*, for example, consists of kind of large scale three-dimensional zoetropes. To produce a sophisticated-looking animation effect Iwai cleverly used the flickering of a normal monitor instead of more specialized strobo lights. When asked to direct a TV program in which children and virtual characters would interact in real-time, he not only created and designed the characters but also developed an ingenious low-cost system

to manipulate them in real-time. He did this by connecting personal computers and modified Nintendo game controllers to the high-end production system of the TV studio. Since then applying such low-cost systems to TV production has become popular in Japan. Recently Toshio Iwai published "Bikkuri Mouse", a software for collaborative painting for Sony's Playstation 2, in collaboration with the illustrators duo Uruma Derubi. While the commercial package is highly educational, publishing a piece of "application software" for a game platform would be considered as an almost impossible move from the Western point of view for, for a highly regarded artist like Iwai .

The continuities between art and entertainment, artwork and commercial work, high-tech and low-tech, specialized tools and everyday equipment are important features of Iwai's work. Iwai respects old and intuitive devices, but applies state-of-the-art technology to bring their underlying ideas into innovative and surprising new contexts. A case in point, the inspiration for his highly acclaimed interactive installation Piano as Image Media and the subsequent performance series in which it was used as a multimedia instrument on stage, Music plays Images, Images Play Music (the winner of the Golden Nica), came originally from a simple old children's music box. Iwai has also been inspired by video games - he even designed an "art-game" cartridge for the Nintendo Famicom console (it was never released by Nintendo, obviously as too experimental; later part of it has been made available as SimTunes). The sense of playfulness so evident in all his works is closely related to the nature of interactivity. Yet it is also something very typically Japanese; in Japanese creativity no combinations seem impossible. In design as well as industrial production, the spirit of playfulness prevails.

The absence of border between art, entertainment and applications-- so evident in Iwai's work -- is also closely connected to Japanese history of art. While a distinction between fine art and applied art was historically established in the West, it never really came to make sense in Japan. It is a known fact, for example, that the best paintings were often realized on screens and other pieces of furniture; designing ceramics was considered one of the most elaborate practices of art. An interesting outcome of such a way of thinking is the work of Kazuhiko Hachiya that I will analyze in the next section. Another interesting example can be seen with Meiwa Electric Company (Meiwa Denki), a duo by two brothers with other members joining for their performances. They develop a full lineup of strange low-tech to high-tech electric/electronic instruments that often incorporate robotic nature, and perform on commercial basis as "entertainers". The commercial look (and nature, as they in fact belong to a commercial entertainment company) of their performances is one of the essential concepts of them as contemporary artists.

### 3.3.2 From Art to a Commercial Product

I have already discussed about Hachiya's Mega Diary and InterDiscommunication Machine from the point of view of identity on the Net in Chapter II, 11. InterDiscommunication Machine, which has been widely exhibited both in Japan and abroad, including Ars Electronica 95.(20)



(Fig.7) To experience this work, two participants are wearing customary HMD -like helmets. A CCD video camera and a microphone have been installed on each helmet, so that each participant can only see the screen in front of his eyes and hear the sound emitted from the headset. However, what he/she sees and hears are the images and sounds sent from the camera and the microphone attached on the other person's HMD. The two participants literally exchange their sight and sound, seeing the world from the other person's point of view. The participants have to communicate and collaborate in order to find one's own location in the real world. Giving rise to a system for communication via an "inter-discommunication" system is the aim of this work.

Behind Hachiya's approach toward communication is the notion of identity or self in the Japanese cultural tradition. The sense of individuality has never been as strong as in the West. The Japanese tend to see the world both through their own and the others' eyes. In Hachiya's earlier network project Mega Diary, 100 participants on the net exchanged their diaries for 100 days to virtually share their lives without ever meeting in the real space. In his interactive installation Seeing is Believing, which is based on Mega Diary, visitors can read others' diaries through an optical coding/decoding system developed by the artist.



Fig. 7 InterDiscommunication Machine



Fig.8 PostPet characters



Fig.9 Momo



Fig.10 The room of Momo



Fig. 11 PostPet Park



Fig.12 KAGE by Moto Chikamori

In Japan, however, Hachiya is best known for both to the public and the industry as the inventor of PostPet, a best selling e-mail software. PostPet is a playful a-life based email software which enables a digital pet to live on the user's desktop and to deliver email to his/her friends. The pet has its own life, moods and temperament. After delivering the message it sometimes

decides not come back immediately, which means that the user cannot send another email until its return; it may even start sending email by itself. PostPet is different from the concept of an agent or an avatar. The fun is in giving up one's position as the master of the pet and allowing it to have its own life and character. (Fig. 8-11)

One can relate PostPet to other Japanese alive entertainment products, such as Tamagotchi and Pokemon, which also reflect the traditional Japanese attitude towards the relationship between human beings and animals or other lifeforms. (21) By combining such a tradition with his continuous experiments to create a new kind of arena for communication through digital technology, Hachiya has come to realize an extremely successful commercial product based on his artistic concept. The notion of life in relation to Japanese traditional culture will be discussed toward the end of this chapter.

### 3.3.3 Visual Tradition

A much younger Japanese media artist Moto Chikamori has consciously taken Japanese tradition as his starting point and incorporated it into his works. He named his recent installation KAGE because its very concept lies in the double meaning of the word - in the Japanese language 'kage' means both 'shadow' and 'image'. (Fig. 12) By thinking about the relationship between an object and its image in the Japanese tradition, the artist succeeded in developing a really beautiful interactive installation in which shadows of simple objects change their shapes or move according to the visitor's interaction. How the Japanese had dealt with the notion of image and shadow in relation to the spatial representation in Japan will be discussed later in more detail.

### 3.4 Summary

The recent international success stories of Japanese electronic games, manga comics and anime films have raised both expectations and an increasing awareness of the role the Japanese culture may play on the fields of contemporary visual arts and entertainment.

In contemporary art too, Japanese artists have been attracting an international attention with the way they deal with the contemporary media culture, often in visually striking manners. Artists like Takashi Murakami, Kenji Yanobe and Mariko Mori have already translated the influence of the Japanese popular culture into contemporary art.

While the themes of the artworks by the media artists discussed in this article are essentially universal -- and that is one of the reasons why their works are highly appreciated internationally -- the approaches that these artists have taken often show certain unique features that their Western colleagues would not have thought about. Also, their approaches and the manner of representing their ideas go beyond the Western notion of art. Fusion of art, entertainment and commercial application takes place. Through the above analysis, following features can be observed in their approaches. These features correlate and overlap each other.

#### **i. Being playful**

Visitors/viewers can just enjoy them. These works do not have a serious look, yet there are themes and original aesthetics in it. This feature can be found also with contemporary artists I listed above. It is related to the absence of border between fine art and applied art, or entertainment. (22) Such playfulness in Japanese art can be also associated to Japanese literature, as I discussed earlier.(23)

#### **ii. Playful use of media technology**

Flexible and unlimited use of technology can be observed. Cutting edge technology is mixed with everyday technology or interface that people are familiar with. It is one reason why their works are not "scary" for visitors. Often what we usually regard (or what looked like at the first glance) "high-tech" are revealed to be low-tech, and what look like low-tech are supported by high-tech. (24)

#### **iii. Art and entertainment are continuous**

Art and entertainment coexist. Artists often take conscious approach to remove the boundary from the traditional Western idea of "what is art". (25)

#### **iv. Art and application are continuous**

Artists produce creative "tools" as a part of their artistic activities. However, these are not necessarily meant for practical, useful purposes. (26)

#### **v. Highly interactive**

Tool-like systems and game-like works to be published or offered to invite users to use them, instead of presenting artworks in a completed form.(27)

#### **vi. Flexible ideas on identity and originality**

Rather than insisting one's identity or originality, both artists and users enjoy playing with their identity and originality.(28)

#### **vii. Collaboration and communication**

Projects based on collaboration/interaction among viewers/participants, in which the artwork serves as a system for communication(29)

#### **viii. Flexible ideas on life**

Virtual pets and characters are treated as if they have their own wills. Their behaviors and moods are respected on the equally basis as human users. (30)

#### **ix. Body and mind are continuous**

Body and mind have not been considered as two opposite entities, contrary to the modern Western philosophical approach that is still strong in the art tradition. In other words, body is not regarded or treated as flesh or a physical entity outside the mind.(31)

#### **x. Flexible idea on visual reality**

Realism is not necessarily required to promote the sense of reality. Artists have flexible choices from simplistic line-drawn characters to 3D characters with exaggerated bodies and faces and yet promote the sense of reality among users.(32)

#### **xi. Simple and yet subtle imagery**

In traditional Japanese aesthetics simplicity and space play important roles. Also, the strength in Japanese graphic design can be at least partly traced back to some elements in its history including the absence of border between fine art and applied art, as mentioned earlier. Such tradition is reflected in contemporary media art. (33)

From the above list we can make the following remarks.

The way Japanese media artists use digital technology in their art making reflects the major role of the technology in Japanese culture both historically and contemporary. New technology has been, and is used, in discovering new form of entertainment and to promote communication through it. Art, entertainment and everyday life are continuous both in terms of concept and visual design. Notion of life and body is different from that of the West, reflecting Japanese tradition in which theologically critical borders did not exist between body and mind, human and animals (or other entities), or even between the real and the image. (34) In a sense, Japanese media culture has a strong Post Modern nature in it, reflecting its history in which the Japanese has introduced different cultural elements from various countries, always mixing them and reinventing them within the traditional framework.

The works of Japanese artists I have discussed have something unique that can be regarded as the mixture of their own ideas and concepts as artists with the contemporary notion of art, and the conscious or unconscious reflection of Japanese tradition which makes their works more interesting. Their ways of using embedded cultural traditions and references can certainly enrich both media art and the more general field of contemporary culture. As digital media become everyday tools for artmaking, particularly artists belonging to the younger generations seem to be able to adopt a more relaxed attitude towards locating and using features of Japanese cultural traditions. For them the process of mixing old and new into ever new combinations seems to be a rich source of creativity.

### **4. Creating Cultural Correctness in Cyberspace**

#### **4.1. Reality for Cyberspace**

Only a few years ago, the lack of reality was a feature of virtual reality. Some people even liked it, thinking it was "cool". Others hated it and thought we needed more realistic 3D real-time graphics to be able to immerse ourselves into cyberspace. Nowadays we can enjoy fairly realistic

images thanks to the technical development. So, what is the state of our virtual worlds now? Are we all immersed in technology?

The history of science tells us that it is only when a technology reaches a certain level that the subsequent problems or viewpoints will show up. Until then, they had been invisible behind all the technical obstacles. In realizing virtual reality, many had thought it was because of the insufficient technical development that the cyberspace looked odd. Now the time has come to examine what are the real key issues in creating a virtual environment, and the influences it gives back to us.

The goals of the current digital image creation technology are based on the long history of art and science in the West; their main effort has been the accurate representation of the world. Hollywood has enhanced the efforts towards photorealistic representation of the world so that digital images could be integrated into live action scenes. However, this is not the only possibility to create a virtual world. There are other societies and cultures, within which people see and represent the world differently. In such cultures the whole system of vision and cognition may be built according to another kind of a logic. We don't necessarily have to create a precise copy of our real world onto our cyberspace.

In this chapter I will deal, instead of art, mainly with digital entertainment, because it is the field where cultural influences can be observed particularly clearly. I will discuss a few examples from Japanese network projects to illustrate how cultural traditions can be rediscovered as a basis for creating a new cultural content on the Net community. The main issues here are identity and the concepts of originality, "life", and time and space. All these are related to each other in the context of the traditional Japanese culture.

## **4.2. Japanese Net Projects**

We can find a variety of characters and avatars in virtual cyberspace. They look different not only because of the different purposes they serve in the virtual communities, but also because of certain features or "tastes" that arise from the real communities. For example, Habitat, which was a 2D based chat environment with visual avatars (it was one of the first cyberspaces of this kind) produced by George Lucas became much more successful in Japan than in the USA. It was observed that Japanese users accepted and enjoyed the not-so-realistic virtual town and characters much more easily than the Americans. This is understandable when we think about the way the Japanese appreciate comics and "anime".

Compared to the realistic avatars in European network communities like "The Second World" from CANAL+, France, the simplicity of such characters in Japanese cyberspace is an advantage in terms of calculation speed and the volume of data. Tamagotchi can be run on a wrist-watch size game machine because the figure is so simple. Yet Japanese kids (and even grown-ups) find enough reality in these creatures. Once digital pets like Tamagotchi had been developed in Japan and exported, it was found out that many American and European kids loved them as well. However, it would have been difficult for western game makers to develop such game and bring it to the market, because they are still bound to the western traditional idea of the reality.



What creates in us a sense of reality, or a sense of immersion, differs depending on the culture in question. It cannot be said that the pursuit of visual reality would right or wrong. However, by examining different cultures, we might be able to discover much richer possibilities in our cyberspace. Hachiya's Mega Diary and PostPet, which have been described earlier, are one example of this, RENGAI is another.

As the web technology becomes more sophisticated, the notion of identity in the digital community becomes more complicated. There are avatars and agents. As far as they represent the users or work for someone for some specific services, the traditional concept of identity (of a user in this case) in the West remains untouched. But there can be different approaches emerging from different cultural backgrounds. Here are some examples. (35)

## **5 NON-Perspective as Symbolic Form**

### **- Vision on Japanese Culture Reflected in Digital Media**

The above title has been adapted from the well-known book by Erwin Panofsky, which is titled "Perspektive als Symbolisch Form". While Panofsky analyzed European culture and perception by examining the history of perspective, I will try to analyze Japanese culture and perception as they are reflected in our digital culture by analyzing our history of non-perspective. Non-perspective, literally, in Japanese traditional visual culture, is a symbolic form of our traditional way of seeing the world. Therefore my aim of this part of my dissertation is in finding evidences to the nature of Japanese culture that many people have certain idea about, but have difficulties in proving it or define its structure.

I began to think about this theme in the early 90s in an effort to understand the gap between the world represented in 3D computer graphics and the way it is done in Japanese traditional representation. My background both in digital media and in Japanese painting has become an important element in carrying the research.

### **5.1 Emerging Popularities of 3D Virtual Beauties**

What is shown here are 3D digital illustrations of a woman drawn by a young Japanese illustrator named Sonehachi. (Fig.13-14) The illustrations show a girl with a huge breast but with an almost child-like face, with unusually big eyes and a small mouth. (36) She wears a minimum dress to cover her body. (37) It depicts the image of a typical girl figure in Japanese 2D comics and "anime" titles. But here, she is brought into 3D, with amazingly realistic details but without overall reality. On her dress it says 'original'. The illustrator explains that what he meant is that this is the archetype of a Japanese girl in our visual culture; i.e. a girl that Japanese men dream to meet. That is what he means by the word "origin". In fact, she is not really realistic, yet she has a strange charm.

The first 'virtual idol' Kyoko Date was created in Japan in 1994 by Hori Production and Visual Science Lab., using 3D computer graphics and started appearing on TV. Since then we have

been seeing a series of such virtual characters on different media. While this phenomenon took place about the same time as the appearance of virtual characters such as Lara Croft in the USA (which became internationally well known), there is something different in the way such virtual idols were conceived in the society.

In Japan, young generation welcomed such 3D "beauties" as a new specie added to the rich traditional culture of appreciating Japanese 2D "anime" and comic characters. For a long time, copying or drawing such "anime" or comic characters (often modifying them according to one's own taste) has been a popular hobby among Japanese young generation. It is known that not a small percentage of computer users are anime or comic fans. (In fact, numerous illustration of that kind can be found on the Net.) (38) As the result, creating one's own 'virtual beauty' in 3D digital image has become increasingly popular as a passion or pastime in Japan, as the technical environment for 3D computer graphics has become much more accessible for anyone. A low-cost Japanese 3D modeling software ("Shade") is often called "hobby 3D software for creating girls", and in fact is promoted for such purpose (Fig.15). One can see amazing numbers of such "3D beauties" on the web.



Fig.13, 14 3D virtual character designed by Sonehachi, 1998



Fig. 15 advertisement of SHADE

In many cases these virtual characters are shown and appreciated as still images.(39) In that sense, it is also connected to so-called "figure" culture. Instead of modeling robots or characters from comics or animation titles using pieces of plastic, some of them went digital. Computers are still too slow to animate virtual girls as shown in Fig.13-14, but the technology is getting closer. There are already commercially produced "virtual talents" who have been exposed to the media. We expect more virtual characters animated on the web, most of them created by individuals. Once succeeding in creating a 3D "realistic" (I will discuss about the notion of reality in the following part of the chapter) virtual girl, it is natural to expect her to be animated as in the story of Pygmalion.

It is also connected to other elements in Japanese society. The idea behind such games which are categorized as "growing simulation" at game shops (along with games such as fish tank simulations) is related to the notion of life, which will be discussed later in this chapter. Another issue is related to more sociological aspect. The popularity of games such as "Princess



Maker" -- with which a user can grow, train and educate a virtual girl on his desktop -- is connected to the social code of gender in our society.(40) However, I am not going to discuss about the gender issue in Japanese digital culture here. It is an extremely important issue by itself, which should be researched further. For the moment I will focus on the way we see 3D space and objects.

Another illustrator Seisaku Kano published a book where he shows in detail how one can use a set of off-the-shelf 3D human body modeling data from US ("Poser") and change each parameter by the degree as precise as 1%, to achieve an ideal body of a virtual woman to meet Japanese taste. Known as the first popular comic illustrator in Japan who moved into the digital world, Kano has been creating a series of sexy virtual beauties (often without any clothes) as ideal "virtual pin-up girls" for Japanese men. (41) (Fig.16)



Fig.16 parameters for a virtual pin-up girl, by Seisaku Kano

It is a big step. Until a few years ago, how to convert characters from 2D to 3D was a big problem. Japanese are so used to those 2D characters which are designed for 2D representation that realistically rendered 3D computer graphics human characters as seen in other countries were not widely accepted by the audience. Such realistic-as-possible characters that one could see at SIGGRAPH, that computer graphics people appreciate, were considered too neutral and "cold" for most Japanese audience. Designers were sweating how to realize "Japanese taste" in 3D. Now there is even a recipe for creating a virtual beauty using an inexpensive off-the-shelf software.

But why these virtual beauties who inherited impossibly distorted faces and unrealistically exaggerated bodies can be taken as 'real' to Japanese audience, rather than physically correct representations of bodies or faces?(Fig.17-18) Needless to say, these figures are not meant for kids, who might not be aware of such distortion. Adults appreciate and also produce these figures seriously. To answer this question, we need to analyze the traditional way of describing the space and objects that the Japanese have had established in the history.



Fig. 17 3D image by Yukie Matsuo, a woman illustrator



Fig. 18 2D+3D image by Toshiki Yui

## 5.2 Traditional Visual Language in Japan

In this part of the dissertation I will analyze Japanese traditional visual language and discuss what are the nature of the differences we find from that in the West in terms of perception and representation of time and space.

Historically Japanese art had developed under a major influence of Chinese art. While Chinese art had been regarded as the model among Japanese intellectuals practically throughout the history until 100 years ago or so, more popular forms of visual contents such as scrolls and ukiyo-e developed into particularly Japanese form of visual art. Scrolls were used at rich families, especially by women and children.

I will mainly use ukiyo-e as resource material for my analysis in this part of the dissertation. There are three major reasons for this, as follows.

### **i. comparative study is possible, with its quantity**

Even specialists of ukiyo-e cannot guess how many prints were produced and consumed. There is still an amazing amount of prints left and accessible to be studied.

### **ii. represents people's perception of the period**

Compared to more authentic or authorized forms of paintings, ukiyo-e was meant for visual entertainment to be enjoyed and consumed by normal people (had to be above certain level of life to spend money on them, though). In other words, ukiyo-e artists and publishers had to produce imagery that are welcomed by consumers. Therefore, we can say that ukiyo-e represents the way people used to see the world.

### iii.representative visual media

Ukiyo-e was the major visual entertainment of the period, and also the cutting-edge technology in the field. Therefore it makes sense to see how people used the technology to represent the world, considering that we have our contemporary digital image culture as the counterpart. Actually ukiyo-e was the first commercially working massive color print production system in the world which was developed by the collaboration among a group of artists, researchers and engineers, which also makes an interesting parallel to the digital image technology. (42)

#### 5.2.1 Visual Language as a System

There should not be too big differences in the way human beings see the world. Our biological status and functions more or less define the way we recognize the world. However, differences exist according to the natural and cultural environment. For example, different "language" of perception is required for people who live in different environments such as a rain forests or an open prairie, or a metropolis. Some researchers even think that there is a possibility that environment causes certain physiological changes in the development of visual/perceptual organs at the early stage of growing.

Seeing and recognizing the outer world is one thing. Representation of the world is another. We know from experience how people draw or paint the same landscape differently. Then the next step is to see and recognize such represented world, and identify it with the real world. If the system of perception -- coding/decoding process between the real and the representation -- is too different among the person who painted and those who see it, identification does not take place properly. According to Panofsky and others, the way we recognize and represent the world is a system that is coherent to the whole way of seeing the world in the society. (43)

It is well known that Japanese ukiyo-e prints which were brought to Europe played a major role in the raise of the Impressionism. According to Bernard Dorival, the influence included a "pantheistic" point of view on the Nature.(44) It means that there were essential differences in Japanese way of seeing the world and that in the West.

What I would try here is to figure out what was the nature of the differences, and what lies beneath visible elements, by going through the imagery from the 13th Century to the 19th Century Japan. We already know differences as follows. Perspective in the Western sense was missing in Japanese art. The absence of shadow and shading is also known. There have been a body of studies on these elements in Japanese art, especially on the absence of perspective and shadow. (45) Based on these researches, my aim is to find out the framework that supported those elements -- as a system, in the sense Panofsky or Hall had meant.(46) There have not been much studies done from that aspect. Adding my own observation to the existing works, I hope to bring up such system that would be useful in understanding our digital culture today. In doing so, my advantage will be in being able to use 3D computer graphics as a mental counter-model. J.Gibson's definition of elements in visual reality will be used as a basic concept.(47)



My questions are as follows: Why perspective, as well as shading and shadowing, happened to be, or had to be, absent in Japanese art? How the sense of reality could be achieved through imagery, while missing almost all the elements that had been considered essential for realistic representation in the Western art history? What was the advantage of such system?

Then, further question will be how such "system" is reflected in the notion of reality in the media culture today. (48) While the visual language transforms itself at the explicit level according to the changes in the society including that in technology, the underlying framework might not change so quickly. (49) Apparently, the visual language that produces images such as Fig.13, 14 or 17 has something different from the equivalent in the West. (50) Can it be the continuation from the old Japanese visual language?

In answering the above questions, analysis on Japanese traditional vision/perception system is needed. In the following part of the dissertation I will analyze ukiyo-e and other traditional artforms to examine the nature of the Japanese traditional visual language.

### 5.2.2 Perspective

I will start with a brief history of the introduction of perspective into Japanese culture compiled from different sources. Then an analysis on the process will follow.

#### < Introduction >

Perspective, in a wider sense, means a method to be used in representing the depth of the space in the real world in two dimensional form. Certain method of translating a 3D space into a 2D image is required in painting or drawing. In a more strict sense it means linear perspective, which has become the basis of the painting and drawing today. In this dissertation the word means linear perspective.

Perspective, originally spelled *perspectiva* in Latin meaning optics, was given the meaning we know now in the Renaissance Firenze, by the Italian painter and engineer Brunelleschi. It is possible that he used an optical equipment for such drawings. (51) By the end of the 15th Century, perspective paintings or drawings of buildings or cityscapes had become popular in Italy. About 50 years after Brunelleschi, Leonardo DaVinci studied the nature of perspective (circa 1490-1515) and established the basis of the use of perspective both in theory and in practice. The development in optical technology, studies in geometry, artists' theoretical and practical works, as well as the printing technology that enabled perspective drawings to be used for popular entertainment known as peepshow or perspective box, made perspective the basis of painting in Europe.

However, perspective was not just a way of drawing or painting. As will be discussed later in comparison to Japanese paintings, it was a part of the system through which people saw and understood the world. E.Panofsky analyzed how the visual representation system was connected to the culture and the society. (52)

Today, perspective is no longer considered as the major (or absolute) method in

representing the world. It is said that "perspective, which developed along with optical technology, lost its dominance with the advent of the Impressionism (...) with the multiple viewpoints of Cezanne, in particular. The development of photography, which had resulted from the same optical technology, was behind the Impressionists' way of seeing." (53) However, according to the above mentioned study in French art history, Japanese vision/representation system might have also played a role in the loss of orthodox perspective in the Impressionists' paintings.

#### < Perspective in Japan -- history >

Japanese traditional way of representing a landscape was developed under the strong influence from Chinese paintings, taking the same method in representing the depth by the height on the two dimensional drawings.(54) Linear perspective drawing did not appear in Asian countries before the idea was brought from Europe. The brief history of the introduction of perspective drawings in Japan follows, for reference.

It is likely that perspective paintings and prints were brought to Japan at first from China, where optical entertainments such as perspective boxes or zograscope brought from Europe had become extremely popular. (55) Probably because Chinese perspective painters could only paint interior scenes, Japanese first generation perspective artists did the same. Okumura Masanobu published his perspective print in Edo around 1745.(56) (Fig.19) These prints were called "uki-e" (floating images) and were used for visual popular entertainments as peepshow boxes("nozoki-karakuri") that attracted people's attention. (57) Eventually certain amount of perspective prints were brought by the Dutch, and became accessible for some Japanese who had right connections. These prints that depicted landscapes from Europe brought an impact on Japanese artists. Maruyama Okyo, who would become a highly recognized painter, was seriously interested in optic devices and produced images to be used for peepshow boxes around 1759.



