





VM503
AESTHETICS AND HISTORY
OF NEW MEDIA

WEEK 5

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Cybernetics, Systems and Software

Jack Burnham

Jo-Anne Green, Emerson College



Cybernetics refresher:

- Cybernetics is the study of **communication, feedback, and control mechanisms** in **living systems** and **machines**.
- A **feedback loop** enables **individual components** of a **system** (a computer or the human brain) to dynamically **communicate information back and forth**, consequently **altering the behavior** of that **system**.
- Cybernetics is preeminently **the science of organization**; its underlying role has been the implementation of **organic relations** through a profound understanding of the **patterns of organization** in **evolving and living systems**.¹

Nicolas Schöffer

- Schöffer was an advisor to the Phillips Corporation of Europe.
- In 1954, he helped to design the first **spatiodynamic, cybernetic, sound-equipped** art structure for the *Parc Saint-Cloud* in Paris.
- The sculpture responded to **real-time data** (light, temperature, sound) in the environment, and employed a randomizer to add the element of **chance** to the **system**.



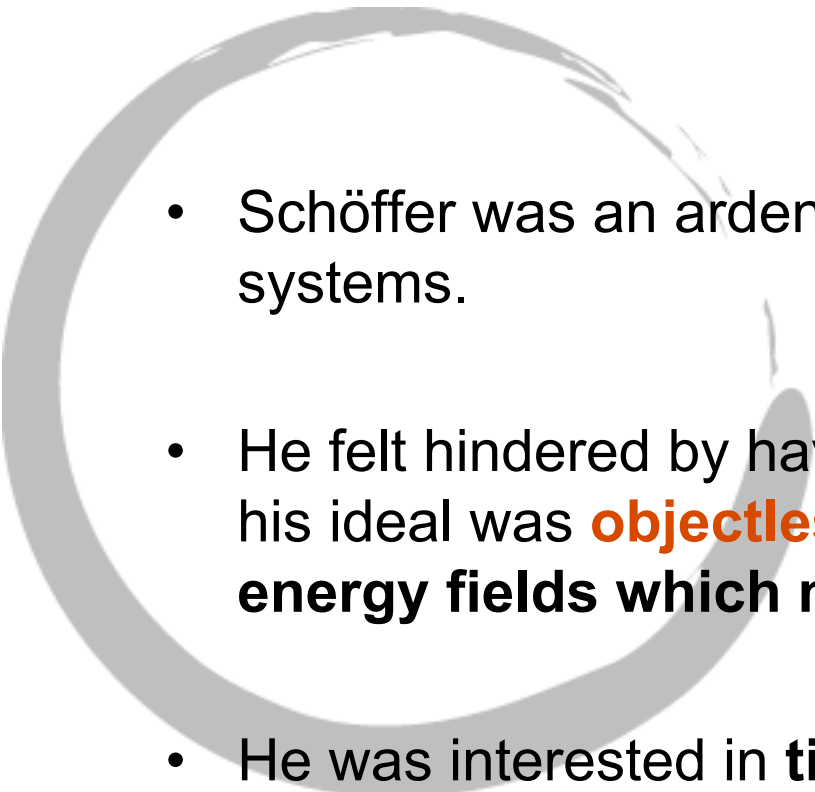
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CYSP I (1956)



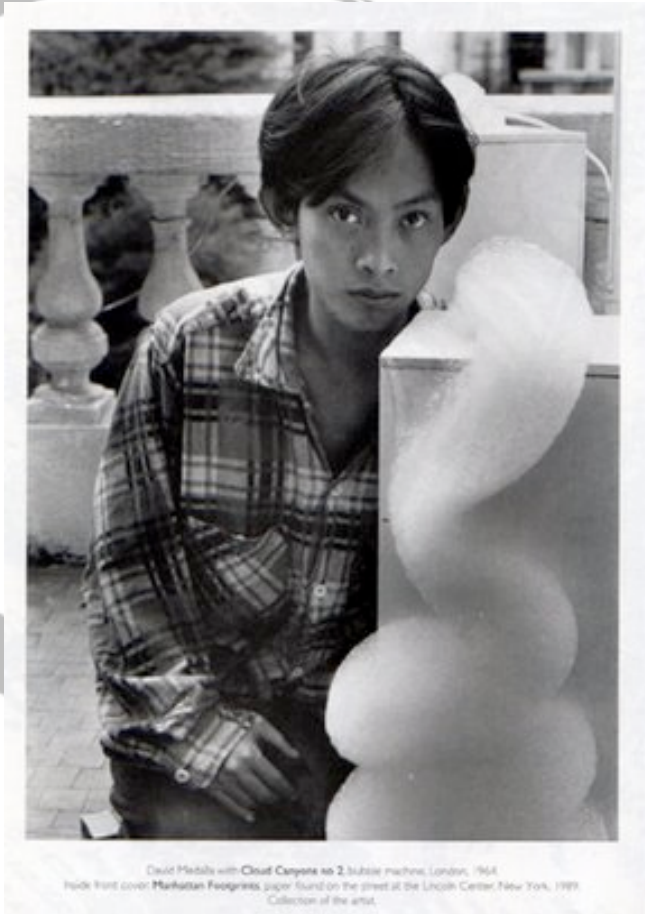
Darkness and silence **animate** the sculpture; brightness and noise make it **still**. Ambiguous stimuli produce the **unpredictability** of an organism.

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- Schöffer was an ardent exponent of the **ephemerality** of systems.
 - He felt hindered by having to use conventional materials; his ideal was **objectlessness**, the manipulation of **pure energy fields which materialize themselves**.
 - He was interested in **time**, not physical *matter*. The “look” of his work was secondary.
 - Aside from Schöffer, it was only around the mid-60s that other artists began using electronic sensory devices, and man-made feedback concepts to control Kinetic Art.

