Intermedia, Interscience: Homo Cyberneticus Evolves

Colophon

Intermedia, Interscience:
Homo Cyberneticus Evolves

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What are the delta t value of 'cybernated art' and the delta x value of 'art for cybernated life?' What is the logarithm of this if its base is 'you' and its top is 'me'? What results if the root of 'Marshall McLuhan' is subtracted from the log of 'John Cage,' and if this is divided by 'Norbert Wiener'?[1]

$$\int_{t=you}^{me} (\text{cybernated art}) \ dt - \frac{\text{art for cybernated life}}{dx} = \left| \frac{3}{\infty} \right|$$

$$\frac{\log_a \text{Cage} - \sqrt[3.5]{\text{McLuhann}} = \pm \text{ sorry}}{\text{Norbert Wiener}}$$

Nam June Paik often used the form of mathematical notations to express his ideas. Looking like secret codes or nonsensical wordplays, these formulae can be decoded only when we look into cybernetics, a discipline whose influence runs underneath Paik's art to a great extent.

Inception of Cybernetics

Artist and thinker, Paik set in motion a keen awareness of contemporary theoretical discourses in his artistic practices, among which cybernetics coming into full blossom in the mid-twentieth century had a particula impact on Paik's art. The term 'cybernetics' was first used by

1
These diagrams are featured in the exhibition catalogue <<Nam June Paik: Electronic Art I>>(Bonino Gallery, New York), 1965.

2

Norbert Wiener, *The Extrapolation, Interpolation and Smoothing of Stationary Time Series*, NDRC Report to the Services 370, 1942.

mathematician Norbert Wiener in his 1948 book 『Cybernetics: or Control and Communication in the Animal and the Machine』. However, even before the name 'cybernetics' itself began to be used, a lot of related studies had been conducted in different fields, which is an important factor in understanding the inter-disciplinary and cross-disciplinary nature of cybernetics from the beginning. Most remarkably, neurophysiologist Warren McCulloch published A Logical Calculus of the Ideas Immanent in Nervous Activity in 1943 and How We Know Universals: The Perception of Auditory and Visual Forms in 1947 with Walter Pitts. These papers delve into the biological nerve system as feedback circuits of a computing machine using mathematical logics and arithmetic operations. McCulloch's research changed the perception of the human body from a power-driven engine to an information system made of neurons. He is said to have made a contribution to theories of neural network, automata and computation.

In this academic milieu, Wiener working in the MIT carried out research combining statistics and communication engineering. He intended to solve the problems of predicting a future trajectory based on past and present conditions, by developing a mathematical tool that analyzes statistical behaviors in a random and variable coordinate. The resulting paper published in 1942 had repercussions over the academia, and was named "yellow peril" due to its yellow cover and too many daunting mathematical notations contained in it.[2] And then the book 『Cybernetics』 came out where, mathematically formulating a way to measure the amount of information, Wiener put forward the unit of information in relation to thermodynamic concepts of entropy and the combination of circuits as a solution to prediction. The computing machine that he devised consists of a series of switching devices, and is put into action by information moving in and out of each stage. That is to say, the functioning of the computer device was conceived to be communication among its various internal circuits. Input and output signals of the computing circuits can be analyzed as messages, and what looks like a control mechanism is in fact a communication process mathematically; therefore, a computer is a communications apparatus.

Another parallel between the two thinkers is the simulation or
comparison of electronics and physiology. Wiener's main theme
was "control and communication in animal AND machine"
(note: animal comes first), which he put as the subtitle of his main
work, 『Cybernetics』. He reached to [sic] the automatic control of
the anti-aircraft gun, an earliest model of today's huge computer,
through the study of feedbacks in animals' nerve systems.
Also the binary code of today's computer has its origin in the
"all or nothing" character of our neuron synapses, which are either
simply "ON," or simply "OFF." (No middle value, middle value
comes from the vast accumulation of this "ON" and "OFF.")