Fig. 19 uki-e, Okumura Masanobu, 1745

Utagawa Toyoharu, who is considered the pioneer of nishiki-e (colorful ukiyo-e), started producing uki-e with landscapes in the 1760s. Toyoharu actively promoted the new style in uki-e in the 1770s which became extremely popular.(58) The scientist/artist Hiraga Gennai, who was a friend of Toyoharu and was close to the Dutch in Nagasaki, was likely to have played the key role both in the development of the color print technology and the perspective painting. At that time there was no color printing technology in Europe used for popular entertainment.

On the other hand, a theoretical approach to the Western painting was done by the painter and a feudal lord Satake Yoshiatsu (Shozan). In 1778 he wrote that he had found the Japanese traditional painting method totally inadequate to perform realistic paintings. (59) It was Hiraga Gennai who had not only taught Satake the Western painting method but also educated Odano Naotake, a man of Satake, who later did all the illustrations for the first translation of an European book of anatomy in Japan.

In 1783, Shiba Kokan mastered the Western painting method and published the first lithography in Japan. He applied correct perspective for the landscapes he printed. He started using the word "shashin" (meaning copying the real) for paintings/drawings using the Western perspective and shadings.

In 1830s, Katsushika Hokusai and Ando Hiroshige actively published prints depicting Japanese landscape, applying perspective in their own manners. Perspective became a part of ukiyo-e, not in the way it originally meant in the Western system of seeing the world, but in a modified manner that the Japanese would understand and appreciate.

Texts from Kabuki and literature of the epoque tell us that uki-e was considered as a totally new experience for the people, and had become popular in a short time. (60) According to Timon Screech "perspective drawings were applied to things which were NOT usual, or for scenes which do NOT belong to the daily life, <...> representing unrealistic paradise-like places for entertainment (such as exclusive houses in the licensed quarter)". (61) It is an interesting observation, which makes sense when we think of the purpose of uki-e as a visual entertainment.

The above mentioned analysis by Screech is a part of his broad and detailed, quite exciting research on Edo visual culture based on numerous prints, books and other sources. What it means is that the perspective drawing -- which was developed in the West for realistic representation of the landscape -- was used for realizing an unrealistic virtual experience as realistic as possible, using an optic device such as a peepshow box or a zograscope. (62)

Perspective prints in the West (hand colored, since there was no technology for printing in color) were also used for similar purposes such as taking virtual trips to famous touristic places. (63) Peepshows were extremely popular at rich households or on the streets. What could have been the difference in the people's perception in the West and in Japan, in seeing peepshows?

Probably the nature of reality or the marvel they brought to the Japanese was different from its equivalent in the West. First, even though the Japanese had not known about perspective, when they saw a perspective painting they had the feeling that it looked like a real space with depth. So it promoted a strong sense of reality on one hand. Secondly, on the other hand, perspective looked still alien to them since it was totally different from what they had known. Thus it enhanced the feeling that it was a new experience, not only in terms of what they see, but also in terms of the way they see -- the nature of experience (i.e. the medium) itself. As the result, perspective prints inside the peepshow boxes could have promoted a mixed sense of real

and unreal. In other words, the "unreal" of the virtual experience (i.e. being inside the places one had never been to) was supported by the "real" of the medium (i.e. perspective with the optic apparatus, and the narration, in case of commercial entertainment). Also, as the perceptual conflicts between the real and the unreal was totally new by itself, it could have caused a strange visual excitement.

Doesn't it sound like what viewers might experience with virtual realities today? Perspective in the 18th Century Japan was in fact a new medium for visual entertainment, to see the world differently. Also, we can make an association to the "virtual beauties" in Fig. 13,14 and 17. In both cases the real and the unreal coexist, to produce a new domain of virtual reality at the boundary.

### < "Floating gaze" and partial perspective >

While the pioneers such as Okumura Masanobu applied geometrically correct perspective, others tried more flexible use of it -- or just misused it.(64) By analyzing how such modification or mistakes had been made, we can see how perspective, which did not belong to Japanese culture of the time, had met difficulties to be understood, and eventually went through a process of "Japanization" under the cultural constraints.

One direction it took was a modification of the very notion of perspective. Fig. 20-22 show images with two vanishing points, which are often seen among ukiyo-e prints we know. Today it is called "partial perspective". (65) The viewpoint of the painter changes from one place to another, which is against the basic idea of perspective. Fumikazu Kishi simulates in detail how the viewpoint traveled within each image for some of the examples. (66)

Why having such partial perspective was possible, and why it was widely accepted? Why artists chose such application of perspective?

Paintings of scenes with more than two viewpoints for a single image are also seen on older form of paintings such as scrolls. In case of scrolls, however, the notion of "viewpoint" itself was absent. The viewer might "travel" with the character in the story as the story goes.(67) While in China a scroll was to be looked at spread on the floor, in Japan only a part of it (the space between the arms of the viewer) was spread and viewed at one time. Therefore it is possible that such nature of scrolls allowed continuous movements of viewpoints without causing confusions, and such floating or drifting gaze had become a part of the visual language that continued after the invention of ukiyo-e.

Fig. 20 shows the exterior and interior of a big theatre. The roof of the theatre is removed to show the interior according to the traditional manner, as can be seen on scrolls such as the Tale of Genji. Since ukiyo-e prints were often used for souvenirs from Edo or other big cities, this could be an ideal piece for such purpose, to show something amazing to the country people. Fig.22 offers even a double chance for viewers to enjoy perspective. The artist Kitao Masayoshi published many uki-e prints. As in Fig.24, he could freely transform the real space to meet the demand and surprise viewers. Therefore, having two viewpoints in this image cannot be a mistake. Probably he played with perspective on purpose, with an idea as follows: If here is a street where a perspective



drawing can be effective, and then a river which is also suitable for a perspective drawing, what is wrong in applying perspective for both?

Actually the two parallel views in this image lead us to an interesting observation on Japanese art and literature. It has been pointed out that juxtaposition is one of the basic methodologies in Japanese culture. For example, juxtaposition of two different images without explicitly showing the relationship between them is a major technique in haiku. There were many publications in Edo period as the listings of interesting places, food, events or anything new, with a specific feature in common -- they are just listed one after another, without any logical order or hierarchical structure. (68) Listing things and events without hierarchical structures means that an absolute point of view was not required in understanding the world.

Fig. 21 shows a different way of using perspective. Spaces inside and outside the wall have different vanishing points. The two spaces actually represent two different scenes from Chushingura, the famous Kabuki title based on the true story. The outdoor scene is the here-and-now of the story, while the indoor scene, which is illustrated with an impressive depth, belongs to a different space -- and probably a different time -- a scene that these men are seeing with their mind's eyes.



Fig. 20 Theatre and its entrance, anonym



Fig. 21 Toyokuni, Chushingura

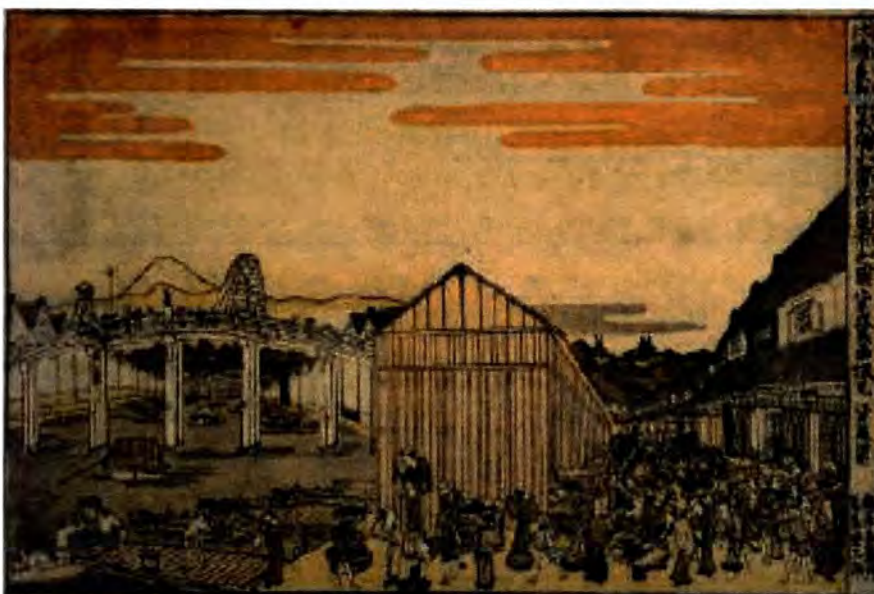


Fig. 22 uki-e, Nihonbashi Odawaracho, by Kitao Masayoshi, 1780s



These examples show how perspective drawings went through modification in the process ukiyo-e artists accepted it and found their own use of it as a new (and fashionable) method of drawing. They did not take perspective drawings as a new system to represent the world we see in the realistic manner based on optical or geometrical correctness. Instead, by inventing partial perspective, Japanese artists found a new way of continuing the tradition with a brand new piece of reality, what I might call a "partial reality".

Based on the above analysis and discussion, we can conclude as follows:

- By applying multiple viewpoints, integrating different space and time within a single image becomes possible. It was the continuation of what had been done in scrolls.
- Having more than two viewpoints means that the viewer's gaze will travel on the image. It means that the image does not represent a moment, but it contains certain flow of time. In short, there is more space for storytelling within an image with multiple viewpoints than that with a single viewpoint.
- Use of perspective drawing allows a "locally realistic" rendering to a globally impossible image composition. Perspective was useful to give a sense of reality and to add depth, to make it clear that the two spaces within an image do not belong to the same "here-and-now".

According to the well known phrase in computer graphics, "details count." That is, a fantasy without a realistic rendering on detail remains a mere unrealistic fantasy. It is the reality in the detail that produces a sense of overall reality. As Screech pointed out, ukiyo-e was often used as a tool of imagination. It is understandable, then, that the visual reality produced by perspective drawings was found useful to promote a sense of reality to the fantasy -- to scenes that the viewers had never visited and might never see.

#### < Modified and exaggerated perspective >

The most influential ukiyo-e artists such as Hiroshige(1797-1858) and Hokusai(1760-1849) did not apply obvious partial perspective, but developed their own way of using perspective. By modifying perspective according to Japanese visual language, using their artistic talents, they established their own styles in rendering the world. (69)

There are several elements used in such modification. One is the distortion of topography. Keeping the topological feature of the landscape (for example, respecting the route for sight seeing), the landform was modified to meet the size of the paper, or to give more interesting or practical view for the users. The birds-eye view in Fig.23 shows how Hokusai distorted the whole area between Edo and Kyoto in his touristic map. He visualized the trip from Edo to Kyoto to meet the experience of the travelers, while achieving an interesting vision for users and also shrinking the map in an affordable scale. The exaggerated size of Mt. Fuji reminds us of Masaki Fujihata's Mt. Fuji project which I discussed earlier in this chapter. The exaggeration comes from the importance of the mountain. Here, perspective is applied effectively to give a sense of reality to the subjectively distorted virtual topography. However, it is not based on a Cartesian model of the real world, but rather on a topologically reconfigured subjective model.

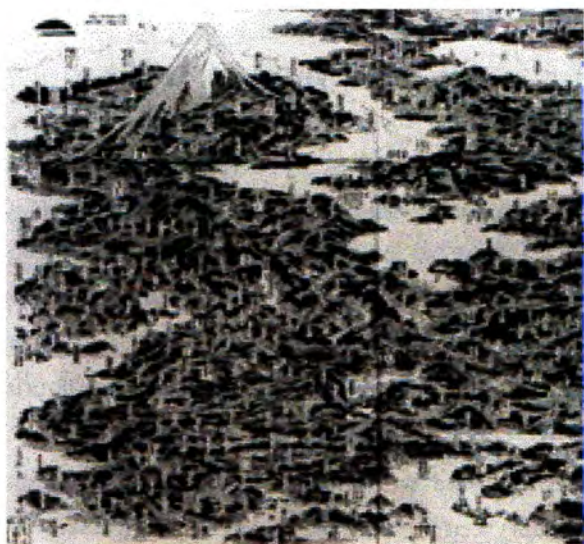


Fig. 23 Tokaido Meisho Ichiran, Hokusai



Fig. 24 Nihon Ezu, Keisai (Kitao Masayoshi)

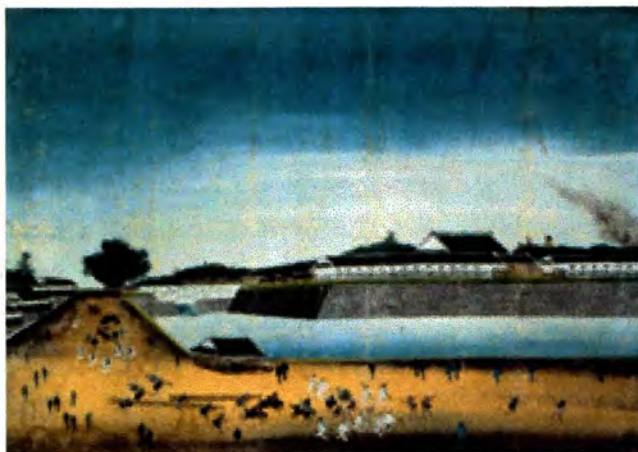


Fig. 25 Toranomon, anonym. late Edo. The detail (left) shows the same location as in Fig. 26.



Fig. 26 Toranomon by Hokusai circa 1833



Fig. 27 Surugacho, by Hiroshige 1856



According to Mitsuru Sakamoto and Toshiro Toeda, " It can be regarded as a result of studying the Western perspective drawing. Best examples of such application of perspective drawings in Japanese manner can be seen earlier with Hokusai's Meisho Ichiran and other maps of Japan. <....> The space is distorted on purpose, as if the viewers should realize that the earth is spherical. Such distortion makes it possible for the artist to cover much wider area, which is impossible with normal perspective drawings. Within a single image, the viewpoint freely changes the height. In case of Hokusai, or even more with Keisai (Kitao Masayoshi, 1776-1824), the viewpoint is almost close to the satellite view, while partial distortion of the space, including stretching and shrinking, are applied freely. " (Fig. 24) (70)

In other words, perspective was used freely as a special effect, both to transform a real landscape into something that the users (ukiyo-e prints were meant to be consumed) had never seen, or to obtain the best view(s) on a single sheet of paper, with almost a user-interface design oriented approach. The latter can be typically seen in the maps illustrated by Hokusai, Keisai, Sadahide and other ukiyo-e artists, for whom publishing maps was a part of their work to offer entertainment for their clients. People used such maps when they traveled, but mostly they seemed to be virtual travelers who enjoyed the landscape while reading travelogues. (71) On these maps, the relationship between each neighboring places is mostly kept, but altogether they form a distorted space representation.

If even maps can have such modified perspective, there is no wonder how perspective was freely used for landscape prints or paintings which are meant for souvenirs or peepshows. Fig.25 and 26 depict the same place painted by different artists, both applying perspective. The ukiyo-e researcher Henry Smith says "(t)hese images show how the same landscape was seen by two different painters." We can see they were truly "impression-ists". On the scene painted by Hiroshige in Fig.27, Smith estimates that Mt.Fuji must have been seen beneath the rooftop level in reality.(72) Probably the exaggeration was made not only because of a visual effect, but was connected to its iconographic and spiritual importance, as in case of Fig.23. If so, perspective was applied to render a subjective point of view, using a realistic outlook. (73)

#### < Framing >



Fig.28 Sazaedo by Hokusai



Fig.29 Kameido Umeyashiki  
by Hiroshige



Fig. 30 Hague, anonym.

Another creative use of perspective by ukiyo-e artists was their way of framing, as shown in Fig.28 and 29. In perspective drawings in the West, a view without an obstacle was the basic concept. (Fig.30) The viewer has a virtual position outside the image when the image is seen in a normal way. When seeing it using an optical equipment such as a perspective box, the viewer is surprised by the feeling that he/she is inside the landscape all of a sudden. Even for prints or paintings that are not meant for such use, this unlimited view was considered to be a major element in European perspective drawing. However, artists such as Hokusai and Hiroshige started framing the view with objects just in front of the viewers eyes. Such framing, which connects the viewer to the painted landscape more directly, gave a different meaning to the use of perspective drawing. The landscape changes its nature from an objective scene to a subjective one, almost connected to the here-and-now which is represented by objects such as the terrace (Fig.28) or the plum tree in front of the viewer. (Fig.29) Viewers no longer keep an objective viewpoint outside the scene. Actually, these prints are known to have given direct influence to the Impressionist artists Monnet and Van Gogh, respectively. (74)

### 5.2.3 Annotation of Space: Size, Distance, and Importance

Another feature in Japanese traditional space representation is the flexible relocation or neglect of (unnecessary) space. The golden clouds (or "mist" in earlier form) that are seen on many landscape paintings in Japan do not represent any natural phenomena. It is a visual code which signifies that the area covered by the cloud are to be visually skipped or neglected. The area to be skipped could be either unimportant (i.e. nothing special to see); or the space of transition. The space could be distorted to make a better arrangement of important elements; or different moments were painted within the same scene, as was discussed earlier regarding scrolls. (75) Fig.31 is a typical example in which the golden cloud connects two different scenes which could not have been seen next to each other in the real space. In Fig.32, normal houses in the town of Kyoto are covered by the cloud, as the picture was supposed to give a panorama of the must-see places in the town. The use of the cloud helps skipping uninteresting objects both for the painter and the viewer, making it possible to focus on important subjects. Of course it also helps minimizing the size of the town to fit the screen size. In that sense it was a working data compression method -- not based on a mechanical processing, but based on human factors. In terms of space manipulation, the application of the golden cloud corresponds to what we already saw with the use of perspective in distorted topography.

From that point of view, the use of mist or golden cloud in Japanese art is one of the possibilities in non-Cartesian flexible manipulation of space, that could be made possible with the absence of perspective. The space and time can be relocated, or rearranged, either according to the subjective importance or the story to be told, or even for visual design purposes.

Another important feature in space representation can be seen in the scaling, i.e. in definition of sizes of the characters to be painted. The size of a character that appears on a scene



can be rendered according to his/her/its importance in Japanese traditional artform.

The oldest example known of such application can be seen in the portrait of Shotoku Taishi (Prince Shotoku) who was the prime minister from the end of the 6th Century to the early 7th Century. In a painting that is considered to be made not much after his death, the prince is accompanied by two other figures who look like children, as they are much smaller in size compared to the Prince. However, according to confirmed studies, they were adults -- the Prince's men. The prince had to be painted bigger because he was the main figure and the others were less important.

Another example can be found in a scroll shown in Fig. 33. In this hunting scene painted in the 17th Century, dogs and a wild boar are painted much larger than men, including Shogun Iemitsu (who sits under the red umbrella). The animals were painted bigger because they were the most spectacular elements of the scene. It is also visible that the size of men are the same regardless of distance from the viewpoint. It is a typical example of the traditional space annotation system in Chinese and Japanese paintings. (76)



Fig. 31 scroll from early 17C, originally painted in 12C



Fig. 32 Rakuchu Rakugaizu



Fig. 33 Hunting a wild boar, from an early Edo scroll

Another interesting example can be found among the basic concepts of Nanga, sumi-e based painting that originated in China, and was very popular among intellectuals in Edo period and after. In Nanga, the color intensity changes according to the importance of the objects (or parts of

the object). Gray scale produced by different thickness of Japanese ink is applied according to the visual and thematic importance of objects (or part of objects) in the scene, instead of realizing some other elements such as shading.

When we think of these manners of representation in Japanese art, it is clear that the system is useful in telling stories or to representing subjective impression, but not meant for realistic and objective representation of scenes or characters.

#### 5.2.4 Time and Space

In Japanese scrolls, different scenes that belong to different moments are painted together.(77) Time can be translated into spatial expression. A typical example is seen with Eshi Soshi (illustrated story of a painter ), a roll from the 14th Century. (78) The house of the artist, the main character of the roll, is painted as if it were a big household with several rooms. However, if one has a knowledge about this part of Japanese visual language, it is easy to recognize that the characters painted on each rooms are the same people. They are not different rooms connected. They are different moments taking place in the same room. (Fig.34)

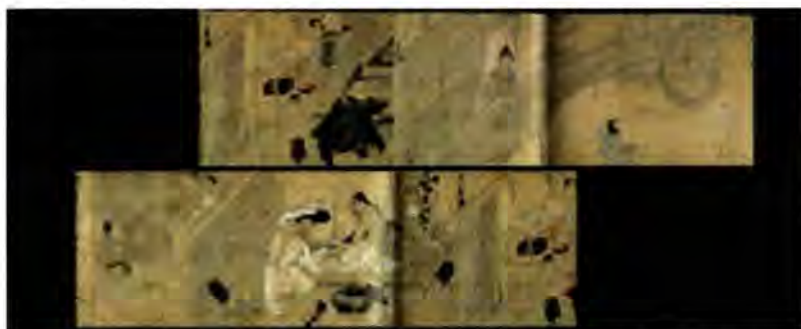


Fig.34 Eshi Soshi (illustrated story of a painter ), a roll from 14C (part)

A similar case is known with Shigisan Engi Emaki. Both the specialist of the the scrolls Junji Wakasugi and the animation director Isao Takahata find analogy between the conversion of time flow into spatial annotation seen in these scrolls and the way film director changes viewpoints and edit sequences. This analogy comes from the fact that scrolls are meant to tell stories. (79)

There seems to be another reason behind such time=space relationship. As I have noted earlier, when seeing a scroll only a part of the scroll is seen in Japanese way of appreciation. It means that the viewer would not see so many different moments in one glance. (80)

However, here again, the absence of precise representation of space makes it possible to support such time=space relationship. If artists and viewers share a vision/perception system that requires a correct representation of space, such a big house with many rooms could not have been painted in Fig.34. Since scrolls belong to the oldest forms of visual art in Japan, these examples suggest that the non-objective space representation in Japanese culture -- which is one of the main theme of this chapter -- is a very old and essential part of Japanese vision system.



### 5.2.5 Shading and Shadowing

Shading and shadowing in Japanese paintings or drawings appeared only by the 18th Century except for few minor earlier examples. Considering the long art history in Japan, it is quite late that these ideas and techniques became commonplace. (81) Even in the beginning of the 20th Century, the use of shading and shadowing can be seen almost exclusively within the circle of artists who were interested in the Western paintings. Although it is difficult to prove, it seems clear that the idea of applying shading or shadows was brought with European paintings and prints. Until then, the Japanese did not think of applying shade or shadow on paintings, even though shades and shadows are everywhere if we see the real world. It gives a perfect example of a hidden dimension(E.Hall) or a symbolic form(E.Panofsky) in our culture. But why shading and shadows had been so much neglected in Japanese art?

There are several reasons we can think of, from what we know about Japanese culture and also from previous researches on this issue. (82)

- i. Japanese art developed under the major influence from China. There is no shading or shadowing in traditional Chinese art.
- ii. It was difficult to apply shading on Japanese painting, as it was either calligraphic monochrome painting, or painted with mat coloring.
- iii. For some reason, the Japanese did not put much importance to shading and shadows. While there are different Chinese words that correspond to shadow and shade respectively, Japanese has only one word "kage", which actually means "image".

The first reasoning explains the absence of shade/shadow somewhat, but it is not strong enough. Japanese could have "discovered" shade/shadow if necessary. The second reasoning is not enough, since such a way of drawing/painting had developed on the basis that shade/shadow were not needed. The third reasoning is more important. This fact suggests that the absence of shade/shadow in Japanese traditional art is related to the cultural element at a deep level.

My argument is that there are cultural reasons behind the fact. Based on the analysis I have made earlier, I would state that there are elements that explain the absence of shading and shadowing in traditional Japanese paintings, in comparison to those in the West. They are as follows:

- i. In Japanese system of painting, flexible handling of space and objects had become the basis of representation. In such system, use of shading and shadowing limit the freedom of space annotation and thus not favourable. It is not that one had become the reason for another, but such coherent elements form the system. To prove this hypothesis is a theme of this chapter.
- ii. In the European art history, which had been tied closely to religious purposes, representing the light (i.e. the Grace of God) was a very important issue. To recognize the light source means to realize the existence of shades and shadows. As the representation of light had become more sophisticated, the representation of "the lack of light" (i.e. shade and shadow) inevitably

developed. Darkness was associated with what is evil. Thus light and shade/shadow had metaphorical meanings for painters. In Japan, the light was associated with the holiness, but darkness or lack of light was not considered as the opposite of such holiness, or something to represent evil power. (83) In short, shade/shadow did not have critical meanings.

iii. Development of science and technology in Europe had brought the awareness toward optical phenomena. Japan did not have an equivalent to such development. In the following part of this dissertation, I will discuss the above issues by analyzing ukiyo-e prints. (84)

### < Shading >

In painting, shading and shadowing offer the information on forms and locations of objects that are included in the scene. The spatial relationship between plural objects or the ground is represented by hiding objects behind or casting shadows on other objects. In other words, to employ shading and shadowing, an artist is required to have a clear idea of the form and location of each object.