David Medalla

- Born in 1942 in Manila, Philippines.
- A pioneer of **land art, kinetic art, participatory art** and **live art**.
- His works were “unsalable because of their very untidiness as **nonobjects**.”
- They were related to the “**intangible cycles of life** which concern the biologist, ecologist, oceanographer, and the physicist.”
- “His sculptures are the **natural happenings of the universe** poetically isolated.”



David Medalla with *Cloud Canyons* no 2 bubble machine, London, 1964.
Back cover *Manhattan Peoplings*, paper found on the street at the Lincoln Center, New York, 1969.
Collection of the artist.

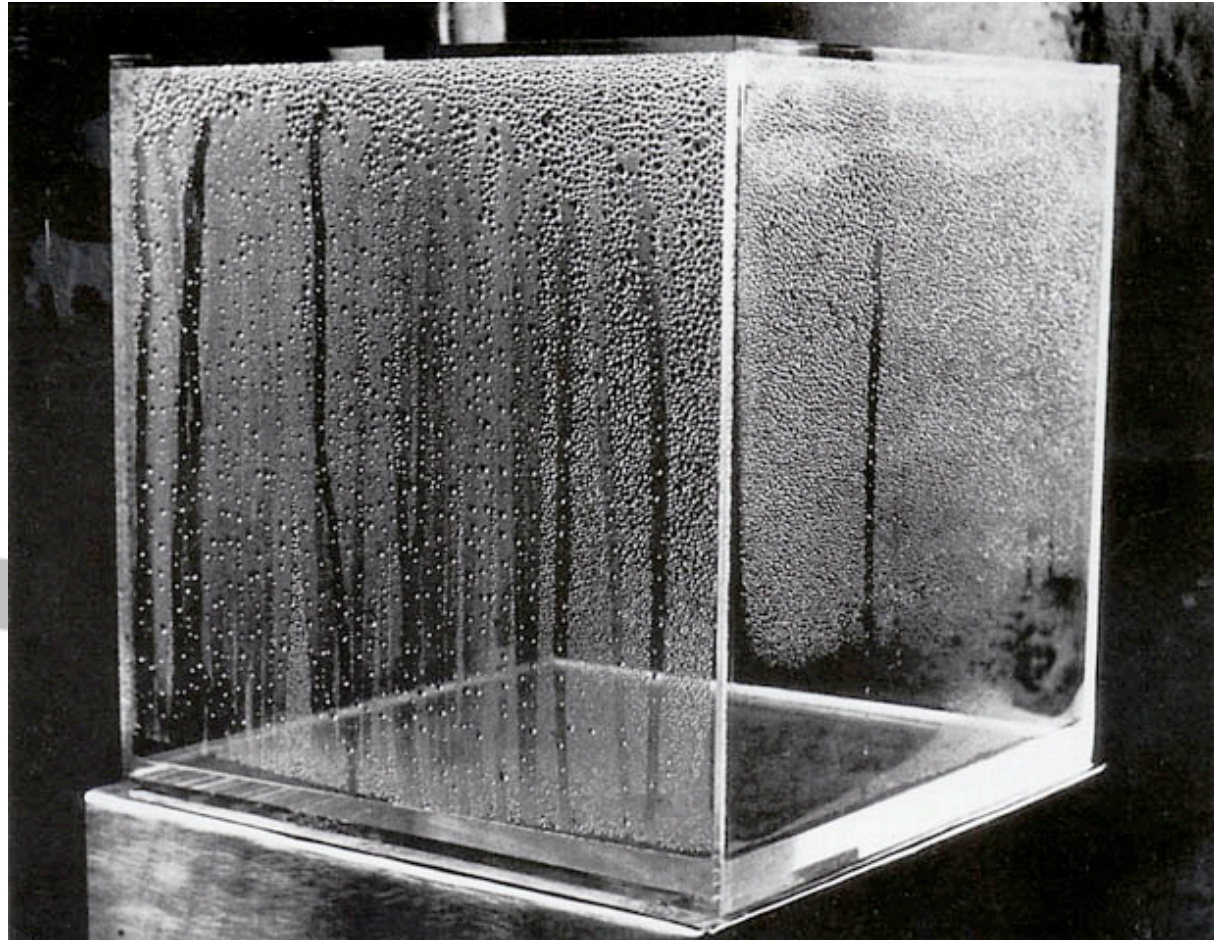


Cloud Canyons (1964); from his series of bubble mobiles; plywood boxes that emitted an unending cascade of bubbles covering everything in their path.

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Hans Haacke

- German born, began his **wind and water experiments** in New York, 1963.
- **Boxes** filled with liquids that dripped, trickled, oozed, splashed, and condensed. **Wind** sculptures balanced balloons on columns of air. Their activity was due to **gravity** and the *mechanics of seeking a position of rest*.
- They seem **self-organizing** and **self-stabilizing**, but he *deliberately omitted feedback mechanisms*; i.e. he was interested in **cyclical processes, natural feedback** and **equilibrium**.