McLuhan expresses his view in the following way: "We wear all
mankind as our skin ... Man extended, or set outside himself,
a live model of the central nervous system itself."
(『Understanding Media』 p.53, p.56)

The above quote is from Paik's Norbert Wiener and Marshall McLuhan[3]
written in 1967. Paik here juxtaposes Wiener's 『Cybernetics』 and
McLuhan's 『Understanding Media: The Extensions of Men』[1964] in terms
of approaching the issues of electric-to-electronic transitions, noise-
information dynamics, and entropy-uncertainty functions. McLuhan is a
media theorist and cultural critic, well-known for his ideas of 'the medium
is the message,' 'cool media, hot media' and 'global village.' Paik connected
Wiener's cybernetics to McLuhan's conceptualization of media as a huge
nervous system turning the whole globe into a single consciousness.
This indicates that Paik precisely knew that cybernetics was not merely a
specific science or a discipline related to technological development, but it
was a paradigm of the age embracing cultural and historical thinking.

From its earliest beginnings, cybernetics cut across different
fields, and even transcended any disciplinary boundaries. It grew into
manifold streams of evolution in parallel, with various angles and
directions but in a closely intertwined and mutually complementary way.
For example, Wiener chose Leibniz as a "patron saint" of cybernetics

4
Norbert Wiener, *Cybernetics: or the Control and Communication in the Animal and the Machine*, Cambridge: MIT Press, 2nd edition, 1965, pp.2, 12.

5
Robert Vallée, "About Cybernetics, Its Roots and Future," *Kybernetes*, 29(5/6), 2000, pp.573–575.

6
Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society*, New York: Doublelady Anchor, 1950/1954, pp.17-18.

7
Warren McCulloch, *Embodiments of Mind*, Cambridge: MIT Press, 1965, p.226.

arguing that Leibniz's 'calculus ratiocinator,' a calculus of reasoning based on binary arithmetics, "contains the germs of" his idea of 'machinea rationcinatrix,' a reasoning machine.[4] He thought highly of Leibniz who penetrated into what was neglected in between established fields and whose research ranged over the diverse intellectual activities of his day. In comparison, McCulloch acknowledged Descartes in that there were modern cybernetic aspects in Descartes' mechanical philosophy and mathematical methodology represented in his 『Treaties on Man』.[5] What McCulloch found out in Descartes' way of turning a living organism into a logical mechanism by dissection are the cybernetic notions of negative feedback and information encoding. These key initiators of cybernetics did not seek to simply integrate technology into human life but to investigate the changes in historical and philosophical perceptions. Wiener said: "Information is a name for the content of what is exchanged with the outer world as we adjust to it, and make our adjustment felt upon it. [...] Thus, communication and control belong to the essence of man's inner life, even as they belong to his life in society."[6] McCulloch also conceived his neurophysiological science as epistemological exploration: he saw cybernetics as an "experimental epistemology" and talked about a way of knowing, i.e., human cognition, continually tested and modified through laboratory investigations of physiology and mathematics.[7]

Demarcation and Relation

It may be said that cybernetics is a theory of systems and information in a narrow sense, and a philosophy of life and knowledge linking man, machine and nature together in a broad sense. The development of cybernetics is characterized by informal interdisciplinary gatherings beyond existing branches of academic departments, such as Macy Conference[1946~1953] in the US and Ratio Club[1949~1958] in the UK. Cybernetics became a multifaceted catalyst for a new way of thinking in political and social fields, and its influence was particularly strong in the art world. "The artist is the person who invents

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Marshall McLuhan, *Laws of Media*, Toronto: University of Toronto Press, 1988, p.98.

9

Ronald Kline, "Where are the Cyborgs in Cybernetics?," *Social Studies of Science*, 39(3), June 2009, pp.331-362.

10

Marshall McLuhan, 1996, "The Relation of Environment to Anti-Environment," in Eric McLuhan and W. Terrence Gordon, eds., *Marshall McLuhan Unbound* (4), Corte Madera, California: Gingko Press, 2005, pp.12, 16-17.

11

Gordon Pask, *An Approach to Cybernetics*, London: Hutchinson, 1961; *Conversation Theory: Application in Education and Epistemology*, Amsterdam: Elsevier, 1976; "Machines and Environments," in Jasia Reichardt, ed., *Cybernetic Serendipity: The Computer and the Arts*, London: Studio International, 1968, pp.34-35.

12

Duncan Graham-Rowe, "John Brockman: Matchmaking with Science and Art," *Wired*, 3 Feb, 2011. John Brockman is the author of 『Digerati: Encounters with the Cyber Elite』 and the president of Edge Foundation. He was active in the cybernetics scene at that time, by organizing <<Expanded Cinema Festival>> for instance.