However, in Japanese traditional painting, as I have discussed, location and size of objects in a scene are not necessarily determined according to the real size or position. Put it another way, the lack of shading and shadowing helps flexible manner of representation as we have seen in Japanese traditional paintings. For example, an object without shading or shadowing does not need to have its precise location in the space specified. It is also related to the fact that lighting was not a part of Japanese art. If light sources were to be considered seriously, either flat, flat coloring (i.e. no shading) or absence of shadows would fail to be the main stream. This makes a strong contrast to the importance of representation of light in the Western art history, which is even inherited in today's digital images.(85)



Fig.35 Sugoroku, a board game depicting a foreigner and a Japanese woman. "Kaika-e" or "Yokohama Ukiyo-e", which were mainly produced in Yokohama from 1860 to the beginning of the 20C, played an important role in describing



Fig.36 Sadahide, 1861, Yokohama Ijin Shokan-no Zu





Fig.37 Yoshiiku, 1861, Russians



Fig.38 Hiroshige III, 1874, Tokyo Kaika Meisho (Ginza) part



Fig.39 Yoshiiku, 1861, Bankoku  
Danjo Jinbutsu Zue (part)



Fig.40 Utagawa, Kunisada, 1864  
Yanagini-kaze, fukiyano itosuji



Fig.41 Toyohara, Kunichika,  
Zouho Tenjiku Tokubee 1881





(detail )

Fig. 42 "Hitotsuya", by Tsukioka, Yoshitoshi, 1890. An old woman ready to kill a young woman. (The story of Adachigahara)

Shading was introduced to Japan in the 18th Century, mainly through Dutch prints and paintings. There was a community of intellectuals, including doctors, writers and Ukiyo-e artists that lived in Edo, within which interesting prints, paintings, books, scientific instruments and other objects of curiosity brought from Europe were circulated. Shading technique was known among them, including painters whose social status varied from ukiyo-e illustrators to feudal lords. (86) While some of them used shading techniques effectively for scientific illustrations, ukiyo-e illustrators who sought for novelty in image creations started applying shadings to draw things and characters that looked differently from the traditional daily life. Shading was usually applied to foreigners and things that were brought from foreign countries, as well as to evil characters and monsters. They all belong to an alien world. (87) (Fig.35-42)

Let me "read" these images more closely.

In Fig.35 and 36, different codes of reality coexist in a single image. While Japanese are illustrated in the traditional manner without shadings, foreigners are shaded both on their faces and clothes. The face of a Japanese woman in Fig. 35 is a typical stereotyped face that belongs to the traditional code of representation. We also see the man's face in Fig. 35 is shaded in a surprisingly similar manner as in today's cell animation. In Fig. 37, two foreigners are drawn with strong shadings on their clothes. Probably their figures were copied from illustrated newspapers brought from abroad, as many ukiyo-e prints illustrating foreigners or foreign cities were. Fig. 38, a vivid illustration of a busy street by Hiroshige III, is an interesting example showing how the artist associated shadings with foreign or modern things of the time. The rikisha man's cloth (a "modern" shirt) is highly shaded, but two other men on both sides of him are illustrated without any shadings. The running man is drawn amazingly realistic in shape, but no shadings is applied. Horses are not shaded. On the other hand, the elephant in Fig. 39 is shaded. probably because drawing horses was a part of the traditional paintings. In Fig.40, while the man on the ground is illustrated in a normal ukiyo-e manner without any shadings, the God of Thunder is illustrated with exaggerated shadings, again, almost like the way we see in comics or anime today. In Fig.41, a monstrous toad is illustrated with a smooth shading that gives an impression of its huge volume, while the samurai in front of the toad is drawn without any shadings. In Fig.42, an old woman who is going to kill a young woman is illustrated with shaded wrinkles on her skin.



The use of shadings in these pictures are not arbitrary. Shaded images gave an exotic, alien, or interesting impression to viewers because it was not a part of the visual tradition. Shadings helped making a distinction between objects from the outer world(e.g. foreigners, monsters) and the familiar objects(e.g. typical woman, samurai). (88) By the use of shadings, which is originally supposed to serve for realistic renderings, artists enhanced the alien-ness of foreigners, monsters, etc. Because the use of shading was not a part of the system for representation of reality, an artist had a freedom to use, or not use, or modify shadings according to his subjective point of view. Isn't it similar to what we have seen with the use of perspective?

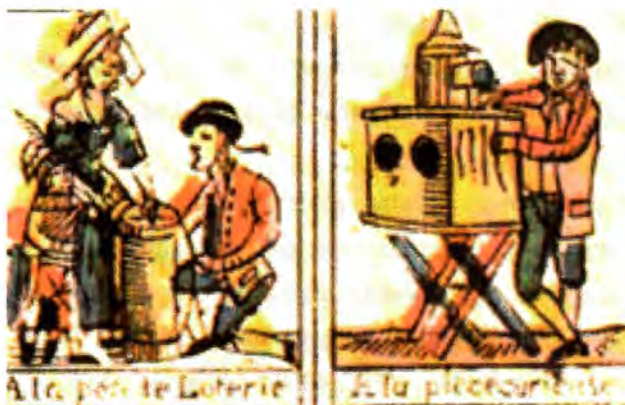


Fig. 43 anonymous print, c.1790, Paris.



Fig.44 detail of a print, 1885



Fig.45 Illustration by Mars, 1883



Fig. 46 magic lantern slide, America, C.1870

Fig. 43 to 46 show images that belong to popular culture from the equivalent period in the West. We can see that shading is applied even on a simple illustration, or on a slide used for projecting a comical story. Shading is clearly a part of the system through which people see the world and represent the world.

To summarize, when shading was brought to Japan people had difficulties in using shading for paintings, because it didn't belong to the perception/vision system the Japanese had. Some artists used shading, but its meaning and roles were transformed into something else. Instead of applying it to achieve realistic rendering for everyday objects, shading was used to add certain kind of "reality" to alien objects. It became a special effect for "alien-ness".



## < Shadowing >

There is no clear explanation why shadows were not painted in Japanese art. The background is similar to the case of shading. Not only in Japan, shadows were almost always neglected in Chinese art as well.

Without doubt, the awareness to shadows in painting was raised after the arrival of western paintings and prints to Japan by the same people who were interested in the use of perspective. Artists who studied western art seriously, such as Satake Shozan and Odano Naotake, painted shadows on their western style landscape or still life paintings. Suzuki Harunobu made an interesting ukiyo-e, in which a young woman looks at her own shadow surprisingly. (Fig. 47) Timon Screech writes "The beauty is surprised to discover that she is casting a shadow." (89) The image shows the surprise Japanese artists had, when they recognized that painting shadows was possible.

However, compared to the popularity that perspective drawing achieved, painting shadow took more time to be practiced by professional artists, and seemed to have met more difficulties in being accepted by users. The effect of painting shadows was probably regarded as nothing but adding dirty spots to the image. (90) Artists such as Hokusai and Hiroshige painted shadows in some of their prints, only when the use of shadows were effective. (Fig. 48,49) Painting shadows in Japanese art remained a rarity until the end of the 19th Century.



Fig.47 by Harunobu  
(1765-1770)



Fig. 48 Hiroshige, "Saruwakacho in Night", and its detail



Fig. 49 Kuniyoshi, Totomeisho Kasumigaseki, c.1830, and its detail





There is another type of ukiyo-e prints depicting shadows. Including a series of prints by Hiroshige, projected shadows on the paper screen are painted. Often the theme was the gap between the real objects and the shadows they cast, or the gap between someone's outlook and his/her real personality. These images were inspired by shadow plays and eventually formed a genre. Shadow play appears in Japanese literature in 1680, and it became a popular entertainment at licensed quarters and small theatres by 1700. (91) The use of shadow as an image in ukiyo-e is by itself a very interesting issue, but it is not closely related to the theme of this dissertation.

To summarize, we have seen how perception/vision system works differently according to the culture, as in case of perspective or shading. A natural phenomenon such as shadows under sunlight had been totally neglected in Japanese art until it was "discovered" through the Western art. Even then, it was just an option that an artist can apply as a visual effect. Most artists had difficulties in incorporating shadows in their images.

The process that perspective, shadings and shadowings had been (un-)accepted in Japanese art is an interesting example how a visual system could be interpreted in a different culture. Even though the realistic Western painting technique based on objective representation of reality were brought to Japan, the way such realistic painting was taken within popular Japanese culture was more in a subjective manner. (92) While artists with more academic approaches understood the theory and seriously practiced realistic paintings, artists working within the domain of popular culture incorporated the alien ideas into the existing visual language, yet to develop a new form of visual entertainment at the boundary of real and unreal. In a paradoxical manner, a visual/perceptual system of reality in the West was deconstructed and transformed into a set of Japanese subsystems, to partly enhance the reality within unreal landscapes. (93)

#### 5.2.6 Face

Above analysis on the use of perspective, shading, and space annotation explains a reason why flexible representation of objects or characters in Japanese paintings were possible without causing conflicts in spatial annotations. In translating 3D landscape or objects, in the Western art history, optically correct, realistic representation using the combination of perspective, shading and shadowing had been considered as the correct model. The combination of these elements would precisely define the way the real space should be represented. However, instead of a system that is based on geometry and optics, the Japanese developed a different system in which subjective importance plays a more important role.

However, the appreciation of subjectivity should be, on the other hand, accompanied with a shared set of rules to translate the "deformed" (i.e. from the Western point of view) vision back, to match the real world. Otherwise people cannot "read" an image. The rules must be shared among artists and the mass. For example, there was a "rule" that Mt. Fuji could be drawn much higher than it really is. People would not have been confused by seeing an exaggerated high mountain in a picture. It was similar with facial representations.

Faces in Japanese traditional artform had been almost always painted according to the code. There were facial patterns that belonged to the culture of the epoques, which represented

either the class that the characters belong to, or the role in the picture, or the personality, etc.

Such facial patterns are already seen among early scrolls.(94) In ukiyo-e, people enjoyed subtle features within the patterns to distinguish the models.(95) From technical point of view, the stereotyping of faces must have helped the efficiency of the ukiyo-e production/publishing system, which was the first commercial based color print industry in the world.(96)

The above observation would lead us to understand the following points. In Japanese tradition of visual culture, the system is based and developed along a different notion of reality compared to that in the West. In such framework, representation of faces or characters had also developed into a different direction toward stereotyping of faces. The roles or personalities of characters were coded according to the rules. Deformation of faces can be understood to have taken place at the crossing point of such direction with the absence of Cartesian space presentation. Stereotyping of characters are universally seen among many cultures in illustrations. But in case of Japan, exaggeration and deformation was made possible because there was no constraints in the culture for visual reality as in case of portraits in the Western art tradition. Painting realistic portraits had once taken place in Japanese art history in 13th Century, but it did not continue for a long time.

From that point of view, Japanese games and animation characters share the tradition with old picture and ukiyo-e. The way comic readers and anime fans recognize their favorite heroes and heroines looks surprisingly similar to what ukiyo-e fans in Edo period had done. Features such as the stereotyping of faces based on the codes shared by readers, or faces which are quite deformed from Cartesian point of view, and flat coloring, are similar to what Japanese already had appreciated nearly thousands years ago. Nevertheless the deformation seems to be taking place in the opposite direction, according to the aesthetics and codes of the era. (Fig.50,51) The woman's eyes in Fig.50 are represented with mere strokes of lines, because that was the code to represent a noble person. Eyes of normal people were drawn open in scrolls from the same period. Today, major characters of comics have big eyes while comical characters are often given very small eyes.(97). While explanations given for this big change in facial representation are interesting and go together well with what I have analyzed, going into details is not within the aim of this dissertation.(98)



Fig. 50. from the Tale of Genji



Fig. 51. from Gilles Poitras's The ANIME Companion, p.85

Often it is pointed out that a face as seen in Fig.51 is impossible to exist both physiologically and geometrically, although many Japanese are accustomed to such expression and

would not find anything wrong with it. The extreme deformation has developed within a visual language that comic artists and readers share, which is highly sophisticated on its own right, similar to what we have seen in ukiyo-e. We can also point out that such deformation is possible only if an un-Cartesian framework is accepted widely. In that sense, typical facial representation in Japanese comics and animation is the continuation of the traditional visual entertainment. With the rapidly increasing interest and demands for the use of 3D digital imagery in popular entertainment, what is happening in our digital media culture is the process of convergence of the two essentially different systems; the un-Cartesian 2D-based visual language as the continuation of Japanese tradition, and the Cartesian, optically correct visual language of 3D computer graphics.

### 5.2.7 Summary: Traditional Visual Language in Japan

We have seen how Japanese traditional visual language functioned, and how new ideas and techniques in visual representation were modified to be continuous to the tradition. The trace of such traditional visual language can be seen in our contemporary culture. (99) If the traditional visual language still underlies beneath our culture, how about the larger part of the system; the way of seeing the world? Probably it makes sense to think it is not only about paintings.

As Panofsky stated, perspective meant much more than a mere painting methodology. As is symbolized by The Eye as the icon for the Trinity, the philosophical background of perspective was the belief in the gaze of the God that covers the whole universe from a single point of view. (100) The monotheistic ideology formed the basis of systematic representation of space in the West. What came out of it is the Cartesian coordinate system that had formed the basis for modern mathematics and other field of science and technology, including computer graphics.

Perspective drawing is geometrically and optically proven, and can be practiced with equipments such as camera obscura. The validity and objectivity of realistic drawing/painting was thus confirmed by science and technology. In the West, science had been considered as a part of philosophy. Therefore, for a new theory or a discovery, proving that it is both physically and philosophically correct was very important. (101) In fact, the development of optical science and technology was almost always associated with the related issue in theology. The appreciation of optical and mechanical equipments was not only because of their practical values. They were regarded as the instruments to visualize theological arguments, since the universe was considered to be the most elaborate machinery that the God has created and tuned. (102) On the contrary, optical and mechanical instruments did not achieve such philosophical meanings in Japan. (103)

Based on the comparison as above, the idea such as 'partial perspective' can be considered a symbolic form representing Japanese way of seeing the world. A vision of the world that is quite contrary to the Western system represented by the perspective -- the polytheistic and pantheistic nature can be still observed today, often being integrated in the popular culture such as comics, animation and games, both visually and conceptually. (104)

Does such visual framework influenced the Japanese in developing a "floating", pantheistic vision, as discussed earlier, or is it the other way around? From what I have analyzed, it should be both, taking place within the network of influence that forms the culture. Other issues in Japanese art, such as the notion of originality and identity, are also within that network of influence. The fact that the Japanese during Edo period considered themselves as living in "floating" or "drifting" world seems to suggest that they were also aware of such vision. (105)

We can conclude that the traditional visual language in Japan had developed on 2D-based representations of the world, with elements that are coherent within the system. Features such as subjectivity and relativity, or a vision from multiple points of view, arose from such unconscious social framework. On the contrary, in the West, realistic and objective Cartesian representations of the world was considered as the serious way of representing the world, while 2D-based representations belonged to the popular culture or kids' culture until the arise of the Impressionism. Such history exists beneath the reason why illustrations or comics are not taken seriously in the West. However, such idea did not occur in Japan.

To summarize, the following features we see in contemporary visual culture can be considered to have developed along the traditional framework of Japanese culture.

#### **i. freedom in the use of frame, space, and time**

Flexible handling of space is possible inside and between frames. Frames can be used for multiple purposes to represent space, time, or imagination or history. Such feature is helpful in visualizing imagination, fantasies, or sophisticated storytelling.(106)

#### **ii. easy-to-understand facial expressions**

Exaggeration and patterns used on facial expressions make it easy for readers to understand the personalities of the characters, or situations. Deformation of face or body can develop according to visual interest, yet respecting visual codes, without having a coherent 3D model in mind. (107)

#### **iii.taste for 2D images**

Traditional Japanese visual culture is not based on Cartesian 3D-oriented concept. Much of Japanese aesthetics seem to have developed on such basis. We are probably still exposed to 2D-based imageries in our daily life more than people in the Western culture are. This can be an explanation why comics and cell animation are extremely popular in Japan.

#### **iv.sophistication in 2D-based expression**

Based on the above factors, a rich 2D-based visual culture was grown.

## **6. Notion of Life and Digital Pets**

### **6.1 Introduction**

What arose from the previous discussions are the elements in Japanese way of seeing the world, such as relativity in vision and the importance of subjective reality, which form a part of



the culture. As the last part of this dissertation I come back to the issue of life, this time in relation to the Japanese way of seeing the world.

Norbert Wiener argued that some sort of the modern automaton can be regarded as having an essentially the same function as a living organism does, in his "Cybernetics" in 1948. (108) David Tomas points out that what Wiener made it clear was that the major activity of life exists in the accurate network of signals, not in the mechanical function of the body. (109) It was quite innovative notion of life at his time. On the other hand, as was discussed in Chapter III, Wiener's point of view also leads to the neglect of the role of organic body as a physical matter. (110)

What is the way we see "life" today?

Cyberspace is no longer a fantasy of science fiction writers, but already the (subjective) reality for many people who live online for hours a day. It is the world where only information matters. The life activities in cyberspace rely on "accurate network of signals", as Wiener had defined. From Wiener's point of view it means that an ideally well coded autonomous agent who performs on an "accurate network of signals" can be regarded as having an essentially the same function as a living organism does. So far, we haven't have agents that can go much beyond what Weisenbaum's Eliza could do, but theoretically we are coming closer. (111)

How about avatars? Cyberspace allows its habitants to enjoy playing different characters. Avatars are more than a graphic interface or masks or virtual bodies that users use in cyberspace. We know that in the real world masks and costumes effect the user's behavior, resulting an emergence of a different personality. We also know that on the Net people often behave differently, playing a different character even on text-based BBS. Therefore, avatars can be the visualization of users' wishes to become different personalities. Thus, a user in cyberspace can be regarded as a blend of embodied information and a disembodied real human.

Programs such as World Chat offered a simple tool to have one's avatar in cyberspace without much possibilities to visualize the virtual personality one has chosen. With Habitat, the possibilities had been expanded. Now, even quite realistic and personalized modeling and rendering of avatars is possible. We can see an example with the French program "The Second World". (112) A user can project one's ideal self-image onto his/her avatar. Such realistic looking (yet different from the real) avatars will inevitably change one's notion of life and body in cyberspace.

In Japan, virtual pets and characters are around us either online or offline, achieving familiarity among normal people. Household robots are becoming the reality, attracting attention of even elderly people. Rather than being worried of "disembodiment" of human beings in cyberspace, embodiment of virtual lives are taking place in daily life.

How these phenomena can be explained in terms of cultural aspects? In Chapter II, I discussed the history of simulating life, and how alife has been dealt by artists. Here, I will analyze the current media culture regarding artificial life and body.

What I will argue is the continuity between virtual pets and physically real robots in Japan. There are several reasons for this argument. In Japanese cultural context, the degree of

life, or the quality of life between virtual pets and pet robots, between virtual characters and humanoid robots, and further between virtual characters and pet (animal-shaped) robots, are continuous. Historically, from theological point of view, the critical distinction between human beings, animals, and machines in the West did not exist in Asian culture. Also, separation of body from mind as in the West did not exist, allowing much flexibility in accepting both virtual lives and physical robots. As we have seen, the sense of reality had been based on subjective elements rather than objective visual realities, allowing freedom to design virtual and physical digital pets. These features suggest that the current media culture in Japan regarding digital pets and characters has in fact grown on the basis of the cultural framework.

## 6.2 Raise of/Raising Digital Pets

When digital technology has opened new possibilities in telecommunication, alife, and robotics, these new possibilities were met with the traditional framework in the process of being accepted by the public. On the other hand, new technologies, along with the way of thinking that accompanies with such technological innovation, are changing the old framework.

Alife has become a popular idea in Japanese entertainment. After the great success of Tamagotchi, a variety of virtual pets on game platforms and personal computers have been developed. They have even 'evolved' from simple dot images of Tamagotchi or original Pokemon generation to realistically rendered and animated 3D images such as of "Seaman", a weird fish-man character from Sega.(Fig.52) Including "PostPet" I referred earlier and "Dokodemo Issyo" which has become a big hit "game" for Sony's Playstation, increasing number of virtual characters have been making their careers both in virtual space inside computers and in real space, even starring on advertisement or becoming a part of candy packages. (Fig.53-54)(113)



Fig.52 Sega's Seaman



Fig.53 Dokodemo Issyo



Fig.54 MOMO, a PostPet character advertising books

On the other hand, robots are becoming familiar to our life in Japan. Sony's AIBO and other robot pets that followed its success, and HONDA's humanoid robot ASIMO which is the successor of P3, the earlier model that was already quite amazing, raised an impression that finally we have real robots to live with human beings -- the dreams we have had for over a century through science fictions coming true, finally. Here, I said dreams, not nightmares. In Japanese way of seeing the robots, practically no scary feeling toward them exists. This is quite different from that in the

West. I will analyze the reasons of this feeling later.

### **< features of Japanese digital pets >**

The following is an analysis on Japanese alife entertainment. After Tamagotchi made a great success, but also revealed the problems (as they demanded to be taken care of so frequently and died easily, many users became unhappy and stopped playing the game after the first enthusiasm) more sophisticated and playful artificial pets have been developed. Major features of the second generation pets can be described as follows.

#### **i. communication for fun**

As can be observed by the way young generation use the mobile phones in Japan, communication is not necessarily meant for a practical use. To enjoy communication is an important feature of communication by itself. The virtual pets of the extremely successful PostPet do not deliver email efficiently. Rather, it is a most impractical email software. But it is fun.

#### **ii. playfulness**

Tamagotchi was fed with normal meal and snacks. Virtual animals in PostPet and Dokodemo Issyo can be fed with a variety of food, including some funny foods. Seaman grows by eating an ugly looking worm that the user should take care of. Besides food, there are a lot of jokes in their lives.

#### **iii. enhanced autonomy**

Different from Tamagotchi, the second generation virtual pets have their own life and will. PostPets start playing with their own friends, or even start writing email on their own. In case of AIBO, the autonomy is realized as its physical behavior, which results from the combination of robotics technology incorporated, preprogrammed behavior to realize a dog-like lovable motion or a robot-like interesting movement, and the behavior it achieves by interaction with the user and the environment.

#### **iv. teaching and learning**

Teaching is a way to enjoy communication. It is the essence of the interaction in Dokodemo. A pet will start using the word the user has taught. The teaching process involves a series of conversation as well as a strong feeling of engagement in the intellectual growth of the pet.

#### **v. equality between the pet and the user**

In case of PostPet, a virtual character take actions on its own. In case of Dokodemo, a pet lives in his/her own room and goes out somewhere. Visually, it does not belong to the life of the user. These virtual pets are not conceived as servants or agents, or real animal pets that are under the control of the user/master.

### **< bits or atoms >**

The basic purpose of both virtual pets and pet robots is in offering an entertaining

communication to the users and possibly among their families or friends. Even though the virtual pets and pet robots are quite different in terms of their physical nature, I regard them as members of the same group; digital pets. (However, the notion of "pet" is different in the West and in Japan.)

Although robots were invented much earlier and has been used in the industry, entertainment robots have only arrived recently, after virtual pets have already paved the way. (114) Small and inexpensive pet robots such as Furby from US, Sega's Poochi and Omron's Cat robot, are expected to play the similar role as virtual pets that kids had been already familiar on pocket games. In that sense, these pet robots can be considered as the embodiment of virtual pets, as an example of embodiment of information, as discussed in Chapter III.

In fact, if simple dot images of Tamagotchi or Pokemon or Dokodemo can work so well, giving an impression to the users that there is some sort of virtual personality in the screen, then why not a pet robot, with a physical existence can work even better? After admitting the existence of "virtual life" in a pocket game console, are there any problems in finding a digital life in a metal body?

However, the critical difference between bits and atoms will arise when a humanoid robot arrives in a Western household. When Tamagotchi became a big hit among kids in Europe, there was a strong criticism and hesitation toward too much involvement with such artificial entities, which had been earlier observed with the use of robots.(115)As we can see from stories such as Golem, or Mary Shelly's Frankenstein, or films such as Metropolis, materializing an artificial life has a critical meaning and is scary, because it means that human beings are interfering the business of the God. Even today, after such religious belief had become much weaker, the framework remains in people's mind in every different level of the way of thinking.

#### < Source of reality >

Even if it looks lovely or nice, an artificial pet would fail if it cannot evoke certain sense of reality to the user. I don't mean that virtual pets should be felt as they are really alive. However, as in case of film or literature, well made fiction creates certain sense of reality without pretending it were a true story. Likewise, a fictional life would trigger the sense of life, if it were designed well and the user would be ready to accept the idea. If we see what is happening in Japan, virtual pets such as PostPet have been successful among the generation over 20 years old. AIBO, which is too expensive for kids, became a smash hit. These facts show that these digital pets could promote a sense of reality to the grown-up users.

However, until now we do not have a technology to create a realistic looking digital pet or robot that moves perfectly natural, with convincing interaction and autonomous behavior. In other words, technically it is still difficult to achieve the objective reality on digital pets. Therefore, it is either that users themselves are filling the missing portion of reality by their imagination, or the sense of reality to be attached for "life" is different from what we know as a set of objective criteria, as was shown in Chapter II.

In this part of dissertation, the nature and the role of "subjective reality" in achieving the sense of reality toward digital pets will be examined, following the argument I had on Japanese culture earlier in this chapter. These analysis will help us to understand why artificial pets and



entertainment robots have almost become a new tradition in Japanese culture.