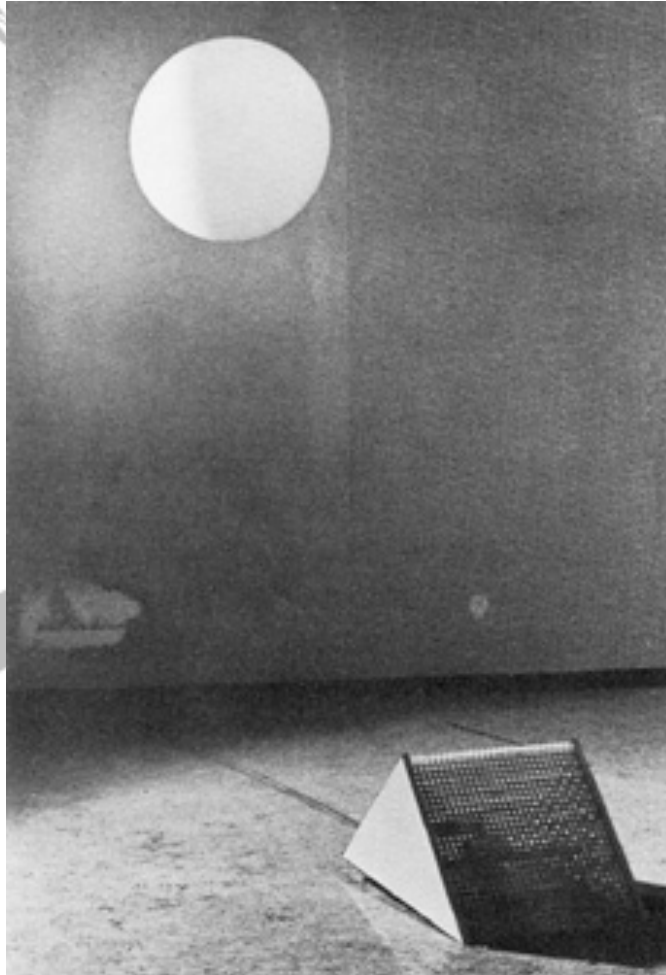


Condensation Cube, 1963

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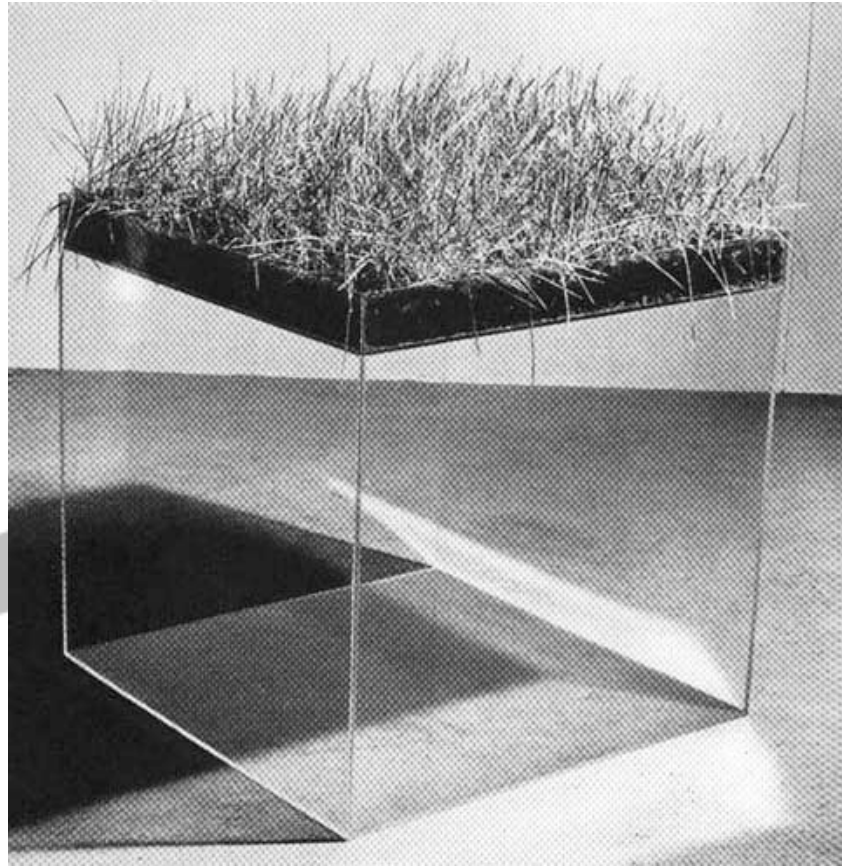
Haacke's goals were to make something:

- which **experiences, reacts to its environment, changes, is non-stable.**
- **indeterminate**, that **always looks different**, the shape of which cannot be predicted precisely.
- that reacts to light and temperature changes, that is subject to air currents and **depends**, in its functioning, **on the forces of gravity.**
- that **lives in time** and allows the “spectator” to **experience time.**



Sphere in Oblique Air-Jet (1967) presents the viewer with a buoyant balloon that stably hovers in space.

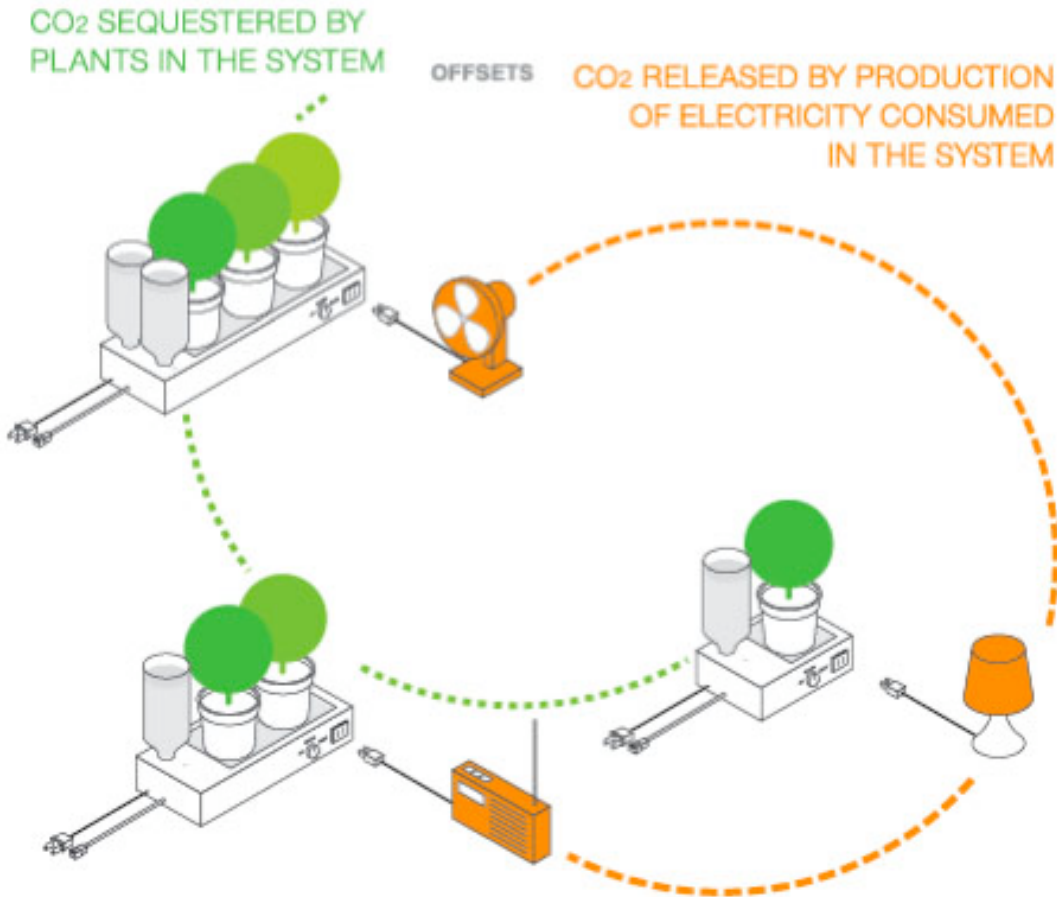
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Grass Cube, 1967