13

Nam June Paik and John Cage in public conversation, University of California, San Diego, 1985.

the means to bridge between biological inheritance and the environments created by technological innovation."[8] This is what McLuhan says, who read cybernetics favorably and found certain possibility in the relationship between art and cybernetics.[9] He notes that electronic technology such as TV and the Internet is to put all extant environments into the position of the object of art, the content of art; and that electronic technology transforms people into a mass audience, not separate individuals, each with his or her own point of view, but individuals profoundly involved in one another as a mass who tend to 'participate' as co-creators rather than as consumers of art.[10] Psychologist Gordon Pask is also one of those who rewrote the relationship between art and cybernetics. Although not an artist, he produced a series of artistic machines directly informed by cybernetics, which encompass art, music, design and architecture. His <Musicolour>^{1953} and <Colloquy of Mobiles>^{1968} are complex and indeterminate structures or systems. In these installations, man and machine interact with and train each other through a spatial feedback loop in which they become an extension of mind and body of each other. This creates a kind of architectural space, an "aesthetically potent environment" in his own words. Pask's unique theoretical contribution to the arts was that his influential 'conversation theory' and 'interactions of actors theory' developed concurrently with his material and aesthetic experiments.[11]

Among those who sought to couple technology and humans, technology and nature, and technology and art, are avant-garde artists. According to John Brockman, there were a group of artists in the 1960s who studied theories in science, technology and cybernetics, and turned this into their works of art, which is well exemplified by John Cage.[12] Cage focused upon the process of sound-making where chance and noise intervened, and eagerly appropriated electronic media to expand the realm of sound. His <Imaginary Landscape No.4>^{1951}, which was called the first new media art by Paik,[13] is made up of twelve radios whose frequency, volume and beat can be played by performers like musical instruments. His <Variations> series – Paik took part in <No. 5>^{1965}, and <No. 7>^{1966} was featured in E.A.T.'s<<9 Evenings>> – are multimedia performances which unfolded the kaleidoscopic collages of light, sound and image created by

14
Lutz Dammbeck, <The NET: The
Unabomber, LSD and the Internet>
영화 중에서.

15
John Cage, "McLuhan's Influence,"
1967, Richard Kostelanetz, ed., *John
Cage: An Anthology*, New York:
Praeger, 1970, p.170.

16
Nam June Paik, 1965, "We are in
Open Circuits," in Dick Higgins, ed.,
*Manifestos (Great Bear Pamphlet
series)*, New York: Something Else
Press, 1966, p.24.

17
Nam June Paik, 1967, *op. cit*.

the actions of musician, artists, dancers and engineers on the stage where recorders, radios, mixers, antennae, televisions, films and photoelectric sensors were laid out. Cage read Wiener's 『Cybernetics』, and participated in Macy Conference.[14] We can also detect McLuhan's influence in Cage: "[…] we live as the effect of electronic inventions by means of which our central nervous systems have been exteriorized. […] The world we live in is now a global mind."[15] As shown in the case of Cage, cybernetics provided a useful model and vocabulary for the avant-garde artists of the time to discuss and produce artworks reflecting what was regarded as important in restructuring human sensory operations and rearranging the interface between art and technology.

In a short manifesto[16] written in 1965, Paik defined cybernetics as "the exploitation of boundary regions between and across various existing sciences." The first line of this manifesto is prefixed with "Rx," the abbreviation for 'receive' or 'receiver' in telegraph and radio, and the last line is "We are in Open Circuits." It may be said that these are emblematic of Paik's openness to new ideas, who actively navigated contemporary cybernetic topography and interchanged ideas with a diversity of figures involved. Leading an unusual life transcending old boundaries and creating new relations on the borders, he argued that all the toils of "the separation of the unseparable" in, for example, "Darwinian conception of development […] Woelfflinesque obsession with style killed the subject of the study before studying." It is in cybernetics that he discovered some potentialities for remedying this.[17] Paik explores the common denominators between Wiener and McLuhan and points out their affinities and differences, strengths and shortcomings, which he then connects and expands with the ideas of such various figures as Werner Karl Heisenberg, Jean Paul Sartre and John Cage. This is to map out the very potentialities of cybernetics.

