Dare to be Digital: Japan's Pioneering Contributions to Today's International Art and Technology Movement

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A number of pioneering artists began experimenting with the computer as a visual arts medium in the late 60s and early 70s when most fine-arts circles refused to recognize art made by computers as a viable product of human creativity. This was the era of computer punch cards, when the visual results of algorithmic input were nothing more than line drawings. Many of the forward-looking artists who were experimenting with this technology were not taken seriously by the established art venues, and were, in fact, often ostracized by their peers.[1] More recently, the work of computer artists has begun to appear in general textbooks on the history of art, but each book features one or two completely different artists. The books are inconsistent in their documentation of this fairly new medium. There are a number of journals that have had special issues devoted to this topic, including the *Art Journal*, and there are also whole journals dedicated to the field, such as *Leonardo*. There are, however, very few books that do justice to the movement, and few that include artists of Japan. In other words, there is a great deal of activity in the field, but the documentation is neither thorough nor consistent.

In this essay, I would like to present the recent history of these contributions to the International Art and Technology movement. Japan's contribution to the global art scene is often ignored, but it is certainly worthy of further exploration. From the exhibitions, installations, and performances of the 1950s avant-garde *Gutai* group and the exploration of materials and space of the *Mono-ha* movement of the 70s to experimentation with electronics and computer technology of the 80s, the ideas and concepts put forth by innovative artists from Japan have certainly had an impact on our contemporary art scene.

One of the earliest pioneers of computer-graphic art in Japan is Masao Komura. Komura graduated from Tama Fine Arts University in 1969. He initiated the first computer art group in Japan titled Computer Technic Group (CTG) in 1966 while still a student. The work of the Computer Technic Group parallels that of E.A.T. (Experiments in Art and Technology), a similar collaboration of artists and engineers from New York that was founded in the same year (1966). E.A.T. included such internationally renowned artists as Robert Rauschenberg, Jasper Johns, Andy Warhol, John Cage, and Merce Cunningham and engineer Billy Kluver. A number of the E.A.T. artists collaborated on installations for the Pepsi Pavilion at the Japan World Exposition, Osaka, of 1970.[2]

Although the Japanese Computer Technic Group was shorter lived and perhaps not as internationally renowned as E.A.T, their activities are evidence of the emergence of the art and technology movement in Japan during that same year, and their legacy had an impact on future artists in Japan as well as abroad. The British art critic Jasia Reichardt, in *The Computer in Art*, lists the members of the CTG group as including Haruki Tsuchiya (systems engineer), Kunio Yamanaka (aeronautic engineer), Junichiro Kakizaki (electronic engi-

neer), Makoto Ohtake (architectural engineer), Koji Fujino (systems engineer), and Fujio Niwa (systems engineer). Komura was the only artist of the group, but the group's activities, as a whole, were of an avant-garde art nature. All of the members were in their early twenties. Reichardt describes their aim (stated in the group's manifesto) as the restoration of man's innate rights of existence by means of computer control.[3] Most of their art pieces involved the transformation of simple line drawings of well-known images, as in Running Cola is Africa*, in which a contour drawing of a running man changes to an outline of a Coca-Cola bottle and then to a line drawing of the continent of Africa. Jasia Reichardt explains:

> Their attitude to computer-aided work is somewhat different from that of their colleagues elsewhere. They felt, for instance, that one of the major underlying possibilities of computer art is that the "artist" actually designs a system – a method of producing a given repertoire of forms and generating patterns. The artist's work consists largely of envisaging possibilities rather than producing individual works. It is the program itself that is the work of art.[4]

The Computer Technic Group created an interactive computer installation entitled Automatic Painting Machine No. 1, which responded to sound and light input from a "happening zone," an area that gallery participants would sometimes inadvertently pass through.[5] The group disbanded in 1969. Komura went on to create other computer-based conceptual work. Katsuhiro Yamaguchi, in his book *Robot Avant-garde, 20th Century Art and the Machine,* describes Komura's "wordless dictionary" of the 1980s, as a "non-man performance" about the process of production. Yamaguchi says it is "conceptual art of the computer era." He writes; "In this computer society where a variety of information is digitized, the digitization of meaningless words is a kind of non-art."[6] The conceptual nature of Komura's art and the activities of the Computer Technic Group are reminiscent of the *Gutai* activities of the 1950s, only transferred to a technological format. The Gutai (Concrete) group was formed in Osaka in 1955.[7] In the 1955 *Gutai* exhibition at Tokyo Ohara Kaikan hall, Tanaka Atsuko created an interactive piece using electricity and bells.