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Natural Fuse by Usman Haque (2009)



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Photo-Electric Viewer-Programmed Coordinate System (1966-1968)

The spectator interrupts infrared beams positioned as a regular right-angled grid in the room. Lighted bulbs determine the movements of spectators in the room.

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Jack Burnham....

- Systems-oriented art ... will deal less with artifacts contrived for their formal value and increasingly with men enmeshed *with* and *within* purposeful **responsive systems**.
- Such a shift should gradually **diminish the distinction between biological and non-biological systems**; i.e. man and system as functioning but organizationally separate entities.
- The **system itself will be made intelligent and sensitive** to the human invading its territorial and sensorial domain.

Jack Burnham....

- Scientists working in the field of bio-electronics say that there are **no qualitative physical differences between living and nonliving matter**; the former are simply more complex in their organization.
- "...the vital processes of living things are ... **interdependent**; they take place within and as a result of the *system* of which they are but a part. Similarly, it will be possible for a machine to utilize life-like processes, but only as part of some larger *system*..." Richard Lander
- The system which produces and sustains natural life and machines is **the same system**.

Jack Burnham....

- The cultural obsession with **the art object is disappearing**; it is being replaced by **systems consciousness**.
- A refocusing of aesthetic awareness on **matter-energy-information exchanges**.
- This prompts us *not* to look at the “skin” of objects, but at those meaningful **relationships** within and beyond their visible boundaries.
- The system, like the art object, is a **physical presence**, yet one that does not maintain the viewer-object dichotomy but **tends to integrate the two into a set of shifting interacting events**.

Jack Burnham: Real Time Systems (1969)

A major illusion of the art system is that art resides in specific objects. Such artifacts are the material basis for the concept of the “work of art.” But in essence, **all institutions which process art data, thus making information, are components of the work of art.*** Without the support system, the object ceases to have definition; but without the object, the support system can still sustain the notion of art. So we can see why the art experience attaches itself less and less to the canonical or given forms but embraces every conceivable experiential mode, including living in everyday environments. Thus **art**, according to John McHale (The Future of the Future) becomes **“temporal immersion in a continuous contextual flow of communicated experiences.”**

Real time systems (which are predicated on communication networks) **“gather and process data from environments, in time to effect future events within those environments.”**

Conceptual Art

- Sought to analyze the **ideas** underlying the **creation** and **reception of art**: “*The idea becomes a machine that makes art.*” – Sol LeWitt, 1967
- Lists, diagrams, measurements, neutral descriptions, counting = vehicles for a preoccupation with **repetition**, the introduction of **daily life and work routines**.
- **Communication** (not community) and **distribution** (not accessibility) were inherent; it was democratic in form, not content; it was rebellious yet art-referential.
- Communication between people was subordinate to **communication about communication**.