Paik noted that the conception of intermedia brought forth an interscience called cybernetics, which in turn pushed the electric age into the electronic age. This suggests the intermedia art he pursued had something to do with cybernetics. The notion of intermedia art became well-known by the essay written in 1966 by Dick Higgins, Paik's

contemporary Fluxus member. Higgins established Something Else Press and published many artistic books – Paik's "Open Circuits" manifesto was published here. In the first page of the first issue of the newsletter of Something Else Press, Higgins defines intermedia art as "falling between media."[18] What Higgins means by intermedia is not just to combine different artistic media; it is to reorganize a sensory system through intersection and appropriation, and for this purpose, to look for productive space that contains the shared structure between media categories. Such Fluxus artists as Paik and Higgins were deeply interested in and appropriated new technology, particularly early computer, not least because they sought to find the right place for intermedia art. Breaking down the boundaries between art and life, the artists needed a flexible unit in mediating and expressing uncountable variables of life, and combining various experience and information. What was useful for this was a structural mechanism of computing.[19]

Attached at the end of Paik's Norbert Wiener and Marshall McLuhan aforementioned is 'List of Dealing with the Relationship of Aesthetics and Cybernetics.' Under somewhat enigmatic categories such as 'Zen and Electronics,' 'Art and Technology,' 'Computer and Audio-Visual Arts,' 'Conceptions of Time,' 'Conceptions of Nature' and 'Theory of Confusion' there is a wide range of artists, theorists, their works and cultural thoughts. Paik here seems to emphasize 'symbolistic correspondence' rather than 'influence,' suggesting that you unravel the functions of cybernetics of art through this list. Under the rubric 'Aesthetics of Boredom: European tradition (Ennui),' Paik mentions Charles Baudelaire together with Cage and Higgins, who was also treated in Paik's Communication-Art[1972]. In this writing Paik states that Baudelaire's poem Correspondence is "nothing but a [sic] research on art and communication."

All nature is a temple whose living pillars seem
At times to babble confused words, half understood;
Man journeys there through an obscure symbolic wood,
Aware of eyes that peep with a familiar gleam.

18
Dick Higgins, "Intermedia," *Something Else Newsletter*, no.1, New York: Something Else Press, 1966, p.1.

19
Hannah B. Higgins, "The Computational Word Works of Eric Anderson and Dick Higgins," in Hannah B. Higgins and Douglas Kahn, eds., *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts*, Berkeley: University of California Press, p.280.

If you replace Baudelaire's pre-Marconian 'nature' to [sic] our pan-cyber-nated 'video-sphere,' all words and insinuation of the symbolistic poem becomes [sic] a 'clear-cut definition' of what artist should be doing today as the aerial antenna of this society.

Baudelaire is a symbolist poet, singing out the synaesthetic experiences evoked and associated by color, sound and fragrance, and dismantling the assumptions as to how realities could be perceived. In Baudelaire's verse, Paik detects the role played by artists in the electronic age. Given that the human body now lives in the flux of light and sound made up of millions of bits of information, the artist of today should, as if being an antenna, take keen note of the bodily perceptions in terms of what and how. Paik opines that Baudelaire anticipated the transformation of communication forms in this age to a multilateral and multimedia correspondence.[20] In his cybernetic art that was based on systems and processes and joined man, machine and nature together, Paik shuffled the cards of disparate elements and then sought for a new aesthetics of communication in the correspondences between these.

Rain and Snow, Machine Age, Chance Encounter

A heart-shaped contour comes up at the center of the monitor, which contains television color bars. After a while, it begins to 'rain' inside the heart. Countless different patterns in white are moving inside, ceaselessly and repetitively, fast and slow, which imbues the heart with a feel of vitality. While raining, the heart itself is getting bigger and smaller, and the colors inside and outside the heart are changing as well. This undated work is Paik's <Rain inside Heart(Snow)>. In the middle of the video, the abstract patterns are replaced by figurative images from Paik's previous videos, which are in distorted and shaken forms as if by signal disturbance, and with certain velocity. The subtitle "snow" implies that this work is about white noise, alias dictus snow, white dots and waves in disorder on a television screen when tuned in to the channels that

broadcasting stations do not use, or when there are no broadcasts. That the patterns resembling white snow and the deformed figurations difficult to identify roll inside the heart, seems to reflect Paik's interest in the cybernetic idea of relationship between the information, in which a message was sent, and the information, in which a message is not sent.[21] This video drawing on the symbolistic rhetoric of rain, snow and heart could produce ampler resonances if we look back at Paik's approaches to cybernetics in the mid 1960s.