### 6.3 Sense of Reality in Digital Pets

My point of view is that the sense of reality in digital pet consists of elements that go into two major categories. The first group of elements is what is made possible with technical achievements. Elements that are designed and calculated, such as realistic modeling, interaction, action, and other performances belong to this category. These are objective elements of reality.

The second category of elements emerge from the user him/herself, from the personal, historical, and cultural context. I consciously call such sense of reality that are based on subjective elements "subjective reality", the same term as I have used in describing Japanese vision/visualization system. The term would sound strange because we are used to the idea that reality is objective. However, Tamagotchi, for example, has proven that even a simple system with dot-based graphics can give fairly strong sense of reality even to adult users. It is the same with Pokemon, in its original game version, and in Dokodemo. The phenomenon cannot be explained by the objective reality those characters offer to the users.

As I have argued in the earlier part of this chapter, objective reality can function only through subjective reality of each person. Above mentioned Japanese products are designed to make the best use of subjective reality. Such subjective reality is both personal and shared in the society at the same time. As I argued earlier in this chapter, both our physical(body) features/functions and the cultural background work in forming the framework for subjective reality. Since members of a community would share these factors more or less, taking subjective realities into account is possible in designing consumer products as a part of consumers' preference. The idea of using subjective sense of user has been commonly practiced especially in advertising and in designing consumer product such as toys or cars. (116)

However, I find that psychological aspects have not been seriously discussed in case of artificial life and its applications or robots, or even androids.

It does not mean that psychological aspects such as emotion have been neglected in alife. On the contrary, rendering emotion-like behaviors or responses on virtual pets/robots/androids has been regarded important. But discussion is usually centered around the features these virtual pets/robots/androids should have -- but not on the emotion on the side of human beings. Let us take an example on a popular discussion, if a robot or android can be considered as human. The androids in the film "Blade Runner" are often considered to "have stepped beyond the boundary" to become human beings by demonstrating humane emotion such as empathy, warmth, and also showing human judgment. (117) Even though what is discussed as the criterion here is about emotion, it is based on the evaluation of what is realized within the ROBOTS(androids, cyborgs), which would be implemented as a piece of software in case of production, and therefore belongs to the objective reality. It is also an epistemology oriented question.

In the above case, my question would be as follows; "what will make me believe that they

are equal to human beings?" instead of "what makes them equal to human beings?" It is to see the same thing from the other direction. (118)

#### **6.4 Objective Elements of Reality in Digital Pets**

I have argued that subjective reality plays an important role in recognizing a virtual life as a life. In this case, major elements in subjective reality are the notion of life and the vision system. Before examining them it is necessary to see what are the objective realities in virtual/digital life.

There are several known factors that evoke the sense of reality in digital art and entertainment. In case of life-like creatures, following factors can be listed.

##### **i. visual reality**

In general, visual reality is effective in evoking the sense of reality, or preventing the sense of fake. It is especially important in case of using such life form in still images, or in films where artificial lifeforms are composed within live shots. However, our perception is accurate and severe in case of human or animals that we are familiar with, such as dogs or cats.

##### **ii. sound and other multimodal input/output**

Sound can be used to promote the sense of reality especially in case of movement or interaction. Tactile sense, if possible to realize, can give strong sense of presence. Although not easy to realize, other modal elements such as smell can be effective in certain cases.

##### **iii. realistic motion**

Even when a life form does not look visually realistic, or does not look like any of the lifeforms we know, realistic representation of its motion has a strong effect in promoting a sense of reality. Whatever the shape of the virtual entity is, physical and physiological dynamics should be respected. We can very well detect poor animation. An excellent example is Karl Sims' "Evolved Creatures". Virtual lifeforms that do not look like real animals at all demonstrate natural and physically correct movements, which are amazingly convincing.(119)

##### **iv. interactivity**

Interactivity brings a strong sense of reality to the users. (On interactive art involving digital creature, see Chapter I) Also, it is the essential part of alife-based entertainment. However, in case of art, interactivity can be intentionally limited according to the concept of the work. (120)

##### **v. autonomy and organic functions**

Almost all virtual pets involve autonomous system in it. Autonomy ( or at least certain kind of random activity, in case real autonomy is not available) is necessary to create the sense of life. Without such a feature it will look like a machine rather than a life. Besides autonomy,

simulation of functions which are particularly associated with life activity is effective, as in case of Vaucancon's duck automaton. (121)

## **6.5 Subjective Elements of Reality in Digital Pets**

What are the subjective elements in finding a digital/virtual creature real?

In comics, illustrations and animations, exaggerated characters and motion ("squash and stretch", typically) are known to be often more effective than realistic looking characters or accurate motion.(121) We have already seen in Japanese visual culture stereotyped faces were regarded as realistic enough, and in contemporary comics and animations as well.

The list below includes major elements that promote subjective reality. They are related to each other.

### **i. personal attachment**

Personal attachment is an element that brings a sense of reality in probably any culture. In our real life, personal attachment makes one's child different from any other kids. It is similar with a pet. We also have the sense of personal attachment for objects which are not alive, such as certain personal belongings. Personal attachment is raised by elements such as history, memories, involvement, association, sense of responsibility, etc. Processes such as giving a name, growing, taking care of, teaching, communicating, personalize the digital pet. (122) Interactivity plays an important role in these processes.

### **ii. familiarity**

The sense of familiarity is framed both culturally and personally. On a personal level, personal memories and experiences play a major role. (123) Above the personal level, there are codes, symbols, icons and imageries which are shared within a community, including popular characters from comics or animations, etc. At a more higher level, the visual language within the culture frames the familiarity. (124) Familiarity (or unfamiliarity) can be felt on different elements such as outlook, behavior, way of speaking, fashion, story, etc. Association triggers familiarity.

### **iii. exaggeration**

By enhancing familiarity with appropriate exaggeration, elements such as visual appearance, motion, behavior, etc. can become easier to understand or expected. Also, by triggering the feelings such as "yes, I knew it" or "I have expected it", users/viewers feel more attached to the characters.

### **iv. impact**

It appears to be contrary to the role of familiarity, but a strong impression in visual or contextual form can produce a sense of reality.



#### **v. story**

Strong storytelling promotes a believable-ness in the contextual level. In role playing games, designing a convincing "world" as an integrated environment with its own history and stories behind is essential in raising the sense of reality among users. A convincing story behind and around virtual lives make them believable.

#### **vi. interaction**

The sense of reality that one is dealing with something like a life is enhanced with appropriate reaction and interaction.

### **6.6 Notion of Body**

As I argued in Chapter II and III, the notion of body is also framed both culturally and personally, with many elements incorporated.

However, studies of notion of body in media culture is rather centered to those from the Western point of view, especially from US. One of the reasons is because the issue is mostly raised through the feminist study, which is centered in US.(125) But more essential reason is to be found in the notion of body in Japan itself.(126) As I discussed earlier, body and mind were not regarded as contradicting entities. Recent studies carried by Timon Screech and Yuko Tanaka have served greatly in understanding ideas about the traditional view on body in Japan. Shoji Tatsukawa analyzes the subject from another aspect.(127)

Europeans who traveled to Japan during the first years when Japan opened its border 150 years ago noticed that the code about body is quite different from that in the West. (128) In short, people were quite open-minded about their bodies. In Japan, because of the different cultural and religious background, such idea as "sinful body" has never taken place. On the other hand, the origin of life or the ownership of body was not an ethnological matter. Altogether, the boundary between body and mind, or the role of body in life, remained unquestioned.

When we think of the psychological or cultural aspect of having virtual characters and pet robots, and the differences between the two genres, we confront the differences in the relation of body to life in Japan and in the West. The issue can be discussed from the following points of view.

Do we find crucial differences between the way we see the body of human beings and those of other animals? (129) What about robots or virtual creatures without physical body? Considering historical background, it is likely that there are differences on the issue among different cultures, which we can observe from comics and animation films.

It seems that the boundary between virtual pets on the screen and pet robots seems unclear in the Japanese consciousness. But probably it is rather natural. Identifying image-based characters (from comics or films) with their physical, materialized versions such as models and stuffed toys, is seen commonplace among kids all over the world. Pokemon has been an extremely

successful example of coexistence of simple images on a pocket game machine with more detailed images on TV and film, to be further developed into physical stuffed toys and other forms.(130) Why, then, it is not supposed to take place when kids get older? Is it a childish manoeuvre to appreciate such physical representation of characters, or the history of religious constraint in the West -- that had brought the cultural suppression of materializing imaginary beings, as is seen in Mary Shelly's Frankenstein -- is behind the psychology?

The "virtual beauty" phenomenon in Japan reflects such cultural difference.(Fig.13-18) It had become possible at the absence of both such cultural constraints and a strong consciousness on body. Appreciation or manipulation of body without ethical, political, or gender problems is a unique situation in Japan. (131) Also, as was seen in case of Japanese visual language, the way the Japanese enjoy juxtaposition without defining a hierarchycal structure, and the way they enjoy the boundary between the real and unreal, creating the new domain of imagination, seem to work in supporting the love for virtual characters and robots.

As cyberspace will be cohabited by increasing number of avatars, agents and virtual characters while robots and human beings will be sharing the real space, real life and virtual life mingling with bodies in atoms and bits, the study on people's notion of life and body in different cultural backgrounds will become more and more important.

## **6.7 Robot as a Friend**

In Japan, the New Year starts with thick morning newspapers filled with special essays and articles that the editors have taken time in preparing to predict what will be waiting for us in the beginning year. This year, one of the major articles in Asahi Shinbun stated that it will be a century of "co-existence with robots".(132) And it was not just a prophecy. Robots welcomed human beings in most normal places in Tokyo to start the new century.(133)

Anticipations about the life with household or pet robots seems to have began to achieve reality status in the past year or two, obviously triggered by AIBO and Honda's P3. The Pet Robot Expo held in December 2000 was more than a success. (134) In Japan, robots are not just industrial tools or household equipment or toys -- robots have started to share the same space with us, as family members or admirable friends. They are part of the culture, as well as of entertainment and even art. (135) One may ask: Why is it so in Japan?

Many Japanese, including robot technology engineers, as well as artists and designers, will answer immediately as follows. "Mighty Atom (Astro Boy)", a TV animation program that started in 1963 has become the conceptual and visual model of "robot" in Japan. The brave and humane robot character created by the comics/animation artist Osamu Tezuka appealed strongly to the Japanese, who were recovering from the damages from the WWII. After Atom, many comics and animation films featured similar robots and cyborgs. The tradition continues to Japanese animation films today. (136)

But this is only a part of the explanation. We also have to think why Tezuka created such a robot character, and why the character has become so widely accepted among the Japanese.

"Love for robots" of the Japanese has been internationally pointed out since early 1980s. Not only the number of robots working on the automobile assembly lines, but the friendly relationship between the human workers and robots surprised engineers, researchers and journalists from abroad. In the early 80s we often heard about workers naming the robots (which did not resembled human beings at all) and regarding them as colleagues, or Shinto ceremonies taking place at the arrival of robots.(137) These episodes probably brought an international understanding that the animism in Japanese native culture underlies the Japanese attitude towards robots, that a metal composition could be treated like a human being, or even respected as something like a god. It is in fact often the first response from the audience when I speak about Japanese entertainment robots,. F.Schodt also points out that it was a wide spread view in the US.(138) However, although animism is considered to be one of the original elements in Japanese traditional culture, it is not a direct reason of the popularity of robots among Japanese. We should try to understand the reasons of the Japanese "love for robots" from a wider aspect.

#### < social reason >

For the Japanese, who do not have memories of the nightmares of industrial revolution or automation age, as illustrated in Charlie Chaplin's "Modern Times", machines such as robots have no problem in being accepted as friends, instead of enemies. Both when Japan opened its border and achieved industrialization in a short time in the early 20C, and when the Japanese economy began to grow after the WWII, machines always represented our hopes and our future. Reflection of such historical memories can be clearly observed when we compare Capek's "R.U.R", Fliz Lang's "Metropolis" or Ridley Scott's "Blade Runner" with robot/android/cyborg characters in Japanese comics or animation films such as ATOM or Shotaro Ishimori's "Cyborg 009".

#### < human-animal relationship >

The relationship between human beings and other creatures is different from that in Europe, mainly because of historically different religious backgrounds.

Animism and polytheism in ancient Japan would exist at the deep root of Japanese culture. But since these concepts are observed in many ancient cultures, we should see how they developed or were substituted by more recent ideologies. There is no absolute difference between the lives of human beings and other animals in Buddhist theory, which formed the backbone of Japanese way of thinking. While the Bible tells that the human beings were created on a different day in a different manner from the way the animals were created, there is no myth in our religion about how all creatures happened to appear on the earth. Even more, according to the Buddhist theory, a bad man's next life could be a dog, or a good dog's next life could be a man. (139) Such idea that comes from historical background can be observed in every detail of our life.

In recent article in Asahi shinbun, we read about an American horse (a great winner of many races) that "went to heaven". (140) Last year a giant panda at Ueno Zoo also "went to heaven" according to Asahi. Actually, according to a Japanese old saying, "even a one inch long worm has a half inch long soul." It is no wonder big animals such as horses or pandas have souls big enough to be qualified for the Heaven. Of course, to discuss if the Heaven exists or if animals are accepted there is not my aim. The point is that since the idea -- absence of critical boundary between the



lives of human beings and those of other animals -- has been so deeply imprinted in the culture, the newspaper editors do not even realize what they mean by writing so. In the Western culture, on the other hand, people would not even imagine such an idea could be possible.

### < human-alife relationship >

If the boundary between the life of human beings and those of animals is not so clear, why could the boundary between real life and virtual life - either with physical "bodies" such as robots, or without any physical body, as avatars and agents on the Net - be distinct? Tamagotchi and Pokemon have already proven that the Japanese can take these virtual creatures playfully and seriously at the same time. AIBO has proven that a robot dog is in fact considered as a substitute for a real dog, or even plays the role of a kid, at a household of an old couple. (141)

The new year article of the Asahi Newspaper tells us a story about the background of Honda's humanoid project. In the early 90s, a VIP from the company visited Vatican to ask, if the development of a humanoid robot disturbs the Catholic point of view. They were obviously aware of the problem that production of humanoid robots might encounter in future. (142)

### < body and soul >

From Christian notion of body and soul, and the Creation of human beings and other animals, both artificial life and artificial body meet theological difficulties in the West. The arguments on humanity of replicants is an example.(143) The question was if it were possible for an artificial body to bear a soul. Robocop was considered humane because his brain was transplanted from a human being. With the arrival of all sorts of artificial life, character, and robots brought by the development of digital technology, the situation will be more complicated. Distinctions between human beings, cyborgs, robots, non-human life, etc. will be difficult to define when digital virtual life and robots are involved. (144) Science and technology no longer care theology, but in the cultural framework through which people see the world, there still remains traditional notion of life and body.

Compared to that, Japanese culture, which had developed without the needs of critical thought about body and soul, has much more flexibility in accepting robots and virtual characters as friends or family members.

This also explains why certain kind of mechanical android/robot stories are so popular in Japanese animation films. The mobile suit of GUNDAM and the organic machine EVE in "Evangelion" are typical examples. (Also, it is strongly connected to the gender issue in Japan. "Evangelion" gives an interesting example.) The idea of human body integrated into a robot vehicle does not sound extremely strange for Japanese kids.

Meanwhile, Tamagotchi had raised a social problem by almost too explicitly bringing in the idea of "soul" to the simplistic virtual creatures that died so easily. (145) Some kids took the death of the virtual pets seriously while others "reset" virtual pets frequently. There was an argument that by getting used to resetting the virtual life, kids might become used to the idea of resetting life. Learning from the case, later products have been designed more carefully to avoid such problems. In PostPet, for example, there is no clear explanation if those pets who disappeared from the user's desktop and went to the PostPet Park are dead or just retired. In Dokodemo Issyo,

the virtual character leaves the room after some period, to start a new life somewhere else.

Since the Japanese would not need to have clear answers if the virtual pets are dead or alive after they had disappeared from the screen, or if they have souls or not, the solution to the problem seems "to make the situation unclear, not explain fully, and let the users decide".

## **6.8 Summary - Blurred Boundary of Life**

We have seen the nature of Japanese vision/representation system in the earlier part of this chapter. Absence of perspective point of view - what was called "pantheistic" or "polytheistic" view by art historians - characterized Japanese traditional way of seeing the world. My argument is that such feature cannot be an independent phenomenon from other features in Japanese culture, since the way people see and represent the world is a major part of a culture's basis. I called it NON-perspective, after Panofsky's argument on the meanings of perspective in Europe, stating that NON-perspective symbolizes Japanese traditional way of seeing the world.

The sense of relativity and absence of hierarchical aspect associate with such framework. The world is understood and represented in non-Cartesian manner. By supposing that NON-perspective represents the idea beneath Japanese cultural tradition, facts and examples I have raised until now can be explained well, with coherency.

NON-perspective framework does not require defining crucial distinctions between things or matters. It applies to the way we see life. The absence of clear border applies to variety of issues, such as between body and mind, human life and animal's life, or rather, the absence of a need to make distinctions is the key issue. By not being required to pursue the border, the Japanese can play between the real and virtual, enjoying the subtle combination of reality and virtuality. Japanese culture seems to have a play -- as a play of a machine -- to allow a flexible attitude in experimenting digital forms of life.

## **7. Japanese paradigm in digital media culture**

What will be the "killer" digital application, making use of all the features of Japanese way of seeing the world? What are the merits of the Japanese cultural framework in digital culture, and what are the demerits?

The largest part of Japanese digital media culture that reflects Japanese traditional way of seeing the world is games -- both in terms of concept and visual representation.

When simple 2D images were the only possibilities in computer games, users still found convincing sense of reality from those images. Within the culture that people had been mediated by images such as ukiyo-e and then by comics and animations, the imagery of games was easy to accept. Apparently that was a reason why computer games developed so quickly as an industry.

In terms of concept as well, Japanese games -- role playing games, in particular -- have

inherited sophisticated storytelling from comics and animation. Because they are not just meant for kids, storytelling in comics and animation titles are often serious or highly sophisticated, as in case of Osamu Tezuka's works, or even surrealistic. It is almost a unique feature of Japanese comics and animation titles (with exceptions from some other countries including France). Leading role playing games such as Dragon Quest or Zelda or Final Fantasy have such "high end" storytelling.

However, the major games are now in 3D. In the beginning of the introduction of 3D graphics, it was mainly required for realizing realistic fighting interaction. (146) Now, the graphics are amazingly good for characters as well - realistic modeling, rendering and animation, probably better than any games from other countries. But why? As I have analyzed, principles of 3D computer graphics work quite differently from Japanese traditional visual system. It has been the major reason why the Japanese often react to virtual 3D characters as they are "cold" and even "scary". How could Japanese game industry make such a successful move into 3D graphics, which is quite different from the traditional aesthetics, and even from the majority of Japanese games only several years ago?

As we could see from the history of media art I analyzed in Chapter I, innovation in art takes place when there is a conflict between the new technology (and the way it changes the society) and the traditional way of seeing the world.

It would sound paradoxical, but because 3D computer graphics is based on a completely different vision/representation system from what the Japanese used to be familiar with, and because 3D had to be introduced to make the best use of digital technology in entertainment, designers and engineers had to develop a new visual paradigm to match these two different way of seeing the world. Beneath the development there is the interest, or curiosity to technology which is also seen in Japanese history, which we have seen as the history of learning new technology and immediately applying it for entertainment.

In the West, where Cartesian vision/representation system had been dominant before the arrival of computer graphics, there was no serious need to seek for a new visual language to use 3DCG for games. The development of "virtual beauties" is another example. Although many of those virtual beauties still look like under development, it is a part of what is happening in the cultural transition. As we have already seen with some of the recent high-end games and digital animation titles, a new visual language to realize imagery between the two different systems seems to be emerging.

Such conflict regarding the nature of reality was another source of creating a new visual representation. As we have seen in the way partial perspective and shading were used, the Japanese have developed a dynamism to create a new sense of reality/imagination at the boundary of the real and unreal, and of the old and new, at the absense of constraints that demand a "right answer" or a hierarchical order.

Household robots or pet robots are certainly another genre that Japanese way of seeing animals and artificial life is helpful in promoting new ideas. By combining different kinds of



technology both practical and entertaining, a variety of application can be conceived.

What will happen, when Japanese way of seeing the life is combined with the new form of realism in virtual characters? As we have seen with products such as PostPet, such application can be quite successful in Japan, as it can fully use both the cultural framework and the possibilities brought by digital technology. More intelligent and autonomous features can be accommodated with such virtual characters in near future. It can be one of the most powerful application of digital technologies, using traditional framework and the dynamism to combine the old and new to create a new way or representation, to enhance users' sense of reality.

However, there can be problems as well. In the Western cultural framework where there is still a strong unconscious feeling that human beings and other lifeforms are different, and that the body and mind are separated, confusion between real life and virtual life -- either with a physical body or not -- is still hard to take place. As I discussed in Chapter III, questions have been raised on the way our vision of the world or the notion of body and space. There is an understanding that such fundamental questions should be asked and answered. In traditional Japanese culture such questions were not really asked seriously. Today, with the cultural framework under a rapid change, such questions and answers should be raised and seriously sought of, so that our paradigm of the world can smoothly develop along with the digital media technologies.

## 8. Conclusion

In this chapter I analyzed the nature of Japanese cultural paradigm and how it is reflected in current media culture. It was observed that the way Japanese artists deal with the idea of identity, originality and subjectivity in their artworks are strongly related to the cultural background. Also, the absence of clear border between art and entertainment, or art and application in traditional Japanese art, has a positive effect in producing innovative products, both being playful and artistic.

A detailed analysis on Japanese vision/perception system, mainly focusing on ukiyo-e and older paintings, has revealed the non-Cartesian, subjectivity-oriented nature of Japanese visual language. Together with evidences from different genres of the culture, we can regard that such feature applies to the basic framework of Japanese culture. The analysis on Japanese way of seeing life brings the observation which is coherent to what we have seen about the visual language. The subjectivity and the sense of relativity embedded in Japanese culture have prepared the flexible ideas on enjoying artificial lifeforms as they are. The Japanese love of robots and the recent development of digital pets, including pet robots, can be understood from the above mentioned point of view.

By combining new technology and finding useful paradigm from the traditional culture, Japanese digital media culture seems to be heading a new stage of creating a new visual language. However, there will be problems that arise from such process, especially about the notion of reality with virtual characters and digital pets. As the degree of artificial reality in cyberspace and with virtual lifeforms increase, serious look on our changing paradigm should be carried to

have a better relationship between technology and culture.

#### notes

1. A member of the first mission from Edo to Europe left a diary, in which he described such surprise he had not only with portraits but also with paintings of 'vegetables and fruits'. See Seiryu Ichikawa. (市川清流・著、楠家重敏・編訳「幕末欧州見聞録」、新人物往来社)
2. About the role of shadows in the western culture, see Albert von Chamisso, Peter Schlemihls Wundersame Geschichte(1814), Victor I. Stoichita, A Short History of the Shadow 1997 Reaktion Books Ltd, E.H.Gombrich, Shadows, 1995, National Gallery Publications, London, Distributed by Yale University Press. About the use of shadow as in shadow theatre, see Michel Oberthur Le Chat Noir Le Livre du Musee d'Orsay Reunion des Musees Nationaux 1992.
3. About Silhouette, see Carol Belanger Grafton, Silhouettes, Dover, 1979
4. Perspective drawing was practiced by Japanese artists in the 18th century. OKUMURA Masanobu is considered to be one of the first ukiyo-e artists who used perspective drawings in 1730s or 40s, which was named uki-e. The painter MARUYAMA Okyo was familiar with optical equipment and achieved perspective drawing successfully. The truly multi-talented HIRAGA Gennai helped some artists to achieve the technique in the late 18th century. See 諏訪春雄「日本人と遠近法」ちくま新書1998, 岸文和「江戸の遠近法 浮絵の視覚」剋草書房, 内山淳一「江戸の好奇心」講談社 1996, 岡泰正「めがね絵新考」筑摩書房1992, タイモン・スクリーチ「大江戸視覚革命」作品社 1998, 若杉準治 編 絵巻物の鑑賞基礎知識 至文堂1995
5. See タイモン・スクリーチ「大江戸視覚革命」作品社 1998, -坂本満、戸枝敏郎 横浜版画と開化絵 至文堂 1993, 安村敏信「近代画への転生を育んだ百花繚乱の表現世界」(朝日美術館「幕末・明治初期の絵画」、朝日新聞社1997, 岡泰正「めがね絵新考」筑摩書房1992
6. In the West as well, perspective was not known *a priori*. The recognition of perspective is considered to be related to the occidental civilization. See Erwin Panofsky, Perspective as Symbolic Form, 1924-1925, Translated by Christopher S.Wood, Zone Books, 1991, also Shigeru Tsuji. (辻茂「遠近法の誕生 ルネッサンスの芸術家と科学」朝日新聞社 1995)
7. See Chapter I.
8. Traditional concept of art in the West that states a clear distinction between fine art and applied art, as well as between professional artists and others, is not necessarily a universal truth, but a historical consequence.
9. This is one example that shows a difference in art making in Japanese history compared to that in the Western tradition. Poems produced by ordinary people were regarded to have the equal values as poems produced by poets of the court. It is because there was no clear boundary between those who make art and those who appreciate art. The tradition continues. Without doubt, Japan will mark the world highest score in the ratio of poets among the population, if we count people who seriously enjoy making short poems such as Haiku or Waka. I do not agree with the idea that this shows how Japanese society or art community was "democratic".
10. See 西郷信綱、永積安明、広末保「日本文学の古典 第二版」岩波書店 1966, 金井清一、小野寛編「年表・資料・上代文学史」笠間書院 平成6年, 犬養廉他「年表・資料・中古文学史」笠間書院 昭和48年, ドナルド・キーン、土屋政雄訳「日本文学の歴史 古代・中世篇1」中央公論社 1994, 吉本隆明「初期歌謡論」ちくま学芸文庫 1994
11. The rule to use "kigo" (words to indicate the season) is in a way a restriction in making a poem, but at the same time it is a well-thought system that makes a very short poem to contain more than what is directly said. In Waka, "makura kotoba" was exactly the way to use keyword to retrieve (in the reader's memory) all the previous poems and other texts which relate to the poem. Both waka and haiku have established what can be regarded as the networks of meaning, which have been accumulated over the centuries. About the usage of rhetoric and citing, see 尾ヶ崎彬「日本のレトリック」ちくま学芸文庫 1994, 古典文学レトリック事

典 國文學第37卷15号 學燈社 平成4年, 吉本隆明「初期歌謡論」ちくま学芸文庫 1994, 小松英雄「やまとうた 古今和歌集の言語ゲーム」講談社 1994

12. [www.renga.com](http://www.renga.com), Toshihiro Anzai, IMAGINA'93 Proceedings

13. "Museum on the Web" InterCommunication, NTT Publishing Co., 1994

14. See [www.petworks.co.jp/~hachiya](http://www.petworks.co.jp/~hachiya), [www.so-net.ne.jp](http://www.so-net.ne.jp), [www.aec.at](http://www.aec.at)

15. Through his early works such as "Geometric Love", Fujihata experimented the representation of "inner vision" through the geometric modeling calculated by the computer.