Joseph Kosuth + Lawrence Weiner

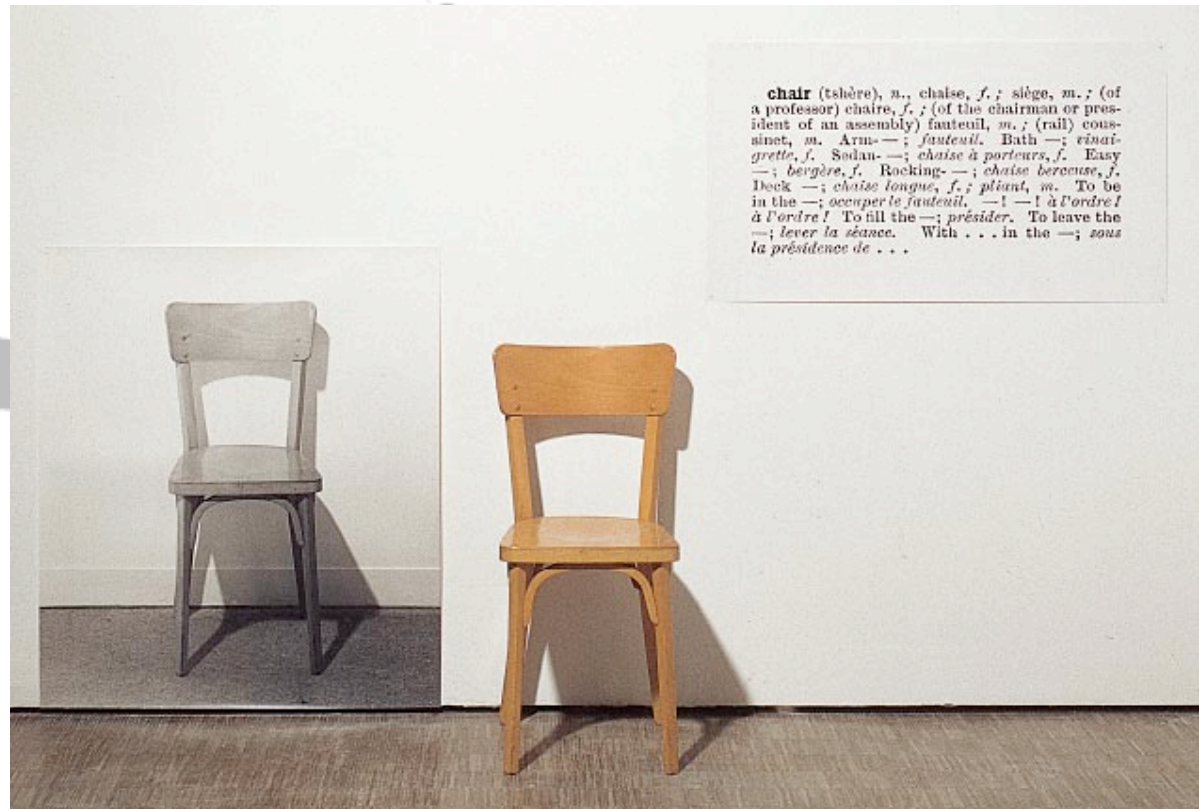
noth-ing (nuth'ing). [Orig. two words, *no thing*.] **I. n.**
No thing, not anything, or naught (as, to see, do, or say *nothing*; "I opened wide the door: Darkness there, and *nothing* more!" Poe's "Raven"); no part, share, or trace (*of*: as, the place shows *nothing* of its former magnificence; there is *nothing* of his father about him); also, that which is non-existent (as, to create a world out of *nothing*; to reduce something to *nothing*, as by a process of extinction or annihilation); also, something of no importance or significance (as, "Gratiano speaks an infinite deal of *nothing*," Shakespeare's "Merchant of Venice," i. 1. 114; "The defeat itself was *nothing* . . . but the death of the Prince was a blow," Besant's "Coligny," ix.); a trifling action, matter, circumstance, or thing; a trivial remark (as, "In pompous *nothings* on his side, and civil assents on that of his cousins, their time passed": Jane Austen's "Pride and Prejudice," xv.); a person of no importance, or a nobody or nonentity; in *arith.*, that which is without quantity or magnitude; also, a cipher or naught (0).

A STAKE SET

Text used as a strategic device to examine the interstice between **visual** and **verbal** languages and **how meaning emerges** in art, seen as a semiotic system.

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Joseph Kosuth, *One and Three Chairs*, 1965



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Joseph Kosuth, *One and Three Chairs*, 1965



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Remote



Remote in Boston



Remote in Second Life

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- Conceptual Art established a working distinction between an **idea** (*art is made of information*) and its realization in material that can be mapped onto the dynamic relations of **software and data** (metaphorically).
- **Dematerialization** and **conceptualization** put a new emphasis on **process** and **communication**.
- **Systems of exchange** and **processes of production** became associated with metaphors of **data flow** and **information processes**.
- Hans Haacke's **Visitor's Profile** was one of the few pieces in the 1960s to make such an explicit connection.
- **Information** is no more "dematerialized" than "ideas," which are **always perceived through material instantiation**.*

Software, Information Technology: Its New Meaning for Art

- The Jewish Museum, NYC, 1970.
- Hans Haacke, Nicholas Negroponte, Les Levine, Joseph Kosuth, Ted Nelson/Ned Woodman, Sonia Sheridan, Douglas Huebler, Vito Acconci, John Baldessari...
- First major U.S. exhibition that **utilized computers** in a museum context.
- Drew parallels between the **ephemeral programs and protocols of computer software** and the increasingly **dematerialized** forms of (**conceptual**) art which, Burnham believed, functioned like **information processing systems**.

Software continued ...

- Burnham interested in how **dialogue** evolves between the **computer** program and the **human** subject, so that **both move beyond their original state**. Anticipated that this model of bi-directional exchange would eventually lead to **two-way communication** in art. *Sculptural practice grounded in **relationships***.
- Software was a testing ground for public interaction with **information systems and their devices**.*
- “*Software*” paralleled aesthetic principles, concepts or programs that underlie the formal embodiment of actual art objects, which in turn parallel “*hardware*.”

Software continued

- An attempt to **produce aesthetic sensations** without the intervening 'object'.
- The public could personally **respond to** programmatic situations structured by the artists.
- Made **no distinctions between art and non-art**; the physical installation was based on the two-tiered model of **Marcel Duchamp's Large Glass**, which Burnham interpreted as a signpost announcing the **demise of art as a separate facet of life.***

Software continued

- By synthesizing **cybernetics**, **aesthetics**, **phenomenology**, and **semiotics**, *Software* emphasized the process of audience interaction with "**control and communication techniques**," encouraging the "public" to "personally respond" and **ascribe meaning to experience**.
- In so doing, *Software* questioned the intrinsic significance of objects and implied that **meaning emerges from perception** in what Burnham (quoting Barthes) later identified as "syntagmatic" and "systematic" contexts.

Les Levine

- *Systems Burn-Off X Residual Software*: Numerous critics and journalists had been bused upstate for the March 1969 opening of the highly publicized *Earth Works* exhibition in Ithaca, New York. Levine photographed the **media spectacle**.
- In April, he made **1,000 copies of 31 photographs** for an installation at the Phyllis Kind Gallery in Chicago. Most of the **31,000 photographs** were randomly distributed on the floor and covered with jello; some were stuck to the wall with chewing gum; the rest were for sale.
- 33 photographs of the installation were shown in **Software**.