In New York in the 1960s, such collectives as E.A.T.Experiments in Art and Technology facilitated and animated interplays between avant-garde artists and engineers in Bell Laboratories in New Jersey, and not surprisingly, Paik was at the core of the cultural currents. He took part in the Fortran workshop in Bell Labs and created the video <Digital Experiment at Bell Labs> in 1966. From 1967, he was a fellow-in-residence, probing different possibilities of computers using the laboratory facilities. In his <Confused Rain> created during the residency, each alphabet of the word 'confuse' is printed as if they fell like rain drops in a random order and in a random location. Regarding this work, Paik borrows Verlaine and says, "It rains in my computer, as it rains in my heart."[22] He argues that the use of computers could contribute to dealing efficiently with randomness and repetition, the two characteristic poles of human artistic materials. Both are explicable in a simple way in mathematical terms, but the problem is how to use these two variables of uncertainty and determinism effectively, wherein "lies the secret for the successful usage of the computer in the creative arts." In the later part of <Rain Inside Heart(Snow)>, the heart shape disappears in a flashy explosion, and what emerge are running colors across the screen. It is as if, after the rapid and repetitive movements of randomly extracted signals which kept the volume and balance of the heart, certain abrupt malfunctioning of a computer program emitted the confined signals out of the heart. It is as if the screen controlled rigidly by a computer fell suddenly into a state of indeterminate chaos by a painter's analogue brush stroke. This could hint at the key to the secret of success in using computers for art-making: to realize in art what cybernetics may call the dialectical composition of control and indeterminacy by means of computers.

21
Nam June Paik, 1967, *op. cit*. Paik in many of his essays quoted Wiener's phrase that "the information, in which a message was sent, plays the same role as the information, in which a message is not sent."

22
Jud Yalkut, "Art and Technology of Nam June Paik," *Arts Magazine*, April 1968, p.51.

23
Nam June Paik, "Projects for Electronic Television," 1965, in Judson Rosebush, ed., **Nam June Paik: Videa 'n' Videology 1959–1973**, Syracuse: Everson Museum of Art, 1974, unpaged.

24
Nam June Paik, "Experiments with Electronic Pictures," 1966, **Fylkingen Bulletin**, Stockholm, 1967, p.38.

25
Nam June Paik, "My Projects in 1966-67," in Wulf Herzogenrath, **Nam June Paik: Fluxus/Video**, Bremen: Kunsthalle Bremen, 1999, p.119.

26
N. Katherine Hayles, "Boundary Disputes: Homeostasis, Reflexivity and the Foundations of Cybernetics," **Configurations: Journal of Literature, Science, and Technology**, 1994, 2(3), p.462.

Already before the Bell Labs residency, Paik dubbed his first New York solo show <<Cybernetics Art and Music>> in 1965 where he showed such experimental televisions as <Participation TV> and <Magnet TV>, and robot pieces including <Robot K-456>. In the preparation of this exhibition, Paik wrote an essay to New School for Social Research, in which he hoped "to open a studio for electronic color television in New York City so that I can begin more complicated technical experiments" such as "self-programming of whole video signal through TV cameras" or "combining the TV with computers and self-invented 50 channel data recorders."[23] At the same time, he argued that these experimentations should be used for educational purposes, and anticipated the development of the video synthesizer as a tool of "active creation" rather than a "passive pastime." As in this essay, the depth and width of his intellectual pursuit reveals itself from the ways he absorbed cybernetics and articulated his understanding of it in writings. In the introduction to Experiments with Electronic Pictures written in 1966, he mentioned 10,000 essays reviewed in 『Computing Review』 from 1960 to 1966 with regard to the lack of visual art, and said that "computerized video experiments derived from the unorthodox instinct of the artist will surely bring forth some unusual results in the research of pure science and applied technology."[24] In another essay written in 1967, he pointed out that the application of computers to visual art was very rare, and set forth his desire to devote his time to academic and fundamental research, which could change art and the status of art in society radically for coming decades.[25]