> Bell piece, which took six months to construct, was conceived as a "sound painting." Connecting twenty electric bells with some 150 feet of cord, Tanaka devised a contraption which set the bells to go off in a chain reaction as soon as one was kicked or in some way activated by a person.[8]

In addition, Tanaka is particularly renowned for her electric-light dresses, made of long blinking light bulbs painted in bright colors. Tanaka modeled these dresses during staged *Gutai* performances. The *Gutai* performances occurred as early as 1957, well before Allan Kaprow's "Happenings" considered by Western critics and art historians as the first performance art. Akira Kanayama, another member of

the *Gutai* group, created paintings with a remote-control toy car with cans of paint attached to it in 1957.

An art movement called *Mono-ha* (School of Things) that was unique to Japan, and uniquely Japanese, came about in the late 1960s and early 1970s. The *Mono-ha* artists were a far cry from computer artists. Their interests lay in the exploration of natural materials with space and time relationships. They would fill the gallery with blocks of wood, clay, cotton, or fiber to visualize the natural effect of the materials on space, visual contrasts of one material on another, or the effect of time on the materials. The artists would sometimes display sets of materials together to emphasize their irony. Among these artists was Takamasa Kuniyasu, who would stack his materials (bricks and logs) without a preconceived plan. Kuniyasu describes his method of working in which he continues to stack his objects until he reaches a kind of meditative state at which point his subconscious intuition takes over.[9]

There are interesting parallels between the computer graphic art of Japan and art derived from the *Mono-ha* and post-*Mono-ha* movements. Some of the characteristics of contemporary Japanese sculpture and installation art that I have found in computer graphic art are: an interest in the subconscious revelations of intuitive technique or natural selection, the desire to explore materials while remaining true to their natural state, arrangement of materials to create new environments, the act of "growing" a work of art through repetitious stacking of small components within an environment or space, and appropriation of traditional imagery. Yoichiro Kawaguchi's computer animations involve growing virtual forms by repeatedly reproducing the building blocks of data in a computer created environment. Kawaguchi, as well as other digital artists, utilizes the random (*guzen*) capabilities of computer programming to represent the natural selection process.

(C)Yoichiro Kawaguchi
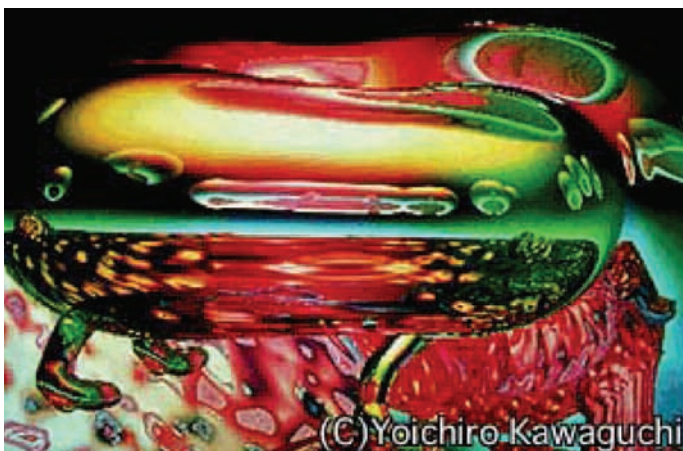
In the 1980s, video art and cinema were the new technological fields in Japan as well as the United States. In the U.S., Laurie Anderson became a cult hero. Her technical concerts involved distorted sound and images. She was, however, a kind of storyteller to her audience. Paralleling her technical performances in Japan is the group Dumb Type, an ensemble of 15 artists, actors, architects, musicians, and computer programmers who use digital technology for staged interactive performances.[10] The group was founded in 1984, but is still active today. The subject matter of the group's performances is often postmodern in their collection of popular imagery and "allegories of post-industrialized society."[11] They control their pastiche of imagery

through motion sensors and remote-control devices. Without a linear story line, the juxtaposition of images is collage-like and disconnected at the same time.