16. [www.zhm.de](http://www.zhm.de)

17. As will be discussed regarding the artists Toshio Iwai and Kazuhiko Hachiya, the border between fine art (artists) and commercial art (artists) is not concrete or so serious in Japan. Fujihata also produced computer animation sequences for broadcasting and commercial purposes in 80s.

See [www.ntticc.or.jp/preactivities/gallery/velocity](http://www.ntticc.or.jp/preactivities/gallery/velocity)

18. [www.canon.co.jp/cast/](http://www.canon.co.jp/cast/), [www.ntticc.or.jp/](http://www.ntticc.or.jp/)

19. [www.iamas.ac.jp/~iwai](http://www.iamas.ac.jp/~iwai), [www.aec.at](http://www.aec.at)

20. [www.petworks.co.jp/~hachiya](http://www.petworks.co.jp/~hachiya), [www.so-net.ne.jp](http://www.so-net.ne.jp), [www.aec.at](http://www.aec.at)

21. See 「仮想空間における生命概念の曖昧化」("Blurring Boundary of Life in Cyberspace"), Machiko Kusahara, Gazo Labo, Vol.9.No.10, 1998

22. see 3.3.1. and 3.3.2. Work by Iwai or Hachiya or Chikamori can be listed. It is the same with Renga, which started from an idea which is almost like "let's try and see how it works".

See Kusahara, Machiko It's Good to Have Fun: Game Culture and Japanese Media Art, CAD FORUM ZBORNIK RADOVA, Zagreb, 1994. It is an essay which developed from the lecture I gave at the exhibition "Game Art Interface" I co-curated with Erkki Huhtamo in the National Art Gallery of New South Wales, Sydney, Australia in 1994. It was the first essay I dealt with the "playfulness" in Japanese media art in comparison to that in the West, in which "it's NOT good to have fun".

23. There has been arguments on "lack of serious concepts" in Japanese art and literature tradition, but it is not the aim of this dissertation. See for example 鶴見俊輔「限界芸術論」勁草書房 1967, 桑原武夫「第二芸術論」河出書房 1947, 田中優子「江戸の想像力」筑摩書房 1992

24. As in case of Iwai using Nintendo interface for TV production and his recent collaborative works using mobile phone, or Hachiya using simple video camera system in InterDiscommunication Machine. Another interesting case is Meiwa Electric Company (Meiwa Denki). Similar feature can be found with contemporary artists such as Kenji Yanobe or Yasumasa Morimura, who used "print club" system for an interactive use. Mariko Mori also has such approach in realizing her photography based pieces. For the artist Yasumasa Morimura, digital technology brought him a breakthrough in fully realizing his concept, which he had been doing using analog photo composition technique. Over recent years Morimura has been mixing various media technology to visualize his concept, always using his body -- with a very interesting exception he made using a "puri-kura"(print club) system at his solo exhibition in Tokyo.

25. Being playful and entertaining can be a feature in fine art, but Japanese artists go beyond the line. The results are typically seen with Meiwa Denki, or Hachiya's PostPet, as well as Iwai's works on TV production, or his recent collaborative product "Bikkuri Mouse", a collaborative painting software on PlayStation 2.

26. Besides the above mentioned artists, the highly conceptual media artist Hideki Nakazawa published "Digital Nendo" in 1996, which was a lego-like modeling software based on his notion of space and object can be listed. Quite a few artists also published their works as "games" on the market. However, they are artistic works with which serving for practical or useful purposes is not the aim.

27. Artists such as Iwai, Hachiya, and projects/products such as Renga, Digital Nendo, etc.

28. As described in the earlier part on the notion of identity, originality in Japan. Such as Renga, Mega Diary, InterCommunication Machine.

29. Collaborative art-related process is found all over Japan, in educational venues especially. In Renga, Mega



Diary, InteDiscommunication Machine, KAGE, Unconscious Flow (Naoko Tosa) and others, the theme is in creating communication through electronic medium.

30. As in PostPet, virtual characters are respected to act at their own wills, and that is the major part of the fun. In case of Seaman, the weirdness in the virtual character itself is the core part of the game. The idea is quite different from creating faithful and useful agents, for example.

31. As I described regarding "disembodiment", body is not treated as flesh, or "meat", as is often put, in contemporary Western art and media culture. While artists such as Stelarc or Orlan, or Eduardo Kac (with one of his recent works) use their bodies as physical objects, Japanese artists such as Dump Type or Seiko Mikami in the installation World, Membrane and the Dismembered Body treat body as a whole entity in its integration with mind.

32. Characters in "game" titles for enjoying sound and rhythm such as "Parappa Rapper" and "Vivribon" (art direction by Kiri Matsuura) are successful examples of simple characters being used effectively in 3D space. PostPet characters offer interesting examples of "cute" characters. About "virtual beauties" see the beginning part of this section.

33. The realizations of Chikamori's "KAGE", Fujihata's "Global Interior Project", DumpType's performances, for example.

34. It is also interesting to observe that some of these features can be observed with the contemporary media culture and artworks in Finland which is located at the border of the European culture.

35. See "Historical Perspective of Art and Technology - Japanese Culture Revived in Digital Era" ARTE NO SEculo - A HUMANIZACAO DAS TECNOLOGIAS(Brasil) Edition UNESP 1997

36. About the origin of the big eyes in Japanese comics, there are several explanations. A widely supported explanation is that American comics such as Betty Boop influenced Japanese comics and illustration. Japanese artists including the famous comics/animation master TEZUKA Osamu popularized such style.

Often 2D faces in Japanese comics are illustrated without having any relevant 3D model in the illustrator's mind. Painters, who are trained in the academic method with which a human body is illustrated according to the bones and muscles, can easily detect such problems. Also important is the fact that both in old scrolls and modern comics the major characters share almost identical faces. See J.Wakasugi 若杉準治 編 「絵巻物の鑑賞基礎知識」 至文堂1995

37. There was an interesting episode recently. An organization of Japanese lawyers published a pamphlet as a guide book for protecting the human right. Probably to achieve more readers, the content took a form of comic. The story starts as follows. A high school boy meets a woman on his way to school. The woman is a super-girl, who was sent (from somewhere.... as in this kind of stories) to protect the human right on earth. The boy happens to work with her.

Then a women's association protested against the publication. They found the costumes of the characters were almost against the idea of human right or equality. In the story the high school boy was dressed in a suit with a necktie, while the super-girl was almost naked, wearing ribbon-like pieces of cloths hanging in the air.

The lawyer who was responsible for the publication happened to be a woman (a rare case in Japan). She commented that she did not think the costumes were problematic. But after a while they decided to withdraw the pamphlets. This story shows how people got used to such stereotype images in Japan, including lawyers and women themselves.

38. When the first(as far as I know) online competition of digital images over multiple networks (NiftyServe, MasterNet, PC Van, NTT PC Network, and Sapience Net) was organized in early 1990s, we the jury members were surprised to see so many "otaku" images produced by the Net users.

39. There are many reasons for it, both in terms of technique and the purpose. Here are some technical reasons. Creating a realistic human character animation still requires a professional skill. Low cost softwares not necessarily offer software to support creating realistic animation. If one wants to have a realistic looking character, the rendering time for animation is still very long, thus it requires a long computational time to

create a whole animation.

40. In the game "Princess Maker" the user is asked to be a "father" to adopt a virtual little girl. However, the presumption of the game publisher and typical reaction of users are clearly not in educating or becoming a good father, judging from the images of sexy virtual girls uploaded on the Net. The reflection of Japanese old stories such as the Tale of Genji is behind the game.

41. About creating one's own "virtual beauty", see 「バーチャルビューティー 完全美少女の作り方」シリーズ、アゴスト、1999

42. It is considered that Harunobu, the artist, worked with Hiraga Genai and others. It was a result of collaboration between artists, scientists and engineers.

43. 小町谷朝生「視覚の文化」 劉草書房 1990 pp7,18,22-25, 布施英利「脳の中の美術館」筑摩書房,1988, p14, James J.Gibson The Ecological Approach to Visual Perception, Houghton Mifflin Co. 1979 ギブソン 古崎敬他訳「生態学的視覚論」サイエンス社 1985, Erwin Panofsky, Perspective as Symbolic Form, 1924-1925, Translated by Christopher S.Wood, Zone Books,1991, Jakob von Uexkull, ヤーコブ・フォン・ユクスキュル、ゲオルク・クリサート、Streifzug durch die umwelten von tieren und menschen bedeutungslehre 1970---「生物から見た世界」日高敏隆・野田保之訳、思索社 1973

44. 馬淵明子「ジャポニスム」ブリュッケ、1997, pp107, 110

45. 諏訪春雄「日本人と遠近法」ちくま新書 1999, 岸文和「江戸の遠近法 浮絵の視覚」劉草書房 1994, 岸文和「浮絵の記号学・序説」思文閣出版 1990, 馬淵明子「ジャポニスム」ブリュッケ 1997, 岡泰正「めがね絵新考」筑摩書房1992, 内山淳一「江戸の好奇心」講談社 1996, 横地清「遠近法で見る浮世絵」三省堂, 坂本満、戸枝敏郎「横浜版画と開化絵」至文堂 1993, 岡泰正他「眼鏡絵と東海道五十三次展」神戸市立美術館 1984, タイモン・スクリーチ「大江戸視覚革命」作品社 1998

46. These elements cannot be independent from each other. They are part of a vision/perception system. Erwin Panofsky, Perspective as Symbolic Form, 1924-1925, Translated by Christopher S.Wood, Zone Books,1991, The Hidden Dimension, Edward Twitchell Hall, Doubleday & Company, Incorporated, 1969.

47. James J. Gibson, The Ecological Approach to Visual Perception, Houghton Mifflin Co. 1979 ギブソン 古崎敬他訳「生態学的視覚論」サイエンス社 1985

48. Roland Barthes discusses about the change of the notion of "reality" after photography in his book La Chambre Claire Note sur la photographie. Komachiya also discusses the issue. Roland Barthes ロラン・バルト La Chambre Claire Note sur la photographie「明るい部屋 写真についての覚書」Gallimard 1980 みすず書房 1985, 小町谷朝生「視覚の文化」劉草書房 1990

49. Edward T.Hall examines such hidden filters of perception (not necessarily visual) in his following books. The Hidden Dimension, Edward Twitchell Hall, Doubleday & Company, Incorporated, 1969. The Silent Language, Edward Twitchell Hall, Doubleday & Company, Incorporated, 1977.

50. Such images are still meant for rather OTAKU users today, but it is also public -- books made of high quality paper, full of such images, are published and can be found from the design section of major books stores. Such cultural phenomenon is particularly Japanese for the moment, yet it is visualizing something that is happening in our society in the global level. It is, for example, related to the figures from the Japanese comic culture that the artist Takashi Murakami has been showing in an exaggarated manner. See the note 1 from Introduction.

Japanese game culture, on which I will come back later, is another example. All in all, Japanese popular culture, which is now transforming itself into digital form, seems to have developed under the influence of the traditional visual language. We will come back to the issue in the conclusion part.

51. 辻茂「遠近法の誕生 ルネッサンスの芸術家と科学」朝日新聞社 1995

52. Erwin Panofsky, Perspective as Symbolic Form, 1924-1925, Translated by Christopher S.Wood, Zone Books,1991

53. 辻茂「遠近法の誕生 ルネッサンスの芸術家と科学」朝日新聞社 1995 p6, translated by kusahara

54. 諏訪春雄「日本人と遠近法」ちくま新書 1999

55. There are early Japanese perspective prints which seem to have their models in Chinese prints. 岡泰正他「眼鏡絵と東海道五十三次展」神戸市立美術館 1984, 岡泰正「めがね絵新考」筑摩書房1992. Images from Chinese peep show culture can be found in Balzer's book. Richard Balzer, Peepshows A Visual History 1998 Abrams. Optic equipments were included in the official Dutch shipping list to Japan. For example, camera obscura was brought to Japan from Holland already in 1646.
56. Suzuki Harunobu (1725-1770), who is considered as the founder of Nishiki-e (colorful print) produced a print with two boys using a zograscope brought from Europe. (「六玉川・高野の玉川」神戸市立博物館蔵)
57. In a book published in 1739, publication of uki-e is listed as one of the most important news, along with other news headlines such as a foreign vessel approaching Japan, or a man killed by an elephant. 岸文和「江戸の遠近法 浮絵の視覚」劉草書房 1994 pp1-4.
58. Henry Smith III, 「浮世絵にみる江戸名所」岩波書店 1993 p6
59. 佐竹曙山「佐竹曙山写生帖」
60. 内山淳一「江戸の好奇心」講談社1996 pp55-56
61. タイモン・スクリーチ「大江戸視覚革命」作品社 1998, p214, translated by Kusahara
62. For the reasons why perspective box (peepshow) produces a realistic feeling, see 小町谷朝生「視覚の文化」劉草書房 1990
63. Richard Balzer's books give a panorama of perspective prints in the West. Ibid.
64. Kokan, Okyo and some other artists such as Aodo Denzen practiced precise perspective drawing, others "misused" it, either because they did not really understand the idea, or because they needed to have it to meet their demand.
65. 諏訪春雄 「日本人と遠近法」筑摩書房1999. For example, Utagawa Toyokuni III (1786-1864), a popular and extremely productive artist toward the end of Edo era, often used partial perspective.
66. 岸文和「江戸の遠近法 浮絵の視覚」劉草書房
67. 長崎巖 「服装表現からみた絵巻物」若杉準治 編 「絵巻物の鑑賞基礎知識」 至文堂1995 p225, 若杉準治 編 「絵巻物の鑑賞基礎知識」 至文堂1995, 高畑勲「十二世紀のアニメーション」徳間書店 1999, 諏訪春雄「日本人と遠近法」ちくま新書 1999
68. 安東次男「芭蕉連句評釈 上下」講談社 1994, 小松英雄「やまとうた 古今和歌集の言語ゲーム」講談社 1994, 田中優子「江戸の想像力」筑摩書房 1992
69. The depth of the space is often exaggerated mainly with two techniques applied. by drawing something (trees, men, or some surprising objects) close to the viewpoint, then leaving a wide, almost empty space at the center. 馬淵明子「ジャポニスム」ブリュッケ 1997
70. 坂本満／戸枝敏郎「横浜絵と開化絵における造形 遠近法の問題」「横浜版画と開化絵」日本の美術 Vol.9 No.328 坂本満／戸枝敏郎 監修 文化庁／東京国立博物館／京都国立博物館／奈良国立博物館 至文堂 1993.9 p51,p56
71. Such way of using images for virtual traveling would be a universal phenomenon in the societies where traveling for fun had become possible, but not yet so easily accessible for anyone. A parallel can be seen in the West with the popularity of panorama in form of books, and stereo cards that became extremely popular around 1900 and also brought to Japan.
72. ヘンリー・スミス 浮世絵に見る江戸名所 岩波書店 1993 pp.25-28
73. Needless to say, the famous Mt. Fuji illustrated by Hokusai (沖浦の富士) is based on the same principle.
74. 馬淵明子「ジャポニスム」ブリュッケ 1997, 諏訪春雄 「日本人と遠近法」ちくま新書 1999, 横地清「遠近法で見る浮世絵」三省堂
75. 高畑勲「十二世紀のアニメーション」徳間書店 1999
76. 諏訪春雄「日本人と遠近法」ちくま新書1998
77. There are some examples like this in Western paintings. The famous trilogy painting by Bosch shows Adam and Eve having an apple and the couple being expelled from Eden on the same panel.
78. According to a recent study done by Fumihiko Gomi, this roll seems to be painted by the painter himself as a part of the petition he made regarding his status. 五味文彦 「絵巻で読む中世」ちくま新書, 五味文彦 「中世の言



79. 若杉準治 編 絵巻物の鑑賞基礎知識 至文堂1995, 高畑勲「十二世紀のアニメーション」徳間書店 1999

80. It is different from Chinese way of appreciating scrolls. In China whole scroll will be spread.

81. 佐藤悟 「近世文学と影絵」(「影絵」の十九世紀)展カタログ) サントリー美術館、1995

82. Compared to the study on perspective, not much studies have been done on shading and shadowing in Japanese art. Okado Toshiyuki has done researches on the use and meanings of shadows in Japanese art.

Interestingly enough, the absence of distinction between shading and shadowing is often seen among researches done in Japan, still reflecting our tradition. Junichi Uchiyama also analyzes the appearance of shadow in ukiyo-e prints. 岡戸敏幸 「影と身体 - 月光と影法師のあわいに」(影-写像としての世界/光-仮想としての世界)展カタログ) 東京都写真美術館、1999, 岡戸敏幸 「影絵」の十九世紀 - 人は「影」に何を見てきたか」(「影絵」の十九世紀)展カタログ) サントリー美術館、1995, 内山淳一「江戸の好奇心」講談社 1996

83. For the re-discovery of shadow, or change of the role of shadow at the arrival of magic lantern culture, see Mannoni. Laurent Mannoni, Le grand art de la lumiere et de l'ombre. Archeologie du cinema, Paris: Nathan, 1994. Laurent Mannoni, Laurent Manoni "Trois Siecles de Cinema" Reunion des Musees Nationaux 1995

84. About the "playfulness" in Japanese way of accepting optical science and technology, see Uchiyama, Ibid. In relation to this issue, Tatsukawa analyzes about the playful nature in Japanese tradition in applying new technology in his books on karakuri.

85. Representation of light was an important motif in religious paintings. Also, luminous images given through stained glasses of churches were the major medium for the normal people to understand the Bible before publication of the Bible in contemporary languages started. In the book "Computer Images" (1986), edited by Carl Machover and published from Time/Life, as a volume from "Understanding Computer" series, the writer states that "now finally we achieved a method to paint with light". This phrase surprised me, as no one had spoke about computer graphics from such point of view in Japan. This sentence reflects the fact that "painting by light" was considered as a dream in the Western art history.

86. The circle including Hiraga Gennai, Morishima Churyo and others was probably the most influential, bridging Western science and art to Japanese. Hiraga Gennai taught the technique to Odano Naotake from Akita, who later did the illustration plates for the first Western book of anatomy translated and published in Japan. See 片桐一男 「開かれた鎖国」 講談社 1997, タイモン・スクリーチ 「江戸の思考空間」青土社 1998

87. There are two other possible reasons why shading was used to illustrate foreigners. One is to emphasize the difference of faces, such as having a big nose. The second is that often they copied from prints from abroad, typically from illustrated newspapers such as London Illustrated or Paris Illustre, which offered prints with shaded expressions. However, by examining how clothes, animals and other objects related to foreigners were illustrated with shadings while Japanese characters and objects had flat coloring, consciousness toward alien, exotic way of representation becomes clear. 「横浜版画と開化絵」日本の美術 Vol.9 No.328 坂本満/戸枝敏郎 監修 文化庁/東京国立博物館/京都国立博物館/奈良国立博物館 至文堂 1993.9

The images cited here are as follows.

Fig.35 横浜異人商館之図 五雲亭貞秀 1861 神奈川県立博物館蔵 出典 「横浜版画と開化絵」日本の美術 Vol.9 No.328 坂本満/戸枝敏郎 監修 文化庁/東京国立博物館/京都国立博物館/奈良国立博物館 至文堂 1993.9

Fig. 36 外国人物図会 落合芳幾 1861日本通運蔵 出典 Ibid

Fig.37 東京開化名勝京橋石造銀座通両側煉化石商家盛栄之図 三代広重 1874 マスプロ電工美術館蔵 出典 Ibid

Fig. 38 万国男女人物図会 落合芳幾 1861 マスプロ電工美術館蔵 出典 Ibid

Fig.39 柳風吹矢の糸条 二代歌川国貞 1864 国立劇場蔵 出典 芝居版画等図録 VIII 日本芸術文化振興会発行 1995

Fig.40 増補天竺徳兵衛 豊原国周 1881 国立劇場蔵 出典 芝居版画等図録 IX 日本芸術文化振興 Fig.41 一ツ家 月岡芳年 1890 国立劇場蔵 出典 Ibid.

88. One of such shaded monstrous figures can be found among the illustrations that Hokusai did for Bakin's "Hyochu Sono-no-yuki". The huge, detailed spider is likely to be inspired by microscopic images of insects. Both Hokusai and Bakin had connection to the circle of intellectuals who had access to the new technology

brought by Dutch people.

89. タイモン・スクリーチ 「江戸の思考空間」 青土社 1998 p206

90. For example, Aodo Denzen, who correctly used perspective drawing, decided not to paint shadows on his painting depicting Mt. Asama. 内山淳一「江戸の好奇心」 講談社 1996 pp128-145

91. Ibid. It is considered that shadow play from Asia was brought to Europe and became extremely popular (Ombres Chinoise). Although researchers have been trying to find an evidence, no clear records on the origins of silhouette, ombre Chinoise, and silhouette like images in Japan have been found.

92. Some artists such as Hiraga Gennai, Aodo Denzen, Satake Yoshiatsu (Shozan) painted fully shaded images. But the popularity of their images were much less compared to later artists such as Gountei Sadahide, Ichimosai Yoshitora or Ochiai Yoshiiku, who used shading in limited manner to emphasize exoticism.

93. Since ukiyo-e was the most important and popular medium of the time, with serious competition among painters and publishers, Ukiyo-e artists always sought for novelties. For example, when Perry arrived Japan in 1853, some courageous painters hired a small boat and approached the American vessels, with their sketchbooks. See 横田洋一「横浜浮世絵」有隣堂 1989, 片桐一男 「開かれた鎖国」 講談社 1997, タイモン・スクリーチ 「江戸の思考空間」 青土社 1998, タイモン・スクリーチ「大江戸視覚革命 — 十八世紀日本の西洋科学と民衆文化」 作品社 1998

94. About the distinction between the way faces were illustrated in scrolls, see Wakasugi. Information can be found in various books on Japanese art history about the era and schools in which realistic portraits were produced.

95. I cannot go into more detail, but it was a system that worked well. There were subtle features within the facial patterns that a ukiyo-e artist could use, to realize his/her own style, or to make distinctions among the faces of celebrities. In appreciating an image, such details on a face and hints in the images (clothes, belongings, background, etc.) served to distinguish a model from each other, which was an important part of the amusement -- which also means that people shared such information. Recent studies in this field have revealed highly sophisticated media culture. (see Screech and Yuko Tanaka, among other resources) However, patternization of faces inevitably met problems in case of small images to be printed as illustration for novels. It was technically too difficult to make distinction among the faces of different characters. Clothes and belongings were used for distinction, and even more, often each character's name in an abbreviated form was printed on his/her cloth, as if it were a part of the textile. There are more details in the way such text-based codings of characters developed further within image representation.

96. The production system was very efficient. Judging from the remaining numbers of ukiyo-e prints, and also from the record (as the publication was controlled by the government), and by the way ukiyo-e served as something like weekly magazines of today, we can see how the production period for each image was short. Also, the prints had to be in the affordable range for normal people.

97. Even switching between these representation can happen on the same character, according to the situation. For example, the comic artist Rumiko Takahashi uses such technique. Such change of code is also part of the visual culture.

98. Among the reasons given to explain why eyes of characters became bigger in Japan, there are a few interesting explanations. One hypothesis is the influence from the American comic/animation Betty Boop which was a big hit in Japan. Another possibility is the influence of Osamu Tezuka's characters. Another hypothesis is that eyes became big because it was useful to produce strong impressions and convey emotions.