Les Levine continued ...

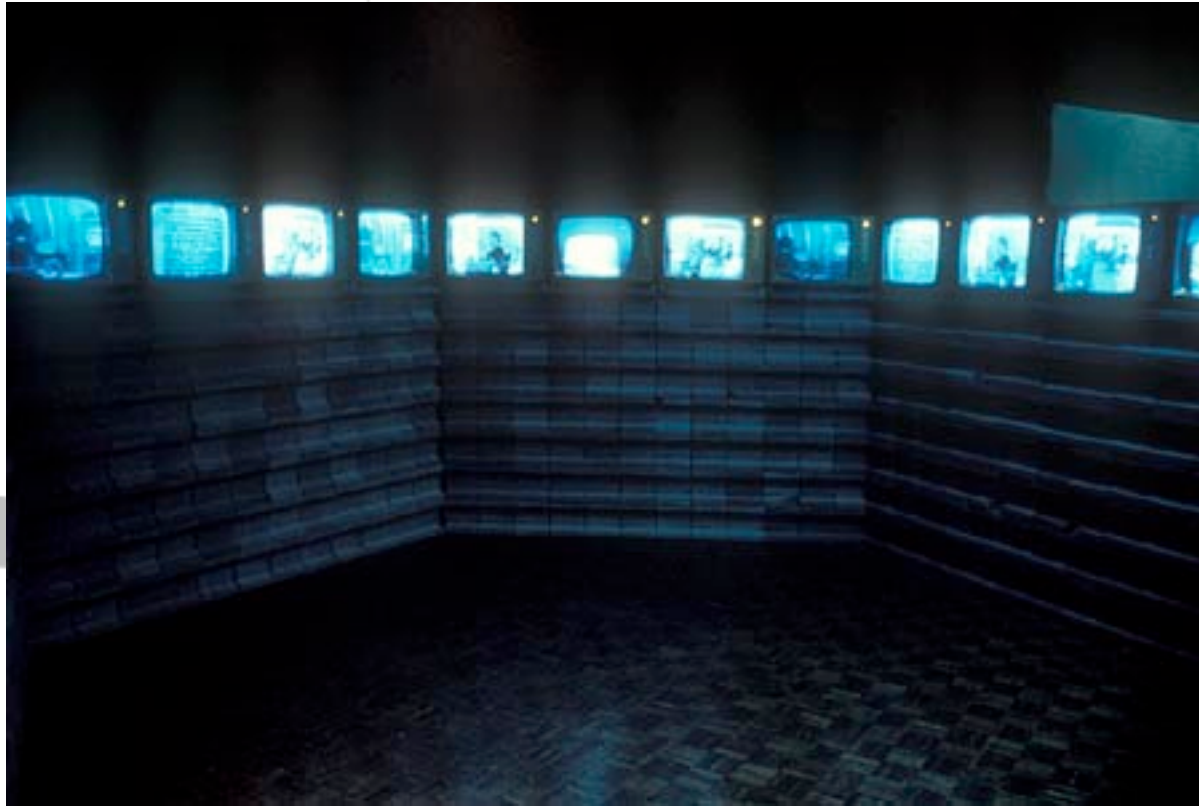
- Levine argued that the proliferation of **mass media** was changing **knowledge** into a **second-hand mental experience of simulations and representations** -- i.e. software.



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Les Levine continued ...

- **A.I.R.** consisted of a group of TV sets which displayed activity taped in the artists studio, showing museum visitors the artist in his natural environment. The images change position from monitor to monitor on a random basis. *“I believe this brings the art process directly to the public environment and thereby makes a closer connection between art and general culture.”*
- **Wire Tap** was a series of twelve speakers, each measuring 12” x 12”, and containing a series of conversations between the artist and anyone who telephoned him during the day. People heard these conversations as they passed by.



A.I.R.

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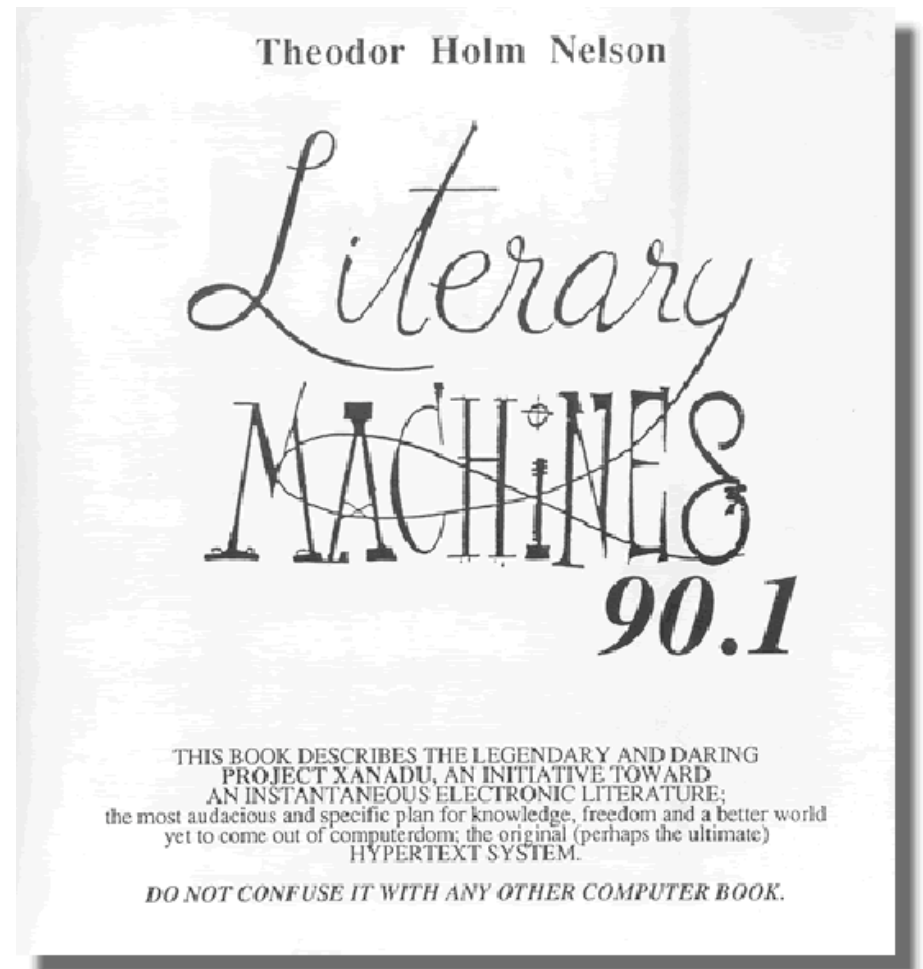