Several daring Tokyo artists experimented early on with computer technology as an art medium. Yoichiro Kawaguchi began in 1975 to program simple line drawings using FORTRAN when he was a student in a painting program at Kyushu Art and Design University in Fukuoka, Japan. He did his senior research project on computer graphics software, and completed his first animated film (Pollen, 1975). Kawaguchi went right on to graduate school at Tokyo University of Education. Even in Japan, however, the computer medium used in the art field was often addressed with alienation. Kawaguchi states that "the ill feelings toward computers was extremely strong, whatever work was created with a computer was not recognized (as art)."[12] After graduate school, Kawaguchi did an internship with the Product Research Institute at the Ministry of International Trade and Industry (M.I.T.I). This is where Kawaguchi began to experiment with CAD and growth algorithms.

Before Kawaguchi began experimenting with growth algorithms, there were programs that produced simple line drawings of trees and such, but when combined with polygonal models, three-dimensional forms were the result. By substituting a cylinder for a line, and a cone for a point, three-dimensional tree-like forms were randomly constructed using recursive algorithms. Kawaguchi found a great deal of support and enthusiasm for his work through the engineering department at Osaka University. Kawaguchi collaborated with Koichi Omura, a professor of engineering at Osaka University, where a new form of surface rendering was developed into the Meta-ball program. The Meta-ball software was based on implicit surfaces instead of polygonal surfaces (conceptual spheres, rather than flat planes). By combining Kawaguchi's 3D growth algorithms with the Meta-ball software, life-like forms with organic surfaces were produced. These ever-changing organisms have become the trademark of Kawaguchi's work.

(C)Yoichiro Kawaguchi

In the field of computer graphics and digital media, Kawaguchi is renowned today. His work is clearly recognized by his many followers, but few understand the importance of his contributions to the field. His work with CAD and 3D growth algorithms mixed with the Meta-ball renderer was innovative for its time. When most 3D modeled computer graphic images were composed of geometric shapes with unnatural-looking polygonal surfaces, Kawaguchi's images were

organic and fluid. When his work was first presented at the ACM SIGGRAPH conference in 1983, the audience response was one of surprise and enthusiasm.

Another artist, Masaki Fujihata, also began experimenting with computer-animated images in the early 1970s as a student at Kyoto Fine Arts University. His work was concept oriented, and he often incorporated traditional Japanese tales or Buddhist ideas into the content of his work. Fujihata began submitting his work to the SIGGRAPH conference in 1983, the same year that Kawaguchi presented his work using the growth algorithm. Fujihata's work, however, was much more concept based, and he collaborated with the Supercomputer center in Minneapolis, Minnesota to render his data into startlingly high-resolution images. In 1990, Fujihata created a series of objects that he entitled Forbidden Fruits. These were the results of algorithms that he designed to mimic nature's selection process within the weightless virtual space of the computer. Fujihata was also one of the first artists to use a stereo-lithographic device to produce actual tangible objects from his Forbidden Fruits data. Fujihata went on to experiment with interactive pieces. Global Interior Project allowed four users at a time to move through a virtual environment and interact with one another. Another work, Beyond Pages, explored the concept of what the book of the future would be like using digital technology and interactive design. Beyond Pages is a picture book that is projected onto the desktop, and the images seem to come alive as the user interacts with them. Each page presents a new artistic concept to the viewer.
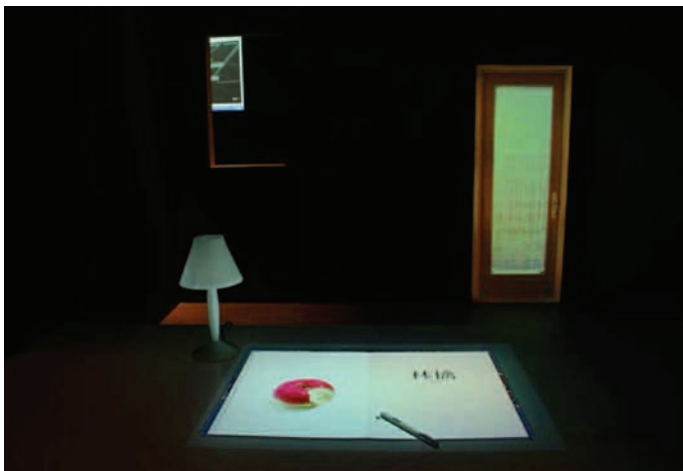
Fujihata was honored for his interactive work with the Golden Nike award at Ars Electronica in Linz, Austria (1996).