In general, according to the studies in this field, Japanese comics and animation developed as the mixture of Japanese traditional visual entertainment and influence from abroad. Caricaturistic illustrations from Europe such as Punch and Judy, which arrived soon after Japan opened the border played an important role in the formation of comics, together with illustrators who came and stayed in Japan. See 岡田斗司夫「マンガ学」1998 美術出版社, Scott McCloud, Understanding Comics: The Invisible Art, Harper Collins, New York 1994, 「本の笑い・マンガ1000年史」文芸春秋デラックス 1975, Keiko Omoto & Francis Macouin, Quand le Japon s'ouvrit au monde,

Gallimard 1990.

Animation culture has developed under the major influence from Hollywood soon after the war because by that time animation industry in Europe had been seriously damaged because of the War. See おかだえみこ、鈴木伸一、高畑勲、宮崎駿「アニメの世界」新潮社1988, Donald Crafton, Before Mickey: The Animated Film. 1898-1928, University of Chicago Press, 1993

99. Concerning the transition of visual language in Japan, ukiyo-e like imagery remained the main stream in the society until the end of the 19th Century. For example, "educational nishiki-e" (ukiyo-e) was formally used in education until the end of 19th Century. The Ministry of Education also supervised the edition of educational magic lantern slides, painted in the traditional imagery. Images appeared in popular culture such as advertising were also traditional in their style.

100. Michel Foucault's "panopticon" deals with the concept.

101. The two major theories to define the space by Kant and DesCartes were conceived from theological arguments. Also, Newton cared about the consistency between science and theology, and in fact, his color theory was received by the contemporary intellectuals as a proof to the perfection of the God.

102. Otto Mayr, "Authority, Liberty, and Automatic Machinery in Early Modern Europe", 1986, The Johns Hopkins University Press, Baltimore. The use of words Deus Ex Machina symbolizes the connection between theology and machinery.

103. Even though telescopes and other optical instruments were even produced domestically in Edo period, they almost always ended up in being used as toys or objects of curiosity. The same with mechanical clock and automata. Certainly there was a political reason behind, but probably there is a deeper reason in it. 立川昭二 からくり 法政大学出版局 1969, タイモン・スクリーチ「大江戸視覚革命 — 十八世紀日本の西洋科学と民衆文化」作品社 1998

104. Flexible use of space in comics coincides with the traditional picture rolls where events in different time-space can be painted on a same scene. The flat expression of characters looks familiar to Japanese eyes rather than a realistic portrait. This will explain why 2D animation became so popular in Japan. Regarding themes, animation titles such as Princess Mononoke, Totoro, and others clearly depict such tradition. About the use of space by Tezuka, I learned a lot from the conversation with Frederick Schodt.

105. タイモン・スクリーチ「大江戸視覚革命 — 十八世紀日本の西洋科学と民衆文化」作品社 1998

106. Osamu Tezuka experimented dynamic use of frames. See Schodt. An interesting example of the use of space and frames is recently done in "Operation Teddy Bear" by Eduard Roussin, a multimedia production (CD-ROM) of digital comic from France.

107. See 80. In the West, exaggeration had become very popular as caricatures, or satire, by the end of 19C. Exaggerated expression is still mainly applied along the same line, for parodies and comical stories.

Patternized faces can be observed in practically every culture, since ancient Egypt. So it should be regarded as a basic manner our vision/perception system can easily take. They are universally common in today's popular culture, such as in comics or in advertisement. However, as we saw from images (Fig. 43-46), even generic faces in popular culture were traditionally drawn with shadings in the West. In fine art, strong focus on realistic representation of the world, including human beings, had become the major trend. In Japan, in contrary, realistic drawings did not become a major trend although there were some attempts in the history.

108. Wiener, Norbert The Human Use of Human Beings - Cybernetics and Society- Houghton Mifflin & Co, 1950  
ノーバート・ウィーナー 鎮目恭夫訳「人間機械論」みすず書房 1979

109. Included in Featherstone, Mike & Burrows, Roger, editors, Cyber Space, Cyber Bodies, Cyber Punk - Cultures of Technological Embodiment, SAGE Publications, London, Thousand Oaks, New Delhi, 1995

110. Hayles, N.Katherine, How We Became Posthuman, The University of Chicago Press, Chicago & London, 1992

111. Some artists have attempted to give eccentric characters to computer programs and achieved certain success in simulating "intellectual" activities of human beings. Ken Feingold's "Head" (realized in 2000) is a Eliza-based program with added function for association of words, and a manner of replying. As a result. the



character (Head) performs conversations with visitors in schizophrenic manner, close to a crazy human being. David Rokeby's "Giver of Names" is based on a program that produces and speaks poetic description on colors of the objects visitor had raised on a table. The text is produced using associations among words and sounds like being written by a poet inside the machine. Both pieces were shown at Alien Intelligence Exhibition in Kiasma, Helsinki.

See Huhtamo, Erkki, ed. Alien Intelligence, Exhibition Catalog, Kiasma, Helsinki, 2000

112. See 草原真知子 「アートと映像表現のためのマルチメディア利用」 岩波講座 マルチメディア情報学 10 自己の表現 岩波書店 2000

113. The main character of Dokodemo was also used in advertisement.

114. About the history of robots in Japan see Frederik L. Schodt, Inside the Robot Kingdom Kodansha 1988

115. Schodt, Ibid., Hayles, Ibid.

116. Key, Wilson Bryan, Media Sexploitation, 1976, ウィルソン・ブライアン・キイ、植島啓司訳「メディア・セックス」リポート 1989, Key, Wilson Bryan., Subliminal Seduction, 1973, ウィルソン・ブライアン・キイ、菅啓次郎訳「潜在意識の誘惑」リポート 1992

117. Hayles, Ibid. p162

118. An approach to promote subjective reality was consciously taken by the development team of AIBO.

Nobutada Doi of Sony says their goal is to develop robots that would sometimes resist to the user's order. It is the similar approach that has been taken with virtual pets such as PostPet and Seaman. I will come back to these cases later in relation to Japanese notion of life. From an interview on Asahi Shinbun, Jan.2001

119. Karl Sims, Evolved Creatures, SIGGRAPH95 Proceedings

120. See Chapter I.

121. See Chapter II.

122. For example, in Aquazone, the first successful fishtank simulation in Japan, naming each fish is the first step of the game.

123. For example, a character that reminds the user of someone he/she knows would trigger a sense of familiarity. It is said that Sega's Seaman brought such feeling to many users.

124. There are often cases that we say to ourselves "I have never seen this character, but it looks familiar to me."

realistic characters and motions in 1940s.

125. See Haraway, Hales, Grznic, Stone. Chizuko Ueno is one of the exceptional feminist researchers in Japan. Toshiya Ueno discusses about the body of women characters in popular animation and comic culture in 「紅のメタルスーツ」 紀伊国屋書店 1998

126. スクリーン, タイモン 高山宏訳「江戸の身体を開く」 作品社 1997, 田中優子「江戸の想像力」 筑摩書房 1992

127. 立川昭二 「日本人の死生観」

128. Various sources, including フィリップ・ポンス 「江戸から東京へ」 They were surprised to see the Japanese showing their bodies openly without bad consciousness, and still behaved "elegantly". As was mentioned in earlier chapters, the process of separation of body and mind grew the notion that the body should not be too respected or proudly shown.

129. In games, users shoot extraterrestrial quasi-human enemies without hesitation. It is natural, in the game world, as well as killing human enemies. But as we have more and more friendly entertainment robots and all kinds of agents around us, it will become a serious question. Then it will also become the issue of body and "soul" as well. We can put it like this: If a humanoid robot who lived together with the family for a long time "dies" (i.e. no hope to be repaired), what would the family do with the body of the robot? Keep it, or bury it, or throw it away, or sell it to a junk yard?(95) Such a case might happen. It can be a test to see how much subjectivity has been attached to the robot, and what would be applied as a metaphor for its body - a machine, or a pet, or an entity similar to human being.

130. Dokodemo Issyo consciously developed four different forms of reality for each character. Dot images on

the pocket game machine, rendered 3D images in the computer graphics generated environment, 3D characters composited with photography, are supplied in the game. Sony Computer Entertainment also promoted a full line-up of staffed toys.

131. The free manipulation of the virtual human body for amusement without any bad consciousness, as the illustrator Seisaku Kano has been even offering, is an idea which is difficult to accept for many people in the West. Since it seems to share the same elements with the appreciation of "figures" in OTAKU culture, according to my young friends, the nature of the difference between dealing with plastic and with digital data needs to be researched as well. Another issue beneath the phenomenon is gender, which is by itself closely related to the notion of body.

132. Asahi Shinbun, January 3, 2001.

133. In fact, those who are skeptical about such a vision given by the newspaper editor might change their minds soon. As they visited major department stores in Tokyo on the 2nd day of the new year, to enjoy the traditional new year's special sales, they were welcomed either by storekeeper girls bowing elegantly in kimonos and holding Sony's AIBOs in their arms, or by a humanoid robot TMSUK IV with an elegantly shaped metal skirt. Special exhibitions of the new AIBO, the cat-like model, attract not only children but also elderly people who spend hours observing and playing with the pet robots before they decide buying one. Literally, Japan has stepped into the new century with robots.

134. Many visitors waited for hours to enter; others had to give up, as tickets were sold out.

135. In the spring of 2000, an exhibition called "Robot-ism" took place in Sogetsu Hall in Tokyo, in the gorgeous altar-like space designed by the famous artist Isamu Noguchi. It was the very first media art exhibition sponsored by the Ministry of Culture and part of the Media Art Festival the ministry started three years ago. Sogetsu Hall, known as the center of the internationally famous flower arrangement school, was filled with all kind of robots and figures from comics or animation characters, created by artists, illustrators, designers and the industry. AIBO, P3 and TMSUK were walking on the show floor, while an "anime-like" figure the contemporary artist Takashi Murakami made (a lovely waitress, who turns into a jet fighter in case of emergency) stretched her arms like a goddess. This year, the Ministry of Culture's media art exhibition will be titled "Charamix", inviting virtual characters created by artists and others. Either being physical or digital, robots and virtual characters are now important elements in the scene of Japanese art and culture.

136. Robot-ism exhibition catalog, CG-ARTS, 2000

137. However, Frederic Schodt points out that by the end of the 1980s people had stopped naming robots or giving special ceremonies, because industrial robots had become commonplace and "too many to name".

Schodt, Frederik L. Inside the Robot Kingdom Kodansha 1988

138. Ibid.

139. I still remember an old woman from my neighborhood who told me that she believed that her favorite cat would re-born as a human being. Recently there was a letter from a reader in the Asahi newspaper, a highly regarded serious journal, asking for an advice. She explained that she is a Christian, and has a friend who is also a Christian. Her friend had recently lost her dog, and she believes the dog's soul must be sent to the heaven. The poor lady is confused, because she agrees with her friend, although she realizes nothing like that is written in the Bible.

An interesting research on the facts and the background of the Shogun who treated dogs almost equally to human beings can be read from the following book. 吉田豊「犬鷹大切物語」柏書房, 1999

140. Asahi Shinbun, Jan.10, 2001

141. There are also other issues which might be difficult to guess for people from other countries. Most people live in big cities like Tokyo, where keeping real animals is usually forbidden at collective housing establishments.

142. According to Asahi, the answer of Vatican was that if it is carried as a part of technical development it does not matter.

143. See Chapter III, on Telebody.

144. In case of Tamagotchi, there was a case that the "dead" Tamagotchi's were buried at a corner next to a Church, in a town in England. The ceremony was mediated by adults who had thought the children should not reset the game.

145. In Japanese domestic version, when Tamagotchi died it turned into a ghost that wandered around its tombstone reproachfully, which was too much for many users. Since such representation of a miserable death in the shape of a Japanese style ghost wandering around a Western style cross-shaped tombstone was impossible to make sense in the Western culture, it was modified for the export version. In export version a dead Tamagotchi would just disappear from the screen.

In Japan, Bandai opened "Tamagotchi's graveyard" on the internet for the consolation of the owners of the dead virtual pets. "Angel's Tamagotchi" was developed to save the sorrowful kids, but also to make more business. "Networking Tamagotchi" was another solution for the "death" of virtual pets.

In Angel's Tamagotch, what one gets on the screen is "the egg of angel". The egg is what a dead tamagotch turned out to be. If a user takes good care of the creature that hatch from the egg, the creature would not be tempted by a devil and thus successfully becomes an angel. A user who lost his/her tamagotch with the old version could have a hope that he/she would be able to save the dead pet finally. Since the story would be impossible to be understood in the West, the product was not exported.

146. In Square's Final Fantasy series, there was a time for transition when the environment was modeled and rendered in a realistic manner but characters looked simple, with 2D-like facial expressions. It was the time when designers and producers were not sure for the appropriate transition of characters from 2D to 3D.

## Conclusion

In this dissertation, I analyzed the various forms of relationship between technology, art, and media culture. The aim was to understand the process how such interaction has developed and come to function, and to find the structure beneath such relationship in the society, to serve for further development and application of digital technology in producing cultural contents.

To realize the above goal, I examined the way art and entertainment have developed along the change in technology and the change brought by technology in our society in Chapter I. What has been observed is the network of influence among technology, science, art, entertainment and other cultural elements, influencing each other while changing culture, and yet modified or appropriated by cultural constraints. However, as we saw in Chapter II, what has become possible with digital technology can be traced back to its conceptual origin in the history, showing that certain fundamental desires of human beings have been appropriated with contemporary science, technology and art throughout the history.

Especially with the way we see the world, technology has been changing the essential elements such as the notion of space or body. Such change has brought innovation in art making, while artists also serve the culture by proposing the new way of seeing the world with the new technology. Chapter III is mainly devoted for the above analysis, focusing on telecommunication technology, art, and our way of seeing the world.

On the other hand, traditional cultural framework remains valid in guiding the way we use technology, even sometimes implicitly influencing the direction of technical and commercial achievement. By the analysis on Japanese visual language and to compare it with contemporary cultural phenomena, we could see how cultural paradigm works on our daily life basis. Digital technology can find innovative application by effectively using such traditional elements, while it is also needed to be aware of such hidden dimension of the culture to avoid social or psychological problems.

The research has revealed that Japanese traditional visual language is featured with importance of subjective and relative way of seeing the world, in a non-Cartesian, NON-perspective manner, including the way of seeing life. Such feature can be observed in our digital contemporary culture. Also, the conflict between the traditional visual language and that of digital 3D system has been producing a body of innovative approaches, which will possibly grow into a new visual language for the digital era.

There are more than several issues which are related to this research that I was not able to develop enough.

One of them is the notion of body in cyberspace (telebody) and with digital pets/characters/robots, seen with the Japanese paradigm. While there has been a body of research



on that issue in US, particularly from the feminist point of view, not much research has been done in Japan. From what I have analyzed in this dissertation, it is apparent that there is a difference in the notion of body in Japan and in the West. Especially with the arrivals of household robots and the diversity in telecommunication platform such as mobile phones, notion of body will go through a drastic change. It is urgent and important to study what can be learned from the existing studies and what should be researched further. (1)

Another is the boundaries between digital art and entertainment from more theoretical approach. The notion of art, design and entertainment has been changing, while the social framework such as museums and publications are still having difficulties in finding an appropriate solution. (2) Involvement of technology in art is a major reason for the change. What I argued in Chapter I should be continuously updated.

What will be needed is more inter-cultural study on how technology has been changing the way we see the world, and what is needed to maintain the bio-diversity of culture in the digital era while enhancing the creativity of human beings on the global basis.

#### notes

1. I have started the research in 1997 with Marina Grznic and the Buto dancer Testuro Fukuhara, but the research has not been developed enough.
2. Museums such as Pompidou Center, Walker Art Center, Mito Art Tower and other places are strongly focusing in the new definition of art.

## Bibliography

### General

- Gibson, James J., *The Ecological Approach to Visual Perception*, Houghton Mifflin Co. 1979 ギブソン 古崎敬他訳「生態学的視覚論」サイエンス社 1985
- Hall, Edward Twitchell. *The Silent Language*, Doubleday & Company, Incorporated 1977
- Hall, Edward Twitchell. *The Hidden Dimension*, Doubleday & Company, Incorporated 1969
- Hall, Edward Twitchell. *Understanding Cultural Differences: Germans, French, and Americans*, Intercultural Press, Inc., 1989
- Hall, Edward Twitchell. *Beyond Culture*, Doubleday & Company, Incorporated, 1976
- Marvin, Carolyn. *When Old Technologies Were New: Thinking About Electric Communication in the Late Nineteenth Century*, New York and Oxford: Oxford University Press, 1988.
- 村上陽一郎「新しい科学論」講談社 1979
- Panofsky, Erwin. *Perspective as Symbolic Form, 1924-1925*, Translated by Christopher S.Wood, Zone Books, 1991
- Riedl, Rupert. *Biologie der Erkenntnis* Verlag Paul Parey, Berlin 1981 ルーベルト・リードル 鈴木達也他訳「認識の生物学」思索社 1990
- Russel, Bertland. *My Philosophical Development*, George Allen @ Unwin, London, 1959 パートランド・ラッセル、野田又夫訳「私の哲学の発展」みすず書房 1960
- 佐々木正人、松野孝一郎、三嶋博之「アフォーダンス」青土社 1997
- Whitehead, Alfred Northe. *Science and the Modern World*, The Free Press, new York 1967
- ヴォルフガング・シヴェルブシュ 加藤二郎訳「鉄道旅行の歴史」法政大学出版局 1982 Schievelbusch, Wolfgang, *Geschichte der Eisenbahnreise. Zur Industrialisierung von Raum und Zeit im 19. Jahrhundert*, Frankfurt am Main: Fischer Taschenbuch Verlag, 1989 [1977].
- Uexkull, Jakob von ヤーコブ・フォン・ユクスキュル、ゲオルク・クリサート、*Streifuge durch die umwelten von tieren und menschen bedeeutunglehre* 1970「生物から見た世界」日高敏隆・野田保之訳、思索社 1973
- Zizek, Slavoj, *The Metaphysics of Enjoyment*, 1994 青土社

### Media Study

- Bay, Hakim *The Information War* Dixson, Joan Broadhurst, Cassidy, Eric J. ed. *Virtual Futures: Cyberotics, Technology and Post-Human Pragmatism*, Routledge, London and New York, 1998
- *Body and the East from the 1960s to the Present*, Museum of Modern Art, Ljubjana, 1998
- 布施英利「ポスト・ヒューマン」法蔵館 1996
- Benjamin, Walter *The Work of Art in the Age of Mechanical Reproduction*, in *Illuminations*, London, Fontana Paperback, 1979
- 伊藤俊治 *ジオラマ論* リプロポート 1986
- Marvin, Carolyn, *When Old Technologies Were New: Thinking About Electric Communication in the Late Nineteenth Century*, New York and Oxford: Oxford University Press, 1988.

- McLuhan, Marshall. Understanding Media, McGraw Hill, New York 1964
- McLuhan, Marshall. The Gutenberg Galaxy, New American Library, New York 1969
- 港千尋 「映像論」 1998 NHKブックス
- 港千尋 「考える皮膚 触覚文化論」 青土社 1993
- 水越伸 メディアの生成 同文館1993
- 水越伸 「デジタル・メディア社会」 岩波書店 1999
- 水越伸責任編集 「20世紀のメディア」 ジャストシステム 1996
- Morse, Margaret "Virtualities: Television, Media Art and Cyberculture" Indiana University Press, 1998
- Norman, Donald A. The Invisible Computer, 1998, The MIT Press
- 大澤真幸、町澤静夫、香山リカ 「心はどこへ行こうとしているか」 マガジンハウス 1998
- ヴォルフガング・シヴェルプシュ 加藤二郎訳 「鉄道旅行の歴史」 法政大学出版局 1982 Schievelbusch, Wolfgang, Geschichte der Eisenbahnreise. Zur Industrialisierung von Raum und Zeit im 19. Jahrhundert, Frankfurt am Main: Fischer Taschenbuch Verlag, 1989 [1977].
- Snow, C.P., The Two Cultures and A Second Look, Cambridge: Cambridge University Press, 1979 [Part One, 1959]
- Sontag, Susan On Photography, Farrar, Straus, and Giroux, New York, 1977
- Stone, Allucqure Rosanne, The War of Desire and Technology at the Close of the Mechanical Age, the MIT Press, 1995
- 吉見俊哉、若林幹夫、水越伸 メディアとしての電話 弘文堂 1992
- Virilio, Paul, War and Cinema. The Logistics of Perception, translated by Patrick Camiller, London & New York: Verso, 1989 [alk. ranskaksi 1984].

## Art History

- Photography after Photography - Memory and Representation in the Digital Age, edited by Huberthus.v.Amelunxen, Stefan Iglhaut, Florian Rotzer, G+B Arts 1996
- Art and Technology, Art&Design Magazine, Academy Group Ltd, 1994
- Art Cognition, edited by Cypres/Ecole d'Art d'Aix-en-Provence, 1991
- Archer, Michael Installation Art, Thames and Hudson, 1994
- Barthes, Roland ロラン・バルト La Chambre Claire Note sur la photographie 「明るい部屋 写真についての覚書」 Gallimard 1980 みすず書房 1985
- Baudrillard, Jean Simulacres et simulation 1981, Edition Galilee, Paris ジャン・ボードリヤール、竹原あき子訳 「シミュラクルとシミュレーション」 法政大学出版局 1984
- Benjamin, Walter Benjamin The Work of Art in the Age of Mechanical Reproduction, in Illuminations, London, Fontana Paperback, 1979
- ベンヤミン、ヴァルター 「ベンヤミン・コレクション 1 近代の意味」 ちくま学芸文庫 1995
- ベンヤミン、ヴァルター 「写真小史」 ちくま学芸文庫 1998
- Breton, Andre Manifeste du Surrealisme/Poisson soluble 1924 アンドレ・ブルトン 巖谷国士訳 「シュルレアリスム宣言・溶ける魚」 岩波文庫 1992
- Burnham, Jack. Beyond Modern Sculpture, Georges Braziller, NY. 1968

- Cornwell, Regina From the Analytical Engine to Lady Ada's Art, Iterations:The New Image, edit. Timothy Dreckrey, The MIT Press, Cambridge and London.1993
- Druckrey, Timothy, Revisioning Technology, Iterations:The New Image, edit. Timothy Dreckrey, The MIT Press, Cambridge and London.1993
- Duchamp, Marcel Duchamp du Signe, 1950, Flammarion 1975
- Gombrich, E.H., Art and Illusion, Phaidon, 1962
- Hogarth, William The Analysis of Beauty, Yale University Press, 1997
- 伊東順二「現在美術」 PARCO出版 1985
- 伊藤俊治「写真都市」トレヴィル 1988
- 伊藤俊治「20世紀写真史」筑摩書房 1988
- 伊藤俊治「トランス・シティ・ファイル」 INAX 1993
- 伊藤俊治「ジオラマ論」リプロポート、1986
- 伊藤俊治「写真と絵画のアルケオロジー」1987 白水社
- Kaprow, Alan Essays on the Blurring of Art and Life, University of California Press, 1993
- Kemp, M., The Science of Art,, New Haven & London, 1990
- 特集ランド・アート アール・ヴィヴァン 1986 20号
- Laurel, Brenda, On Dramatic Interaction, Iterations:The New Image, edit. Timothy Dreckrey, The MIT Press, Cambridge and London.1993
- Lulcie-Smith, Edward Movements in art since 1945 , 1965 Thames and Hudson, エドワード・ルーシー＝スミス 岡田隆彦、水沢勉訳 「現代美術の流れ」 PARCO出版 1986
- Lyotard, Jean Francois Lyotard, La condition postmoderne, Edition de Minuit, Paris 1979 ジャン＝フランソワ・リオタール、小林康夫訳「ポスト・モダンの条件」 書菴風の薔薇 1986
- モデル・アニメーション ー三次元の創造ー イメージフォーラム 1989.6 ダゲレオ出版
- Malraux, Andre Le Musee Imaginaire, Gallimard,1965
- Naylor, Gillian bauhaus, 1968, Studio Vista, ギリアン・ネイラー、利光功訳「バウハウス」 PARCO出版 1977
- 森村泰昌「芸術家Mのできるまで」筑摩書房 1998
- Paz, Octavio. Marcel Duchamp ou le chateau de la parete, 1967, オクタビオ・パス、宮川淳、柳瀬尚紀訳、書菴風の薔薇、1990
- Oriveira, Nicolas. , Perry, Michael, Oxley, Nicola Installation Art, Thames and Hudson London 1990
- Popper, Frank. "Art Action et Participation" 1982, Edition Klincksieck, Paris
- Popper, Frank. Art in the Electronic Age, London: Thames and Hudson, 1993.
- Man Ray, カメラ毎日別冊 毎日新聞社、1984.9
- Rotzer, Florian. Images Within Images, or From the Image to the Virtual World, Iterations:The New Image, edit. Timothy Dreckrey, The MIT Press, Cambridge and London.1993
- 映像の100年 イメージフォーラム100号記念特別号 1988 ダゲレオ出版
- Scharf, Aaron. Art and Photography,1974, Penguin Books
- ケネス・クウツ・スミス ダダ 柳生不二雄 PARCO出版 1976
- Schwarts, Hillel. The Culture of the Copy, Zone Books, NY 1996
- Sontag, Susan. On Photography, Farrar, Straus, and Giroux, New York, 1977



- Stafford, Barbara Maria., Artful Science, MIT Press, 1994
- Stangos, Nikos. Concepts of Modern Art, Thames and Hudson 1974, ニコス・タンゴス、宝木範義訳、PARCO出版 1985
- Walker, John A. , Art in the Age of Mass Media, 1994, Westview Press
- 横江文憲 「ヨーロッパの写真史」1997 白水社

## Digital Media Technology, Art and Technology, Computer Graphics, Virtual Reality

- 会津泉 進化するネットワーク NTT出版 1994
- Angel, Edward. Computer Graphics Addison-Wesley, New York 1990
- 安西 祐一郎 他 岩波講座 マルチメディア情報学 10 自己の表現 岩波書店 2000
- Ascott, Roy. The Technoetic Dimension of Art Art@Science, Springer. Wien and New York, 1997
- Ars Electronica 93
- Ars Electronica 91 Out of Control -
- Ars Electronica 90 Viertuelle Welten,
- Ars Electronica Festival 96, Memesis, Springer, 1996
- ArtIntact I(1994), II(1995), III(1996), IV(1998) Ostfilden Cantz Verlag/ZKM
- 浅田彰監修 科学と芸術の対話 NTT出版 1998
- 浅田彰, 伊藤俊治, 他 テクノカルチャー・マトリックス NTT出版 (1994)
- Baudrillard, Jean. The Seismic Order, Gerbel, Karl. ed. Out of Control: Ars Electronica 1991 Landesverlag, Linz, 1991
- Benedikt, Michael. et al, CYBERSPACE, 1991 MIT Press, マイケル・ベネディクト編、NTTヒューマンインタフェース研究会+鈴木圭介+山田和子訳「サイバースペース」NTT出版 1994
- ジャック・ブノワ＝メシヤン 河野鶴代・横山正 訳 「人間の庭」 思索社 1985
- 長幾朗他「メディア・レヴオリューション」ジャストシステム、1996
- Computer Art in Context: Siggraph '89 Art Show Catalog. Coordinating editor Pamela Grant-Ryan, Leonardo, Supplemental Issue 1989.
- Computer Graphics Visual Proceedings, Annual Conference Series, 1993, edited by Thomas E. Linehan, New York: The Associating for Computer Machinery, 1993.
- Computers in Art and Design. Edited by Isaac Victor Kerlow, Siggraph '91 Art and Design Show, New York: Association for Computing Machinery, 1991.
- Cox, Donna. What Can an Artist Do for Science: "Cosmic Voyage" IMAX Film. Art@Science, Springer. Wien and New York, 1997
- Coyne, Richard., Designing Information Technology in the Postmodern Age, LEONARDO Books, MIT Press, 1997
- Deken, Joseph. Computer Images ジョセフ・ディーケン、河口洋一郎監修「CGの世界」朝日新聞社、1984
- Dugues, Anne-Marie, ed. Delicate Technology, edited by SCAN+I&S, Treville, 1989
- Eams, Charles&Ray, office of ed. A Computer Perspective, Harvard University Press 1990
- Grant-Ryan, Pamela Coordinating Editor Digital Image - Digital Cinema: Siggraph '90 Art Show Catalog. Leonardo, Supplemental Issue 1990.