Wiretap

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Labyrinth by Ted Nelson and Ned Woodman

- An **interactive catalogue**; a **hypertext system**.
- Allowed participants to **browse, gather** information about the exhibit, then **print** out **an individually profiled search record** following the mazelike intuitive pathways suggested by its title.
- Makes use of an **associative linking process** envisioned by **Vannever Bush**.



Hans Haacke



News (1969) incorporated several Teletype machines that delivered a perpetual flow of information about local, national and international events, printed out on continuous rolls of paper in real time.

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Hans Haacke



Visitor's Profile

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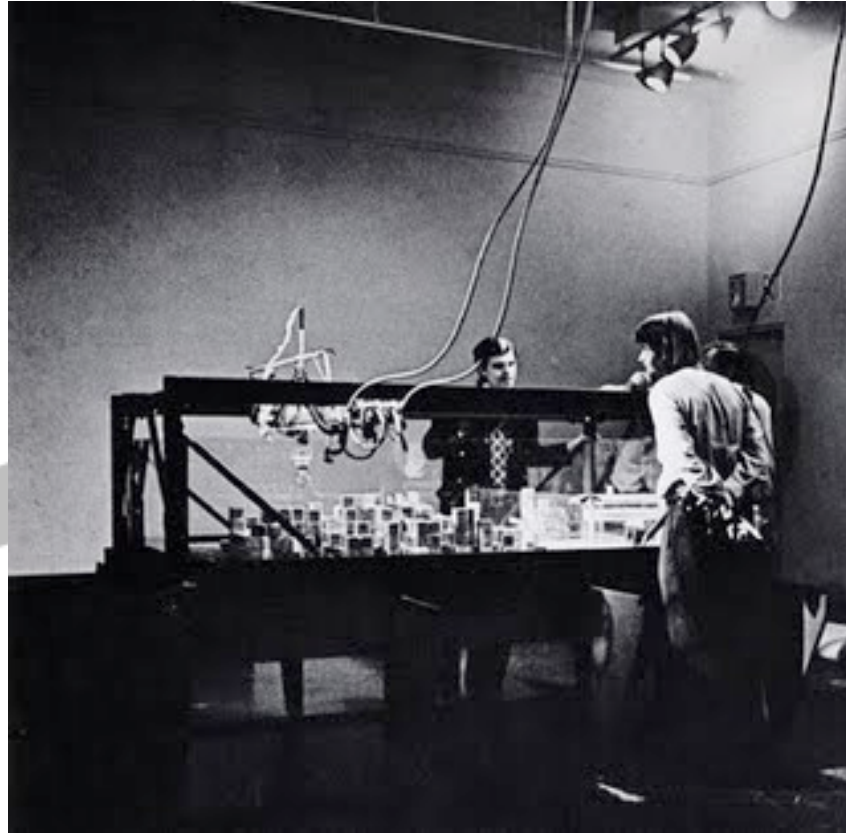
Hans Haacke continued

- **News** and **Visitor's Profile** were part of the artist's *Real Time Systems* series, inspired in part by conversations with Burnham, who introduced Haacke to the idea of open biological systems developed by **Ludwig Von Bertalanffy** and to **Norbert Wiener's** theories of cybernetics.
- Such demographic research - as art - opened up a critical discourse on the exclusivity of cultural institutions and their patrons, **revealing the myth of public service as a thin veneer justifying the hierarchical values that reify extant social relations.**