Looking into the historical development of cybernetics in terms of its discourses and technologies,[26] the first wave of cybernetics focused on a system's homeostasis, i.e., the process and predisposition to maintain stability by adapting itself to external changes through information and feedback. The second wave then came to elaborate the notion of reflexivity, which puts into question the categorical boundaries between subject and object in a system. The external subject who observes the system is in fact part of the system, the object of observation, and is involved in the system's operation. Here comes autopoiesis, i.e., self-organization in which an organism creates a complex system responding to its environment,

not on the basis of what is observed out there but in an encoded way to the needs of the organism as a living system. More emphasis has been laid on change than constancy, on evolution than equilibrium, on complexity than predictability; and the attention has shifted from how the components of a given system would work together to how a complex system would be created and constructed. Katherine Hayles picks up the early- and mid-1960s where the discussion of the second-order cybernetics became most heated. Interestingly enough, this coincided with the period of time in which many art exhibitions took place, taking cybernetics as a theoretical backbone and shedding light on the paradigmatic shift in the relationship between art and technology. As Paik stated, this was to express the concerns about the artist's social role in light of the use of technology. Many of these exhibitions featured no other than Paik, among which two exhibitions held in 1968 have significant implications for the mapping between Paik's work with a stress on communication and participation on the one hand, and the discussion of cybernetics in the art world of the time on the other.

The exhibition <<The Machine as Seen at the End of Mechanical Age>> was concerned with the time when the age of industrial machines was in decline and the age of information technologies was dawning. Curated by Karl Gunnar Pontus Hultén, the then director of Moderna Museet, Stockholm, the exhibition was a historical contemplation on the double-sidedness of technology, in other words, the achievement of utopia by means of technology and the destruction of human values because of technology. "This exhibition began with Leonardo da Vinci's sketches of flying machines and ended with pieces by Nam June Paik and Tinguely."[27] Putting it this way, Hultén showed the works of artists dealing with the machines like cars and cameras, from the 15th-centuray artists to Marcel Duchamp, E.A.T., Buckminster Fuller, and futurist and dadaist artists in the 20th century. In this exhibition, Paik set up an open-reel playback deck using a sewing-machine's bobbin and spool, and ran the spliced-together videotapes between them, whose configuration foresaw a video loop device. The videotapes played there were <Lindsay Tape> and <Nixon Tape>, and while these videotapes were being played, viewers were led to slide magnets across the monitor, able to distort the political figures' features.

27
Hans Ulrich Obrist, "Karl G. P. Hultén Interviews," *ArtForum*, April 1997.

28

The precise title uses a radical sign for 'rondo electronique.'

29

Jud Yalkut, *Electronic Zen: The Alternative Video Generation*, unpublished manuscript, 1984, http://www.vasulka.org/archive/Artists10/Yalkut,Jud/.

30

Gene Youngblood, *Expanded Cinema*, New York: E. P. Dutton, 1970, p.308.

31

Nam June Paik, <A New Design for TV Chair>, Silkscreen print, 1973.

32

Wulf Herzogenrath, "The Anti-Technological Technology of Nam June Paik's Robots," in *Nam June Paik: Video Works 1963-88*, London: Hayward Gallery, pp.24-25.

Together with <McLuhan Caged> transforming a TV image in a similar principle, there was another type of TV work called <Rondo Electronique>,[28] an experimental television in which viewers were allowed to create Lissajous figures on the monitor. In an interview with Jud Yalkut in 1984 Paik said that for the <<Machine>> exhibition "I first made all my color TV playable by the viewer; now I can do much better using the computer."[29] To this exhibition Paik also contributed a chair with a built-in TV set beneath in place of the seat so that one was able to sit on the program of one's choice.[30] In so doing, Paik let spectators perceive the physical and electronic dimensions of TV. "Do you know…? / How soon TV-chair will be available in most museums? / How soon artist will have their own TV channels? / How soon wall to wall TV for video-art will be installed in most homes?"[31] Having been the extension of the human muscles for centuries, machines are now designed to function in much the same light as the human brain. In the exhibition that handled the consequences of this change and posed questions as to what was the distinction between a man and a machine and whether machines were becoming like humans, or vice versa, Paik showed the future where art, machine and everyday life would interpenetrate each other from various angles.