- Dennet, Daniel C. Kind of Minds, HarperCollins 1996 ダニエル・デネット、土屋俊訳「心はどこにあるのか」草思社 1997
- デヴィッド・エム、モントリオール・グループ、モニク・ナハ&エルベ・ユイトリック、河口洋一郎、Independent CGART、美術出版社 1986
- Fisher, Scott. Telepresence, Context and Sense-ability in Digital Worlds, Technoculture-Matrix, NTT Publishing 1994
- Foley/vanDam/Feiner/Hughes Computer Graphics: Principles and Practice Addison-Wesley, New York 1990
- Garbel, Karl & Peter Weibel, Intelligent Ambiente Ars Electronica 94, PBS Berleger, 1994
- Goodman, Cynthia, Digital Visions. Computers and Art, New York & Syracuse: Abrams & Everson Museum of Art, 1987.
- Goodman, Cynthia., Art and Technology: The Ineluctable Liaison Art@Science, Springer. Wien and New York, 1997
- Goodman, Cynthia., InfoArt, CD-ROM, Rutt Video Interactive, NY, 1996
- Druckrey, Timothy. , edited by, Iterations: The New Image, New York: International Center of Photography and Cambridge, Mass.: The MIT Press, 1993.
- デジタルメディア、CG、VR、マルチメディア
- Dundes, Alan., From Game to War The University Press of Kentucky, 1997
- Frieling, Rudolf., Dieter Daniels, ed. Media Art Interaction, Springer Wien, New York 1998
- 藤幡正樹 Geometric Love PARCO出版 1987
- Greenberger, Martin. ed. On Multimedia, The Voyager Company, Santa Monica, 1990 「マルチメディア 21世紀のテクノロジー 浜野保樹 訳 岩波書店
- 原島博 他「仮想現実学への序曲 - パーチャルリアリティ ドリーム -」共立出版 1994
- Haraway, Donna. Simians, Cyborgs, and Women. New York and London: Routledge, 1991.
- 服部桂「人工現実感の世界」工業調査会 1991
- 服部幸英, 大口孝之, 藤田祐二, 草原真知子 他 NICOGRAPHデータファイル 日本コンピュータグラフィックス協会 (1991)
- Heim, Michael. The Metaphysics of Virtual Reality, New York & Oxford: Oxford University Press, 1993.
- Heim, Michael. The Design of Virtual Reality, Featherstone, Mike & Burrows, Roger, ed., Cyber Space, Cyber Bodies, Cyber Punk - Cultures of Technological Embodiment, SAGE Publications, London, Thousand Oaks, New Dehli, 1995
- 広瀬通孝「パーチャル・リアリティって何だろう 仮想と現実のあいだ」ダイヤモンド社 1997
- 広瀬通孝「電脳都市の誕生 パーチャルリアリティとアーバンデザイン」PHP研究所 1996
- 広瀬通孝「パーチャルリアリティ」(ヒューマンコミュニケーション工学シリーズ) オーム社 1995
- 広瀬通孝「パーチャル・リアリティ」産業図書 1993
- 広瀬通孝「技術はどこまで人間に近づくか」(PHPブライテスト)(生体化するテクノロジーと21世紀) PHP研究所 1992
- Holtzman, Steven. Digital Mosaics - The Aesthetics of Cyberspace, Simon&Schuster, 1997, New York
- Huhtamo, Erkki. Time Traveling in the Gallery: An Archaeological Approach in Media Art,

- Immersed in Technology, edit. Anne Moser, MIT Press, 1996
- Huhtamo, Erkki. Art on the CD-ROM Frontier - A Mirage, a Fly in the Eye, or a real Thing? home essays E.M.M.I., www.urova.fi, 1995
  - Huhtamo, Erkki. Resurrecting the Technological Past - An Introduction to the Archaeology of Media Art, InterCommunication No.14, NTT Publishing 1995
  - Huhtamo, Erkki. From Kaleidoscomaniac to Cybernerd. Towards an Archeology of the Media, 1994, ISEA94 Proceedings, www.uiah.fi
  - Iimura, Takahiko 「飯村隆彦のメディア・ワールド」 Studio200, 1991
  - Iimura, Takahiko 「飯村隆彦のメディア・ワールド(II)」 Kirin Plaza Osaka, 1993
  - Iimura, Takahiko Meta Media 東京都写真美術館 1995
  - Iimura, Takahiko Takahiko Iimura Film and Video, Anthology Film Arcives, NY, 1990
  - 特集「身体／パフォーマンス」 InterCommunication 11 1995 NTT出版
  - 市村祐一・大石慎三郎「ゆるやかな情報革命」 講談社1995
  - InterCommunication 31 特集 マルチメディアと教育 2000
  - 石井裕 他 Tangible Bits ICC/NTT 出版 1999
  - 伊藤俊治他「インターメディウム・テキストブック」1997、光琳社
  - OPEN STUDIO 岩井俊雄展—そのメディア・アートの軌跡 NTT出版 1997
  - TOSHIO IWAI, ZKM/Gallery OTSO Espoo, 1994
  - Kac, Eduarudo Teleporting an Unknown State, 1998, KIBLA
  - 河口洋一郎「ザ・コンピュータ・グラフィックス」グラフィック社 1982
  - 河口洋一郎「コンピュータ・グラフィックスの世界」アスキー出版 1981
  - 河口洋一郎、草原真知子、大石孝之他"Computer Graphics Anthology" LD10枚組+解説書, 文献社, 1988
  - Key, Wilson Bryan. Media Sexploitation, 1976, ウィルソン・ブライアン・キイ、植島啓司訳「メディア・セックス」リプロポート 1989
  - Key, Wilson Bryan. Subliminal Seduction, 1973, ウィルソン・ブライアン・キイ、菅啓次郎訳「潜在意識の誘惑」リプロポート 1992
  - 紀田順一郎、西垣通、荒俣宏「マルチメディア」ジャストシステム 1993
  - Kidwell Peggy A., Ceruzzi Paul A., ed. Landmarks in Digital Computing, Smithsonian Institute Press, Washington & London, 1994
  - 木原民雄、安斎利洋、中村理恵子、草原真知子他「連画コミュニケーションシステムの基本構成」 情報処理学会 1995/10/25-27 (W-DPS95) マルチメディア通信と分散処理研究会ワークショップ 95.10
  - 基礎造形教育学研究、Matrix「感覚とメディア」基礎造形教育学研究会、No.2. 2000
  - Klein, Michael. The Evolution of Images Between Chaos, Art and New Media Art@Science, Springer. Wien and New York, 1997
  - Krueger, Myron W., Artificial Reality II, Reading, Massachusetts et al.: Addison-Wesley, 1991.
  - 草原真知子 「アートと映像表現のためのマルチメディア利用」岩波講座 マルチメディア情報学 10 自己の表現 岩波書店 2000
  - 草原真知子 「システムとしてのアートに向かって」 伊藤俊治他「インターメディウム・テキストブック」1997、光琳社
  - Kusahara, Machiko. Avatars of Virtual Worlds: Japanese interactive Artists, Art Asia Pacific,

- Machiko Kusahara "Tactile Renga -- Ahe Process of Rediscovery of Color" , ISEA2000, 2000
- 草原真知子 「視覚と触覚におけるイメージの共有と触発」 情報処理学会 コンピュータビジョンとイメージメディア研究会、124-11、2000
- Kusahara, Machiko. Nicht-perspektivische-Darstellung als symbolische Form, KUNSTFORUM International, Bd,151 2000
- Kusahara, Machiko. Non-perspective as Symbolic Form, SYNWORLD CD-ROM Proceedings, Museumquarter, Wien, 1999
- Kusahara,Machiko. Adding Media, Subtracting Signs, InterCommunication, 1999
- Kusahara, Machiko. "Transition of Concept of Life in Art and Culture from Automata to Network" 'art@science' Springer/Verlag P.99~P.119 1997
- Kusahara, Machiko. "Flora and Fauna: Japanese Games and Traditional Culture" 'Flesh Factor - informationsmaschine mensch' pp232-235, Springer/Verlag 1997
- Kusahara, Machiko. "Signed by Artist" 'Cyber Arts97' pp22-27, Springer/Verlag 1997
- Kusahara, Machiko. "Historical Perspective of Art and Technology - Japanese Culture Revived in Digital Era" ARTE NO SEculo XXI- A HUMANIZACAO DAS TECNOLOGIAS. Diana Domingues, ed. Editora UNESP,Sao Paulo 1997
- 草原真知子 CGアートの成立前後 日経CG12月号(特集CGアートの最新動向 日経BP社、1994
- 草原真知子 インタラクティブアートの現在 日経CG12月号(特集CGアートの最新動向) 日経BP社、1994
- 草原真知子「インタラクティブアートの成立過程」InterCommunication vol.7, NTT Publishing, pp.80-84, 1994
- 草原真知子 意味の衝突と連想のパラダイム InterCommunication 9 (NTT出版) 1994
- Kusahara, Machiko. It's Good to Have Fun: Game Culture and Japanese Media Art CAD FORUM ZBORNIK RADOVA 1994
- 草原真知子 あなたは自分の創った生物たちを十分に愛しますか? InterCommunication 10 NTT出版 1994
- 草原真知子 他 "Computer Graphics Access" LD 7 枚組+解説書, 文献社, 1991
- 草原真知子 「身体と空間のトポロジー」 NTT/ICC 「ネットワークの中のミュージアム」 展覧会カタログ 1995
- Kusahara, Machiko/Christa Sommerer/Laurent Mignonneau "Art as Living System" システム・情報・制御 vol.40. No.8 pp.16-23 (システム制御情報学会論文誌)
- Kusahara, Machiko. Telematic Dreaming" Museum in the Network, IC95 NTTPublishing 1996
- Kusahara, Machiko. "Collisions of Meanings and Free Association Paradigms" Annual InterCommunication 95 NTT Publishing 1995
- Kusahara, Machiko. "How Much Do You Love the Creatures You Have Made? " Annual InterCommunication 95 NTT Publishing 1995
- 草原真知子 「アートとしてのCD-ROM」 美術手帖 1996
- Kusahara, Machiko. "Are We Still Enjoying Interactivity?" (Publication of Prix Ars Electronica 99, Springer, 1999)
- Kusahara, Machiko. Creating Cultural Correctness in Cyberspace CAA99 Proceedings 1999
- Kusahara, Machiko. Shadow and Life - A Perspective on Japanese Digital Entertainment,



Stuttgart Filmwinter Catalog(1998)

- Laurel, Brenda. Computers as Theatre, Reading, Massachusetts at al.: Addison-Wesley, 1991.
- Leopoldseder, Hannes. Schopf, Christine. ed. Cyberarts,99 Springer Wien New York 1999
- Leopoldseder, Hannes. Schopf, Christine. ed. Cyberarts 98, Springer Wien New York 1998
- Leopoldseder, Hannes. Schopf, Christine. ed. Cyberarts, Springer Wien New York 1997
- Leopoldseder, Hannes. ed Der Prix Ars Electronica 96 Springer Wien New York 1996
- Leopoldseder, Hannes. ed Der Prix Ars Electronica 95 eritas Verlag Linz 1995
- Leopoldseder, Hannes. ed Der Prix Ars Electronica 94 eritas Verlag Linz 1994
- Leopoldseder, Hannes. ed Der Prix Ars Electronica 93 eritas Verlag Linz 1993
- Leopoldseder, Hannes. ed. Der Prix Ars Electronica Veritas Verlag Linz 1992
- Leopoldseder, Hannes. ed. Der Prix Ars Electronica Veritas Verlag Linz 1991
- Leopoldseder, Hannes. ed. Der Prix Ars Electronica Veritas Verlag Linz 1990
- Loeffler, Carl Eugene Virtual Realities, 1993 カール・E.ロフラー、福富忠和他訳 「ヴァーチャル・リアリティーズ」技術評論社 1993
- Machover, Carl edit. "Computer Images" TIME/LIFE Understanding Computer-西垣通「マルチメディア」岩波書店 1994
- McGrath, Melanie. Hard, Soft & Wet, Flamingo, London 1997
- Murray, Janet H. Hamlet on the Holodeck, Steling, New York, 1997
- Naimark, Michael. Art("and" or "versus") Technology - Some Personal Observations Art@Science, Springer. Wien and New York, 1997
- Nakatsu, Ryohei. Image/Speech Processing Adopting an Artistic Approach - Toward Integration of Art and Technology, Art@Science, Springer. Wien and New York, 1997
- 中津良平他 「インタラクティブ映画システムのコンセプトと構成例」電子情報通信学会和文論文誌 Vol.J81-D2 No.5 1998
- Norman, Donald.A, The Invisible Computer, The MIT Press, 1998
- 大口孝之 他 「CG夢博物館」Fujitsu Books 1992
- 大口孝之他 ハイパーアート・ミュージアム F2 94
- 大村皓一 「映像ワンダーランドへようこそ」パンリサーチ出版局 1989
- Paik, Nam June. Video Works 1963-88, Hayward Gallery, 1988
- Paik, Nam June. Feed Back & Feed Forth ナム・ジュン・パイク、フィード・バック&フィード。フォース、監修ワタリウム美術館、1993
- Panofsky, Erwin. アーウィン・パノフスキー 中森義宗他訳「視覚芸術の意味」岩崎美術社 1971
- Penley, Constance. & Andrew Ross, edit. Minneapolis: Technoculture, University of Minneapolis Press, 1991.
- Peterson, Ivars. The Mathematical Tourist: snapshot of modern mathematics Freeman, NY 1988
- Prueitt, Melvin L., Art and the Computer, New York: McGraw-Hill, 1984.
- Queau, Philippe. Virtual Communities: The Art of Presence, Art@Science, Springer. Wien and New York, 1997
- Queau, Philippe Le Virtuel: Vertus et Vertiges Champ Vallon, Paris 1989
- Reichardt, Jasja. Cybernetics, Art and Ideas London ICA 1971
- Rheingold, Howard., Virtual Reality, Summit Books, New York 1991. ハワード・ラインゴールド、沼田

博訳「バーチャル・リアリティ」ソフトバンク、1992

- Rheingold, Howard., Virtual Community: Homesteading on the Electronic Frontier Addison Wesley, Reading, MA, 1993
- Rheingold, Howard. , Tools for Thought, Simon&Schuster, 1985
- Rushkoff, Douglas. Media Virus, Ballantine Books, New York 1994
- Sakane, Itsuo. The Historical Background of Science-Art and its Potential. Art@Science, Springer. Wien and New York, 1997
- 坂根徹夫「遊びの博物誌」朝日新聞社 1977
- 坂根徹夫「新・遊びの博物誌」朝日新聞社 1982
- 坂根徹夫「境界線の旅」朝日新聞社 1985
- 坂根徹夫「科学と芸術の間」朝日新聞社 1986
- 坂根徹夫「イメージの回廊」朝日新聞社 1986
- 坂根徹夫他「インタラクション'95展」カタログ 1995
- 坂根徹夫他「インタラクション'97展」カタログ 1997
- 佐々木正人、松野孝一郎、三嶋博之「アフォーダンス」 青土社 1997
- 榎木野衣 「テクノデリック」集英社1996
- 関口敦仁、タナカノリユキ、日比野克彦「Xデパートメント」、東京書籍 1991
- Shaw, Jeffrey. Convergence of Art, Science and Technology? Art@Science, Springer. Wien and New York, 1997
- 下條信輔「＜意識＞とは何だろうか」講談社 1999
- Stocker, Gertfried., Schoepf., Christine. ed., Ars Electronica Festival 96 MEMESIS"Springer 1996
- Stocker, Gertfried., Schoepf., Christine. ed., Ars Electronica Festival 98 INFOWAR "Springer 1998
- 館 日章・広瀬通孝「バーチャル・テック・ラボ「超」現実への接近」工業調査会 1992
- 立花隆 編 「新世紀デジタル講義ー情報とは何かから、ネットワーク社会の未来までー」新潮社 2000
- Tanaka ,Noriyuki. "PAGES" 光琳社、1996
- Tanaka ,Noriyuki. "The Art of Clear Light" DIGITALOGUE
- Taylor, Mark., Saarinem Esa, IMAGOLOGIES, Routledge, New York, 1994
- Thalmann, Nadia Magnenat. & Daniel, Image Synthesis, Springer-Verlag Wien, New York,Tokyo, 1987
- Thalmann, Nadia Magnenat & Daniel,Computer Animation '91, Springer-Verlag Wien, New York, Tokyo, 1991
- Velthoven, Willem., ed. Mediamatic CD-ROM Vol.5-9 (1994-1996) , Mediamatic
- Weibel, Peter. The Unreasonable Effectiveness of the Methodological Convergence of Art and Science. Art@Science, Springer. Wien and New York, 1997
- HARDWARE SOFTWARE ARTWARE, ZKM, 1997
- Whitney,John Digital Harmony : On the Complementarity of Music and Visual Art McGraw-Hill, 1980
- 山口勝弘 「ロボット・アヴァンギャルド」PARCO出版1985
- 山口勝弘 「メディア時代の天神祭」美術出版社 1992

## Notion of Life, ALIFE and Art, Automata and Robot, Body

- Asimov, Isaac. I, ROBOT, 1950 小尾芙佐子他訳「われはロボット」 早川書房 昭和38年
- Bailly, Christian. AUTOMATA at Bagatelles Edition AAAJA 1993
- Barthelemy-Madaule, M. LAMARCK, ou le mythe du Precueuseur 1979 M・バルテルミ=マドール 横山輝雄、寺田元一訳 「ラマルクと進化論」朝日新聞社 1993
- リラダン, ヴィリエ・ド・ 未来のイヴ 1886 斎藤磯雄 訳 創元ライブラリ
- Bec, Louis. Artificial Life under Tension - A Lesson in Epistemological Fabulation, Art@Science, Springer. Wien and New York, 1997
- Bedel, Jean Les Automates, Jacques Grancher, Editeur Paris, 1987
- ビアス, アンブローズ、奥田俊介訳「自動チェス人形」(風間賢二編 ヴィクトリア朝空想科学小説 に収録)
- Bolter, David J. Turing's Man: Western Culture in the Computer Age, The University of North Caroline Press, Chapel Hill, 1984
- Brooks, Rodney A. and Patties Maes, edit. ARTIFICIAL LIFE IV, MIT Press, Cambridge, 1994
- Bukatman, Scott., Terminal Identity, Duke University Press, 1993
- Bukatman, Scott., Blade Runner, British Film Institute, 1998
- Capek, Karel. R.U.R. 1920 千野栄一訳「ロボット」岩波書店 1989
- Cleo Odzer., Virtual Spaces - Sex and the Cyber Citizen, Berkeley Books, Ner York, 1997
- 布施秀利「ポスト・ヒューマン」法蔵館 1995
- Dawkins, R. "The Blind Watchmaker" 1986 リチャード・ドーキンス、中嶋康裕他訳・日高敏隆監修「ブラインド・ウォッチメイカー」、早川書房 1993
- Dawkins, R. The Selfish Gene, 1976 Oxford University Press リチャード・ドーキンス、日高敏隆他訳、利己的な遺伝子、紀伊国屋書店 1986
- ド・ラ・メトリ 『人間機械論』杉捷夫訳、岩波書店、1932
- De Landa, Manuel. Virtual Environments an the Emergence of Synthetic Reason Dixon, Joan Broadhurst, Cassidy, Eric J. ed. Virtual Futures: Cyberotics, Technology and Post-Human Pragmatism, Routledge, London and New York, 1998
- Denett, Daniel. Darwin's Dangerous Idea, Touchstone, NY, 1996
- Denett, Daniel. Kinds of Minds, Brockman, New York 1996
- Descartes, Rene. "Introduction to Methodology" 1637, デカルト 落合太郎訳「方法序説」岩波文庫
- Dick, Philip.K., The Comic Puppet, Ace Book, NY 1956
- Dick, Philip.K, Do Androids Dream of Electric Sheep, 1968
- Dixon, Joan Broadhurst., Cassidy, Eric J. ed. Virtual Futures: Cyberotics, Technology and Post-Human Pragmatism, Routledge, London and New York, 1998
- Domingues, Diana. edit, A Arte No Seculo XXI, Editora UNESP, 1997
- Dyke, C. The Evolutionary Dynamics of Complex Systems, Oxford University Press, 1988
- Dyson, Frances, When Is the Ear Pierce? The Clashes Of Sound, Technology, and Cyberculture, Immersed in Technology, edit. Anne Moser, MIT Press, 1996
- Emmeche, Claus "The Garden in the Machines" 1994, Princeton University Press
- Featherstone, Mike. & Burrows, Roger, ed., Cyber Space, Cyber Bodies, Cyber Punk - Cultures of

- Technological Embodiment, SAGE Publications, London, Thousand Oaks, New Dehli, 1995
- Fleischmann, Monika., Strauss, Wolfgang. Images of the Body in the House of Illusion., Art@Science, Springer. Wien and New York, 1997
  - フロイト, S. S.Freud 「無気味なもの」 Das Unheimliche(1917-1920) 種村季弘訳 「砂男／無気味なもの」所収 河出書房新社 1995
  - Gerbel, Karl. ed. Out of Control: Ars Electronica 1991 Landesverlag, Linz, 1991
  - Gibson, William, Neuromancer, Ace Books, NY, 1983
  - Gray, Chris Hables, ed. The Cyborg Handbook, Routledge, NY., 1995
  - 原島博 他「人の顔を変えたのは何か」河出書房新社 1996
  - Harraway, Donna. Cyborg Manifesto: Science,Technology, and Socialist-Femminism in the Late Twentieth Century", pp149-81 in Simians, Cyborgs, and Women: The Reinvention of Nature. New York, Routridge, 1991
  - 服部桂 人工生命の世界 オーム社 1994
  - Hayles, N.Katherine. How We Became Posthuman, The University of Chicago Press, Chicago & London, 1992
  - Hayles, N.Katherine. Embodied Virtuality: Or How To Put Bodies Back Into The Picture, Immersed in Technology, ed. Anne Moser, MIT Press, Cambridge 1996
  - 星野力 編著 人工生命の夢と悩み 裳華房 1994
  - ホフマン, E.T. E.T.A.Hoffmann 「砂男」 Der Sandmann(1960-65) 種村季弘訳 「砂男／無気味なもの」所収 河出書房新社 1995
  - Huhtamo, Erkki. ed. Alien Intelligence, Exhibition Catalog, Kiasma, Helsinki, 2000
  - Huhtamo, Erkki. The Prehistory of Alien Intelligence, or How an Exhibition found its 'Final' Form, Alien Intelligence, Kiasma, 2000
  - Huhtamo, Erkki. Seeing at a Distance: Toward an Archaeology of the "Small Screen", Art@Science, Springer. Wien and New York, 1997
  - Huxley, Julian. Evolution in Action, Harper and Brothers, NY, 1953
  - Huxley, Julian. Brave New World, Bantam 1932
  - 特集「We are the ROBOTS」 InterCommunication 28 1999 NTT出版
  - 「共生する／進化するロボット」 ICC展示カタログ 1999 NTT出版
  - 伊東順二 他 Robo-ism1950-2000 文化庁メディア芸術祭展覧会カタログ CG-ART, 2000
  - 井村君江 「妖精学入門」講談社 1998
  - Jacob, Francois "Le Jeu des Possibles" Librairie Arthème Fayard, 1981
  - Kac, Eduardo GENESIS, O.K. Centrum fur Gegenwartskunst, 1999
  - 金子邦彦、郡司ベギオ幸夫。高木由臣 「多様性の生物学」 現代思想 vol.25-7, 1997.6
  - 河口洋一郎 「Growth Morphogenesis」 JICC出版局 1985
  - 河口洋一郎 「COACERVATER」 NTT出版 1994
  - Kawaguchi, Yoichiro., A Morphological Study of the Form of Nature, Siggraph Proceedings, Vol.16. 1982
  - Kawaguchi, Yoichiro. The Making of GROWTH II: Morphogenesis. IEEE Computer Graphics and Applications, 1985
  - Kawaguchi, Yoichiro. The Art of the GROWTH Algorithm with Cells, Artificial Life V, 1997