Naoko Tosa began as a video artist who first used the computer for editing and adding visual effects to her time-based productions. Then she collaborated with a group of computer scientists at Carnegie Mellon University in Pittsburgh, Pennsylvania. The result was Neuro Baby, an interactive computer baby that responds to voice input using a new form of artificial intelligence that simulates the neurological networks of the human brain. This kind of artificial intelligence includes a random component and has the unpredictable quality of nature's rhythms.

Tosa continues to work with human emotional input and digital responses with a piece called Unconscious Flow displayed for audience participation in the TechnOasis Gallery of SIGGRAPH 99 with the sponsorship of Sony-Kihara Research Center, Inc.

Certainly, the art and technology movement was not born in Japan, but a number of Japanese artists have helped fan the flames that have caused it to spread across the globe. Today, many of these artists continue to be active and innovative in the field. Kawaguchi is producing multimedia pieces that incorporate live performance artists and digital projections of his work. Animation is the utilization of a medium in motion, similar to live performance. Kawaguchi combines these two forms of art in presentations to the public. Fujihata creates interactive pieces over the internet, in which a global audience participates. Tosa is working with more intimate interactive pieces. Many new emerging artists from Japan are exploring the computer algorithm as a medium for their art, including Toshio Iwai and Haruo Ishii.

Ishii works with virtual 3D grids utilizing motion sensors that detect the movement of the participants' arms and hands, so that the user can conduct sounds and images like a conductor with a symphony. Iwai creates interactive tables that can be used by participants for composing music through visual arrangements on the surface of the table. Iwai has been experimenting with the visualization of music since 1993, and has just begun to explore its interactive potential. Artists of Japan began experimenting with the computer as a tool for producing art as early as the late 1960s, and have continued to contribute to the field. Many of these artists continue to be active today. Their trials and tribulations often parallel artists from the United

States, but they bring new ideas from a fresh perspective. They often include their own cultural influences from experimental groups and currents outside of the technological milieu. Mainstream critics and writers have not always had ready access to information and dialogue about their work, but these artists' contributions to the field of digital media are nevertheless undeniable.

Endnotes

1. Trachtman, P. Charles Csuri is an Old Master in a new medium. *Smithsonian* (February 1995): 56.

2. The Story of Experiments in Art and Technology. E.A.T. *InterCommunication Online.* Calendar, 2003. www.ntticc.or.jp/Calendar/2003/EAT/preface.html

3. Reichardt, J. *The Computer in Art.* London: Studio Vista and New York: Van Nostrand Reinhold Company, 1971), 81.

4. Reichardt, J. *ibid*, 81.

5. Reichardt, J. *ibid*, 84.

6. Yamaguchi, K. *Robot Avant-Garde, 20th Century Art and the Machine*. Tokyo: Parco Co., Ltd., 1985), 113. [Translation mine.]

7. The complete title of the group is *Gutai Bijutsu Kyokai* (Concrete Fine Arts Association). Alexandra Monroe, To challenge the midsummer sun: The Gutai Group, in Alexander Munroe, *Japanese Art Since 1945: Scream Against the Sky*. New York: Harry N. Abrams, Inc., 1994, 83.

8. Munroe, The Gutai Group, 90.

9. Fox, H. *A Primal Spirit*. New York: Harry N. Abrams, Inc., 1990, 81.

10. *Against Nature: Japanese Art in the Eighties.* Exhibition Catalogue, Grey Art Gallery and New York University, the MIT List Visual Arts Center, and The Japan Foundation, 1989, 78.

11. Munroe, A. Hinomaru illumination: Japanese art of the 1990s, in Alexandra Munroe, *Japanese Art Since 1945: Scream Against the Sky*. New York: Harry N. Abrams, Inc., 1994, 343.

12. Yoichiro Kawaguchi, Interview, *Konpyuuta Shinjinrui no Kenkyuu*. Research on the New Computer Generation, ed. Masaki Noda. Tokyo: Bungei Shunjuu Publishing, 1987, 255. [Translation mine.]