Across the Atlantic in the same year, there was an exhibition <<Cybernetic Serendipity: The Computer and the Arts>> which directly took cybernetics as a theoretical backdrop. This exhibition showed poetry, music, dance and film produced with a computer's help, cybernetic apparatus and environment as works of art, and machines related to the use of computers and the history of cybernetics. Who were featured in this exhibition were not only artists but a variety of figures including engineers, architects, doctors, philosophers and computer system designers. Along with about a hundred and thirty people such as Cage and Pask, Paik presented his remote-controlled <Robot K-456>. This robot was on the one hand a mechanical man, an automaton, who did things for humans; on the other, it was an artificially created man who accompanied Paik in many performances from <Robot Opera> in 1964 as a child and friend.[32] Representing the changes that the development of technology caused to the modality of human existence, Paik's man-machine hybrid was

decorated with cheap dross like a toy plane's propeller, polystyrene, sponge rubber. Paik did not boastfully wield technical expertise but chose to disclose the robot's primitiveness and fragility.

<<Cybernetic Serendipity>> as in <<Machine>> included Paik's experimental televisions producing images by manipulating scanning lines. <McLuhan Caged>, for example, used a demagnetizer, an electromagnetic ring in front of the television which played the video recording of the NBC program where McLuhan talked about new media. Through hand and foot switches connected to the videotape playback device, audiences could deform the scanning lines in a free-floating way. In <Tango Electronique> a signal generator was attached to a television to intercept the sine waves of transmitted images, and audiences could turn a TV knob like playing a musical instrument and create shimmering Lissajous lines. Norman Bauman explains about Paik's experimental televisions in terms of the difference between the analysis of an oscilloscope's workings with knowledge in physics, and the feeling of real and vivid electrons in a bodily lived experience.[33]

The curator Jasia Reichardt defines <<Cybernetic Serendipity>> as "not an art exhibition as such, nor a technological fun fair, nor a programmatic manifesto – it was primarily a demonstration of contemporary ideas, acts and objects, linking cybernetics and the creative process."[34] She was an editor of the monthly 『ICA Bulletin』from 1964 to 1970 – Paik's Norbert Wiener and Marshall McLuhan was put in the issue of July 1967. She also did a diversity of programming for art, poetry, architecture and music from the Caribbean, Africa, Asia and Latin America, the periphery areas vis-à-vis the European and American art world. She notes that her interdisciplinary approaches to art are consistent with a fascination with the borderline and with what is excluded from demarcated territories.[35] This exhibition was an arena where the cybernetic world view could be shared with the general public, and the possibility of computer technology could be explored in bridging the inside and outside of art and dismissing the classical view of art and life.

33
Norman Bauman, "Five-year Guaranty," in Jasia Reichardt, ed., **Cybernetic Serendipity: The Computer and the Arts**, London: Studio International, 1968, p.43.

34
Jasia Reichardt, **Cybernetics, Art and Ideas**, Greenwich, CT: New York Graphic Society, 1971, p.14.

35
Maria Fernandez, "Detached from HiStory: Jasia Reichardt and Cybernetic Serendipity," **Art Journal**, Fall 2008, p.21.

36
Nam June Paik, 1964, "Afterlude
to the Exposition of Experimental
Television," in Judson Rosebush,
ed., *op. cit.*

Cyberneticus, a Pathfinder into the Black Box

It is hard to define cybernetics in a word, but at its heart lies
the investigation of systems that evolve and change through feedback
generated out of the interactions of control and communication between
man, machine and nature. The system's processes give rise to certain
actions in the flow of information, and the actions bring about changes to
the environment, and the changes again communicate with the system.
The system in cybernetics could encompass all types of systems, including
machines like computers, human societies, and ecological systems.
The carriers for communication between different parties in the system
could thus be technical, biological, personal and social units. In the widest
sense, cybernetics regards the whole world as a huge system and pays
attention to the ways each category and component of the world is created
and recreated, which means what cybernetics is concerned with is the
coexistence of all systems including man, machine and nature.