- 河本英夫 オートポイエーシス 青土社 1995
- Kelly, Kevin. Out of Control, 1994, Addison Wesley
- 小谷真理 「ファンタジーの冒険」筑摩書房1998
- Kroker, Arthur. and Marilouise, Digital Delirium, St.Martin's Press, NY, 1997
- Koestler, Arthur. The Roots of Coincidence, 1972 アーサー・ケストラー、村上陽一郎訳「偶然の本質」蒼樹書房 1974
- 北野宏明 進化するコンピュータ ジャストシステム 1993
- Kusahara, Machiko. "Transition of Concept of Life in Art and Culture from Automata to Network" ed. Christa Sommerer and Laurent Mignonneau, "art@science"Springer/Verlag pp.99-119, 1997
- 草原真知子 仮想空間における生命概念の曖昧化 画像ラボVol.9 No.10 1998
- 草原真知子 「ALifeアート展覧会」 日立 Vol.58 No.8 1996.8 特集「人工生命の世界」 p8
- 草原真知子「自動人形とインタラクティブ・アート - 人工生命をめぐる考察 -」東京工芸大学芸術学部紀要 Vol.1 (1995)
- 草原真知子 コンピュータグラフィックスに見る人工生命 遺伝48 (9) 装華房 94.9
- 草原真知子 カール・シムズの世界 ソカロ (埼玉県立美術館ニュース) 94.7
- Langton, Christopher., edit. ARTIFICIAL LIFE, Addison-Wesley, Reading, 1989
- Langton, Christopher., et al. edit. ARTIFICIAL LIFE II, Addison-Wesley, Reading, 1992
- Langton, Christopher., edit. ARTIFICIAL LIFE III, Addison-Wesley, Reading, 1994
- Langton, Christopher., Katsunori Shimohara, edit.ARTIFICIAL LIFE V, MIT Press, Cambridge, 1995
- Langton, Christopher., edit. ARTIFICIAL LIFE, An Overview MIT Press, Cambridge, 1997
- Latham,William. The Conquest of Form, Arnolfini Gallery, Bristol, 1989
- Latham, William. "The Empire of Form" O Art Museum 1990 ウィリアム・レイサム展 O美術館 1990
- Levy, Steven., Artificial Life, Vintage Books, New York,1992
- Lily, John C. Programming and Metaprogramming in the Human Biocomputer, 1967 菅靖彦訳 「バイオコンピュータとLSD」 リプロポート、1993
- Lunenfeld, Peter., Alien Aesthetics: Politics, Theory & Technology Alien Intelligence, Kiasma, 2000
- Maes, Pattie., Artificial Life Meets Entertainment: Life like Autonomous Agents, Communication of the ACM Special Issue on New Horizons of Commercial and Industrial: Artificial Intelligence 38 no.11,1995
- Maes, Pattie. ed. Designing Autonomous Agents: Theory and Practice from Biology to Engineering and Back, MIT Press, Cambridge, 1992
- Maingot, Eliane Les Automates Hachette 1959
- McCarthy, Helen, Hayao Miyazaki, Master of Japanese Animation, Stone Bridge Press, Berkeley, 1999
- Mannovich, Lev, Alien Vision: Simulation of Life and the History of Illusion Alien Intelligence, Kiasma, 2000
- Milner, Max. La Fantasmagorie, Essai sur l'optique fantasique, 1982 Press Universitaire de France

- Milthorp, Rob. Fascination, Masculinity, and Cyberspace, Immersed in Technology, edit. Anne Moser, MIT Press, 1996
- Minsky, Marvin, The Society of Mind, Simon & Schuster, New York, 1986
- Moravec, Hans. The Universal Robot, Gerbel, Karl. ed. Out of Control: Ars Electronica 1991 Landesverlag, Linz, 1991
- Morse, Margaret, Nature Morte: Landscape and Narrative in Virtual Environment, Immersed in Technology, edit. Anne Moser, MIT Press, 1996
- Morse, Margaret "Virtualities: Television, Media Art and Cyberculture" Indiana University Press, 1998
- Morse, Margaret, Gort! Klaatu Barada Nikto - on Alien Intelligence, Alien Intelligence, Kiasma, 2000
- 村上陽一郎編 「時間と進化」 東京大学出版会 1981
- 中村量空 「複雑系の意匠」 中公親書 1998
- 野田春彦、日高敏隆、丸山工作 「新しい生物学」 講談社1974
- 大橋力、小田晋、日高敏隆、村上陽一郎 「情緒ロボットの世界」 講談社 1985
- Omoto, Keiko & Macouin, Francis, Quand le Japon s'ouvrit au monde, Gallimard 1990
- Plant, Saddle. Coming Across the Future Dixon, Joan Broadhurst, Cassidy, Eric J. ed. Virtual Futures: Cyberotics, Technology and Post-Human Pragmatism, Routledge, London and New York, 1998
- Plant, Saddle. The Future Looms: Weaving Women and Cybernetics, Featherstone, Mike & Burrows, Roger, ed., Cyber Space, Cyber Bodies, Cyber Punk - Cultures of Technological Embodiment, SAGE Publications, London, Thousand Oaks, New Dehli, 1995
- Prusinkiewicz, Przemyslaw, Aristid Lindenmayer, The Algorithmic Beauty of Plants, Apringer Verlag 1990
- Prusinkiewicz, Przemyslaw, In Search of the Right Abstraction: The Synergy Between Art, Science, and Information Technology in the Modeling of Natural Phenomena. Art@Science, Springer. Wien and New York, 1997
- Ray, Thomas. Evolution as Artist, Art@Science, Springer. Wien and New York, 1997
- Riedl, Rupert Biologie der Erkenntnis Verlag Paul Parey, Berlin 1981 ルーベルト・リードル 鈴木達也他訳「認識の生物学」思索社 1990
- Ronell, Avital, A Disappearance of Community, Immersed in Technology, edit. Anne Moser, MIT Press, 1996
- Rucker, Rudy, Artificial life Lab, Waite Group Press 1993
- Rucker, Rudy, WETWARE, 1988 Hayakawa Publishing
- 佐倉統 生命をめぐる冒険 河出書房新社 1998
- 佐倉統 動きはじめた人工生命 同文書院 1993
- 佐倉統、北野宏明 人工生命というシステム ジャストシステム 1995
- 佐倉統 フランケンシュタインの末裔たち 日本経済新聞社 1995
- 佐倉統、服部桂、草原真知子他 人工生命の美学 洋泉社 1994
- Schodt, Frederik L. Inside the Robot Kingdom Kodansha 1988
- Schoepf, Christine edit. Flesh Factor(1997) Springer/Verlag

- スクリーチ, タイモン 高山宏訳「江戸の身体を開く」作品社 1997
- Schrodinger, Erwin My View of the World, 1961, Ox Bow Press
- Schrodinger, Erwin What is Life? The Physical Aspect of the Living Cell, 「生命とは何か」  
Cambridge University Press/岩波書店 1951
- Sctocker, Gerfried, Schoepf, Christine ed., FLESHFACTOR, 1997, Springer
- Sctocker, Gerfried, Christine Schoepf, ed., Cyber Arts97(1997) Springer/Verlag
- Seltzer, Mark, Serial Killers, Routledge, NY, 1998
- Shelley, Mary Frankenstein, 1818
- 柴田崇徳、福田敏男 人工生命の近未来 時事通信社 1994
- 下原勝憲 人工生命と進化するコンピュータ 工業調査会1998
- Shirai, Akihiko, Masaru Sato, Yuichiro Kume, Machiko Kusahara Fantastic Phantom Slipper,  
SIGGRAPH98 Augmented Realities (1998)
- Sims, Karl. Evolving Virtual Creatures, Siggraph '94 Proceedings, ACM/SIGGRAPH 1994
- Sims, Karl. Evolving 3D Morphology and Behavior by Competition, ALIFE IV, ed. Brooks & Maes, MIT Press, 1994
- Sims, K. Artificial Evolution for Computer Graphics, Siggraph'91 Proceedings, ACM/SIGGRAPH 1991
- Smith, John Maynard The Problems of Biology, 1986 Oxford University Press
- Sommerer, Christa, Laurent Mignonneau, edit. art@science(1997) Springer/Verlag
- Stelarc From Psycho-body to Cyber0systems: Images as Post-human Entities Dixon, Joan Broadhurst, Cassidy, Eric J. ed. Virtual Futures: Cyberotics, Technology and Post-Human Pragmatism, Routledge, London and New York, 1998
- Stone, Allucquire Rosanne. Cyberdammerung at Wellspring Systems, Immersed in Technology, edit. Anne Moser, MIT Press, 1996
- Stone, Allucquire Rosanne. The War of Desire and Technology at the Close of the Mechanical Age, the MIT Press, 1995
- 鈴木晶「グリム童話」講談社 1991
- 高安秀樹編著「フラクタル科学」朝倉書店、1987
- 種村季弘 「ホフマンとフロイト」「砂男／無気味なもの」所収 河出書房新社 1995
- 立川昭二 「人形からくり」 日本ブリタニカ 1980
- 立川昭二 「からくり」 法政大学出版局 1969
- 立川昭二 「日本人の死生観」 筑摩書房 1979
- 高梨生馬 からくり人形の文化誌 学芸書林 1990
- 多様性の生物学 現代思想特集号 青土社 1997
- Tenhaaf, Nell, Mysteries of the Bioapparatus, Immersed in Technology, edit. Anne Moser, MIT Press, 1996
- Terzopoulos, Demetri, Artificial Life for Computer Animation. Art@Science, Springer. Wien and New York, 1997
- Thompson, D'Arcy W., On Growth and Form, 1917, Abridged ver. Cambridge, 1961
- Todd, Stephen and William Latham, Evolutionary Art and Computers, Academic Press, 1992
- 特集・人工生命 「遺伝」vol.48, No.9, 1994 裳華房

- Turing, Alan. Computing Machinery and Intelligence, edited by E.A. Feigenbaum and I. Feldman, MacGrow Hill, NY, 1950
- Turkle, Sherry, The Second Self: Computers and the Human Spirit Simon & Schuster, New York, 1984
- Turkle, Sherry, Life on the Screen: Identity in the Age of the Internet Simon & Schuster, New York, 1995
- Waldrop, M. Mitchell M. ミッチェル・ワールドロップ、田中三彦・遠山峻征訳 Complexity: the emerging science at the edge of order and chaos, 1992 「複雑系」新潮社、1996
- Wiener, Norbert The Human Use of Human Beings - Cybernetics and Society- Houghton Mifflin & Co, 1950 ノーバート・ウィーナー 鎮目恭夫訳「人間機械論」みすず書房 1979
- Uexkull, Jakob von ヤーコブ・フォン・ユクスキュル、ゲオルク・クリサート、Streifzug durch die umwelten von tieren und menschen bedeutungslehre 1970---「生物から見た世界」日高敏隆・野田保之訳、思索社 1973
- Vollmer, Gerhard Evolutionäre Erkenntnistheorie 1990 ゲアハルト・フォルマー、入江重吉訳「認識の進化論」新思索社 1995
- Wisenbaum, Joseph, Computer Power and Human Reason, Freeman, New York 1976
- 吉田豊 「犬鷹大切物語」 柏書房 1999
- 養老孟司 「唯脳論」 青土社 1989

### Originality, Identity

- 尼ヶ崎彬「日本のレトリック」 ちくま学芸文庫 1994
- 安東次男「芭蕉連句評釈 上下」講談社 1994
- Attali, Jacques Au Propre et au Figure, Librairie Artheme Fayard, Paris 1988 ジャック・アタリ「所有の歴史」山内ひさし訳 法政大学出版局
- Auerbach, Erich MIMESIS, 1946 E.アウエルパッハ、篠田一士、川村二郎訳「ミメシス ― ヨーロッパ文学における現実描写」筑摩書房 1967
- 犬養廉他「年表・資料・中古文学史」笠間書院 昭和48年
- ドナルド・キーン、土屋政雄訳「日本文学の歴史 古代・中世篇1」中央公論社 1994
- 金井清一、小野寛編「年表・資料・上代文学史」笠間書院 平成6年
- 小泉八雲 平川祐弘訳「日本の心」講談社学術文庫 1990
- 小松英雄「やまとうた 古今和歌集の言語ゲーム」講談社 1994
- 古典文学レトリック事典 國文學第37巻15号 學燈社 平成4年
- 野口武彦「日本思想史入門」ちくまライブラリー 1993
- 尾本圭子、フランシス・マクワン「日本の開国 -エミール・ギメ、あるフランス人の見た明治」創元社 1996
- Panofsky, Erwin Perspective as Symbolic Form, 1924-1925, Translated by Christopher S. Wood, Zone Books, 1991
- 西郷信綱、永積安明、広末保「日本文学の古典 第二版」岩波書店 1966
- 島津忠夫 校注「連歌集」新潮日本古典集成 新潮社 1979
- Schwartz, Hilles The Culture of the Copy, Zone Books, 1996

- 渡辺保史「デジタルコンテンツの知的所有権」O'Reilly, 1998
- 吉本隆明「マス・イメージ論」福武書店 1984
- 吉本隆明「初期歌謡論」ちくま学芸文庫 1994
- 吉本隆明、梅原猛、中沢新一「日本人は思想したか」新潮社 1995

## Perception, Optics, Perspective, Technology and Culture

- Baltrusaitis, Jurgis, Le Miroir, Edition de Seuil, 1978
- Balzer, Richard Peepshows A Visual History 1998 Abrams
- Evelyn J. Fruitema and Paul A. Zoetmulder, editors, The Panorama Phenomenon. Mesdag Panorama 1881-1981, Den Haag: Foundation for the Preservation of the Centenarian Mesdag Panorama, 1981.
- 布施英利「脳の中の美術館」筑摩書房, 1988
- Gibson, James J., The Ecological Approach to Visual Perception, Houghton Mifflin Co. 1979 ギブソン 古崎敬他訳「生態学的視覚論」サイエンス社 1985
- Gombrich, E.H., Art and Illusion, Phaidon, 1962
- 五味文彦 「絵巻で読む中世」 ちくま新書 1994
- 五味文彦 「中世の言葉と絵」 中公新書 1990
- Hall, Edward Twitchell The Silent Language, Doubleday & Company, Incorporated 1977
- Hall, Edward Twitchell. The Hidden Dimension, Doubleday & Company, Incorporated 1969
- Hall, Edward Twitchell, Understanding Cultural Differences: Germans, French, and Americans , Intercultural Press, Inc. , 1989
- Hall, Edward Twitchell, Beyond Culture, Doubleday & Company, Incorporated, 1976
- Jenks, Chris, editor, Visual Culture, Routledge, London and New York, 1995
- キルヒャー, アタナシウス 「大いなる光と影の術」1646 ジョスリン・ゴドウィン著 川島昭夫訳 キルヒャーの世界図鑑 工作舎 1986
- 岸文和「江戸の遠近法 浮絵の視覚」劉草書房 1994
- 小林源次郎 「写し絵」中央大学出版会 1987
- 小林忠「非常・適意の人平賀源内と浮世絵」(「花のお江戸のエレキテル」展カタログ) 1989 サントリー美術館
- 小町谷朝生「視覚の文化」 劉草書房 1990
- 小山清男 「遠近法 - 絵画の奥行きを読む」 朝日新聞社 1998
- 馬淵明子「ジャポニスム」ブリュッケ、1997
- Mannoni, Laurent, Le grand art de la lumiere et de l'ombre. Archelogie du cinéa, Paris: Nathan, 1994.
- Mannoni, Laurent, "Trois Siecles de Cinema" Reunion des Musees Nationaux 1995
- Milner, Max La Fantasmagorie, Essai sur l'optique fantasique, 1982 Press Universitaire de France
- 三田村雅子「源氏物語 物語空間を読む」筑摩書房 1997
- Needham, Joseph Science in Traditional China Harvard University Press 1900
- Oberthur ,Michel Le Chat Noir Le Livre du Musee d'Orsay Reunion des Musees Nationaux



1992

- 岡泰正「めがね絵新考」筑摩書房1992
- 岡泰正他「眼鏡絵と東海道五十三次展」神戸市立博物館 1984
- タイモン・スクリーチ「大江戸視覚革命」作品社 1998
- 諏訪春雄「日本人と遠近法」ちくま新書 1998
- 高階秀爾「平賀源内の時代」(「花のお江戸のエレキテル」展カタログ)1989 サントリー美術館
- 高畑勲「十二世紀のアニメーション」徳間書店 1999
- 辻茂「遠近法の誕生 ルネッサンスの芸術家と科学」朝日新聞社 1995
- Vries, Leonard de, Victorian Inventions, London: John Murray, 1991 [1971]
- Uexkull, Jakob von ヤーコブ・フォン・ユクスキュル、ゲオルク・クリサート、Streifuge durch die umwelten von tieren und menschen bededeutunglehre 1970「生物から見た世界」日高敏隆・野田保之訳、思索社 1973
- 内田欽三「平賀源内-その人と生涯」(「花のお江戸のエレキテル」展カタログ)1989 サントリー美術館
- 内山淳一「江戸の好奇心」講談社 1996
- 若杉準治 編「絵巻物の鑑賞基礎知識」至文堂1995
- 横山俊夫編 視覚の一九世紀 思文閣出版 1992
- Yokoe, Fuminori, Between the Arrival of the Camera Obscura and the Daguerreotype in Japan, The Advent of Photography in Japan, Tokyo Metropolitan Museum of Photography, 1997
- 横地清「遠近法で見る浮世絵」三省堂
- 吉田直哉「脳内イメージと映像」文春新書 1998

## Shadow and Shade

- 有坂隆道他「論集 日本の洋学」清文堂 1993
- Baxandall, Michael, Shadows and Enlightenment, Yale University Press, New Haven & London 1997
- Chamisso, Albert von シャミッソー「影をなくした男」Peter Schlemihls Wundersame Geschichte(1814) 池内紀 訳 岩波文庫 1985
- Grafton, Carol Belanger, Silhouettes, Dover, 1979
- Jackson, E.N. SILHOUETTES: A History and Dictionary of Artists, Dover, 1991
- Stoichita, Victor I., A Short History of the Shadow 1997 Reaktion Books Ltd
- Gombrich, E.H., Shadows, 1995, National Gallery Publications, London, Distributed by Yale University Press, New Haven & London
- Gombrich, E.H., Art and Illusion, Phaidon, 1962
- 市川清流・著、楠家重敏・編訳「幕末欧州見聞録」、新人物往来社 1992
- 今道友信「光と影の美学」日本の美学 29, No.26, 1997 ぺりかん社
- 磯崎新・高階秀爾・橋本典子「光の造形化をめぐる」日本の美学 29, No.26, 1997 ぺりかん社
- 小林忠監修「浮世絵の歴史」美術出版社 1998
- Kobayashi, Tadashi「UKIYO-E」, 講談社 1997
- クライナー、ヨーゼフ 編著「黄昏のトクガワ・ジャパン」NHKブックス1998

- Koppelkamm, Stefan シュテファン・コッペルカム Der imaginare Orient 1987 「幻想のオリエント」  
池内紀ほか訳 鹿島出版会 1991
- 国立劇場 「芝居版画等図録I-X」 日本芸術文化振興会発行 1993-1996
- 草原真知子「闇から光へ - 影絵と幻燈の150年」(影-写像としての世界/光-仮想としての世界)展カタログ、東京都写真美術館、1999
- 草原真知子 「幻燈 - 十九世紀のニューメディア」図書、岩波書店、2000
- 桑原博史「おとぎ草子 全訳注」講談社学術文庫1982
- Lowell, Percival The Soul of the Far East, Houghton, Mifflin & Co. 1888, ローエル 川西瑛子訳「極東の魂」 公論社 1977
- 馬淵明子「ジャポニスム」ブリュッケ、1997
- Needham, Joseph , The Grand Titration - Science and Society in East and West, 1969 George Allen & Unwin Ltd. ジョセフ・ニーダム 橋本敬造訳「文明の滴定」法政大学出版会 1974
- Needham, Joseph , Science in Traditional China, Harvard, 1981
- 岡長三郎監修 太陽浮世絵シリーズ「北斎」平凡社 1975
- 岡泰正他「眼鏡絵と東海道五十三次展」神戸市立美術館、1984
- 岡戸敏幸 他「「影絵」の十九世紀」サントリー美術館、1995
- 岡戸敏幸 「「影絵」の十九世紀 - 人は「影」に何を見てきたか」(「「影絵」の十九世紀」展カタログ)サントリー美術館、1995
- 岡戸敏幸 「影と身体 - 月光と影法師のあわいに」(影-写像としての世界/光-仮想としての世界)展カタログ)東京都写真美術館、1999
- 坂本満、戸枝敏郎 「横浜版画と開化絵」 至文堂 1993
- 佐藤悟 「近世文学と影絵」(「「影絵」の十九世紀」展カタログ)サントリー美術館、1995
- ヘンリー・スミス 「浮世絵に見る江戸名所」 岩波書店 1993
- 高山茂 「神遊びの陽光・能の月光」日本の美学 29, No.26, 1997 ペリカン社
- 高階秀爾監修 「江戸のなかの近代 秋田蘭画と解体新書」 筑摩書房 1996
- タウト、ブルーノ 篠田英雄訳 「日本美の再発見」岩波書店 1939
- 安村敏信「近代画への転生を育んだ百花繚乱の表現世界」(朝日美術館「幕末・明治初期の絵画」、朝日新聞社 1997)
- 安村敏信編 朝日美術館「幕末・明治初期の絵画」 朝日新聞社 1997
- 横田洋一「横浜浮世絵」有隣堂 1989
- 吉村貞司 「日本美の特質」鹿島出版会 昭和42

### Popular Culture, Japanese Culture in General

- Crafton, Donald, Before Mickey: The Animated Film. 1898-1928, University of Chicago Press, 1993
- 「子どもの昭和史」 別冊太陽 平凡社 1986
- 日本の笑い・マンガ1000年史 文芸春秋デラックス 1975
- 古典の遊び・日本のかるた 文芸春秋デラックス 1974
- 「もののけ姫を描く、語る」別冊COMIC BOX Vol.3 1997 フュージョンプロダクツ

- 片桐一男 「江戸のオランダ人 カピタンの江戸参府」中央公論新社 2000
- 片桐一男 「開かれた鎖国」 講談社 1997
- 岸田劉生「美の本体」河出書房 1941
- 香坂真帆 「空想流行通信」 メディアワークス 1997
- 桑原武夫 「第二芸術論」 河出書房 1947
- McCloud, Scott, Understanding Comics: The Invisible Art, Harper Collins, New York 1994
- 三井秀樹「美のジャポニスム」文芸春秋 1999
- 宮台真司、石原英樹、大塚明子「サブカルチャー神話解体」バルコ出版1993
- 守屋慶子「子どもとファンタジー」 新曜社 1994
- 「コンプリート クーロンズ・ゲート」 ソニー・マガジズ 1997
- 中野美代子 「仙界とポルノグラフィ」河出書房新社1995（初版1989 青土社）
- 夏目房之介「マンガはなぜ面白いのか」NHKライブラリー
- 夏目房之介 「マンガと「戦争」」講談社現代新書 1997
- おかだえみこ、鈴木伸一、高畑勲、宮崎駿「アニメの世界」新潮社 1988
- 岡田斗司夫 「マンガ学」1998 美術出版社
- フィリップ・ポンス 「江戸から東京へ」. 町人文化と庶民文化: 神谷幹夫 訳 筑摩書房 1992.
- 大澤真幸「戦後の思想空間」筑摩書房 1998
- 櫻井進 「江戸の無意識」講談社 1991
- 田中優子「江戸の想像力」 筑摩書房 1992
- 立川昭二「日本人の死生観」 筑摩書房 1998
- 高畑勲「十二世紀のアニメーション」徳間書店 1999
- 鶴見俊輔「限界芸術論」勁草書房 1967
- 戸沢行夫「江戸がのぞいた＜西洋＞」教育出版 1999
- 上野俊哉 「紅のメタルスーツ」紀伊国屋書店 1998