> First I seek the 'WAY,' of which I cannot foresee where it leads
> to. The 'WAY' … that means, to study the circuit, to try various
> 'FEEDBACKS,' to cut some places and feed the different waves
> there, to change the phase of waves, etc.[36]

This is an afterword to Paik's 1963 work of experimental televisions
manipulating inner-circuits and thereby composing diversely distorted
images, which can also be read as a metaphor for his way of thinking.
He did not follow a prescribed path but paved the way himself by going
through the circuits at firsthand. He preferred the surprise of by-products
gained by mistake and chance, achieved through the complicated process
of trial and error. This was the exploration of vigorously 'thinking hands.'
Paik tried various feedbacks in the waves and vibrations produced between
man, machine and nature, to produce new relationships in the process,
which is embodied in his attitude, sometimes poetic, sometimes full of
Fluxus humour, sometimes rigorous and scholarly.

Since the mid-1980s, cybernetics has come to cover the notion of

virtuality, which sees a physical system as inextricably intertwined with an information system. Such artistic genres as electronic art and digital art have become established too. In the 1960s and 70s when the convergence of information technology and experimental art practice entered into orbit, Paik already anticipated the age of database and network, and aptly learnt cutting-edge computer technologies. From the 1980s, however, he seems, rather unexpectedly, to have turned to video sculptures of analogue flavors, populist live satellite projects, or laser works with stunning visual effects. This is a far cry from the lethargy of the artist who could not keep up with the speed of technological development and could not help dealing with cybernetics only as a metaphor. This is nothing to with the sigh which the artist would let out with a pessimistic prospect for technology, namely, humanity overwhelmed by technology, either. Hybridization of reality and virtuality, of nature and art, has been there from the beginning of the human history; it is only the mediating technologies in hybridity that have changed. Therefore Paik's way of thinking is not restricted to technology itself, the machine of information processing, but it is cybernetic thinking intended to contribute to the changes in the ways man and machine share life. In addition to the changes in attitudes towards man and machine, cybernetics has a role to play for the changes in understanding of what the attitudes are. Aware of the hybridity's historicity and contemporaneity, Paik opened up the black box of technology and found his own way, but he did neither stay in there nor desire to dominate it.

Starting from the scientific names of homo-habilis, homo-erectus and homo-sapiens, human beings are producing different alias today such as homo-interneticus, homo-mobilius, homo-hybridus, etc., which point to the nature of humans combined with technology. Then why do we need to add 'homo-cyberneticus' to the list, and what aspects of humans would the specific name imply? Reichardt of <<Cybernetic Serendipity>> says: "It is also widely assumed that to the engineer, scientist, and mathematician, art is magic, and to the composer, painter, and poet, technology is a mystery. [...] Today these categorical assumptions about our various talents, functions, and possibilities are less accurate than ever."[37] Hultén of <<Machine>> says: "Standing astonished and enchanted amid a world of

38
Karl Gunnar Pontus Hultén, *The Machine as Seen at the End of the Mechanical Age*, New York: MoMA, 1968.

39
Jack Burnham, a curator of the exhibition <<Software: Information Technology – Its New Meaning for Art>> held in Jewish Museum, New York in 1970, said this in relation to Paik's <Robot K-456>. He underlines that Paik undertook an in-depth study, but in his own distinct way, into the works of contemporary figures influential in the fields of art, cybernetics and communications, and also that his work was not overpowered by theories and discourses. Jack Burnham, *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of This Century*, New York: George Braziller, 1968, p.351.

machines, these artists are determined not to allow themselves to be duped by them. They have shown that while different aspects of our relations to machines may conflict, they are not necessarily contradictory."[38] In how these curators saw artists, we can see the birth of homo-cyberneticus. And this takes after Nam June Paik. When he consistently mentioned cybernetics, when the associations with cybernetics disappeared from the surface of his work, "there is mastery of incantation: if [...] [Norbert] Wiener, John Cage and Marshall McLuhan are repeated with enough fervency and juxtaposed with random mathematical symbols then the age of the electronic humanoid plugged in for instant global communication will be upon us."[39] Paik's logarithmic notations contain certain information, but not necessarily the message of a single right answer. These are a kind of guide to lead you to retrace Paik's thought and practice on information flow, system sharing and posthumans, which cannot be simplified as a naive utopian ideal of communication for everybody. The mathematical formulae also help contemplate on the role of art and on the conditions of human beings in the digital and Internet age beyond the realm of art. How to decode the information of mathematical signs depends on how we compose the 'open circuits' where different values and thoughts could be inserted and connected so as to create new waves. *#3*

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