Sonia Sheridan and Joseph Kosuth

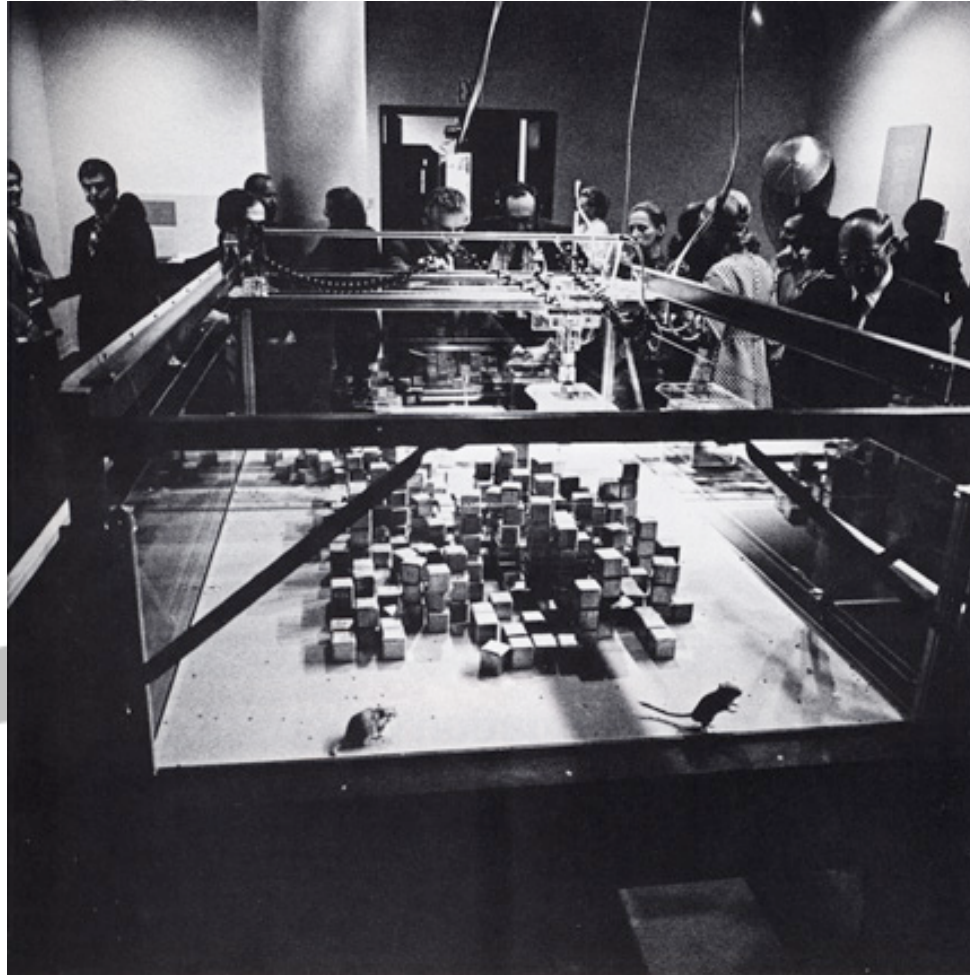
- **Interactive Paper Systems** by *Sonia Sheridan*, engaged museum-goers in a creative exchange with the artist and 3M's first commercially available color photocopying machine, dissolving conventional artist-viewer-object relations.
- In **The Seventh Investigation (Art as Idea as Idea)** *Joseph Kosuth* utilized multiple forms of mass media and distribution (a billboard, an newspaper advertisement, a banner, and a museum installation) to question the conceptual and contextual boundaries between art, philosophy, commerce, pictures, and texts.

Seek by Nicolas Negroponte, et al



Standing behind the exhibit is Nicholas Negroponte, head of MIT's Architecture Machine Group, 1970.

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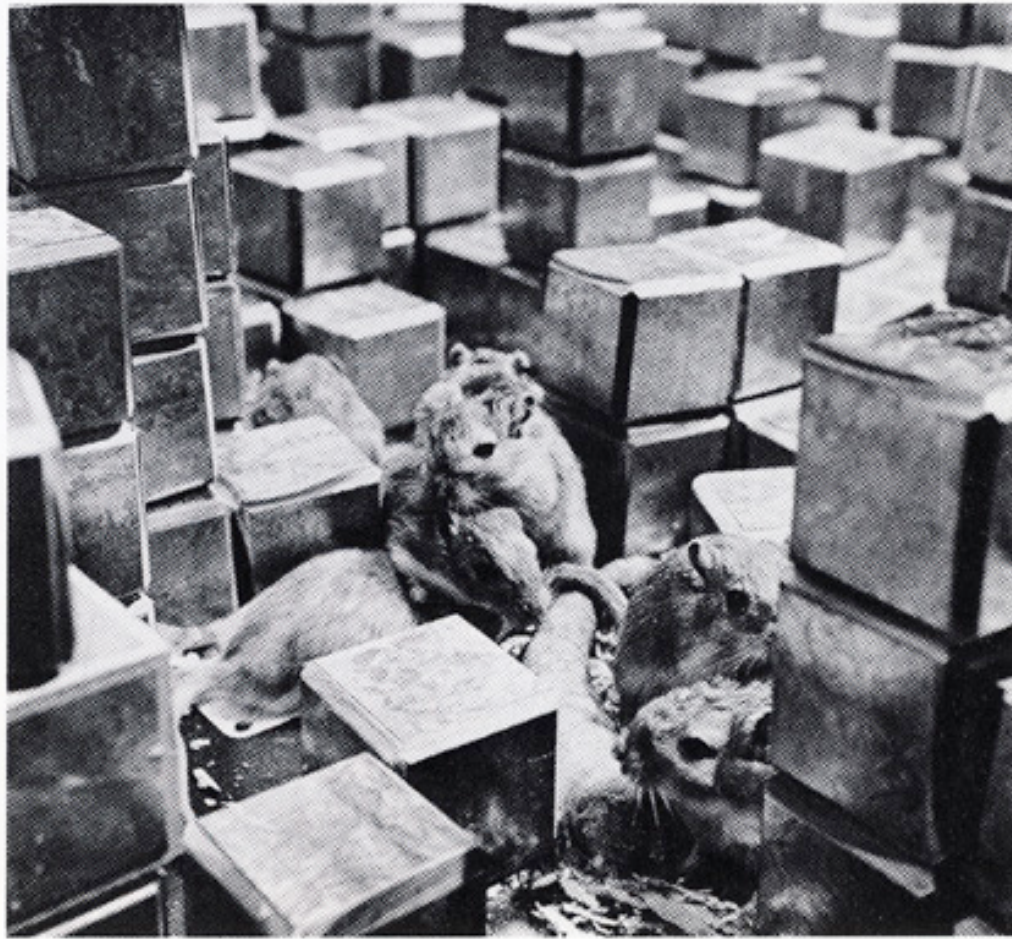
Seek -- a model of intelligent architecture -- was a small city made of cubes, arranged according to a specific ground plan, and inhabited by Mongolian Gerbils: a biological system.

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The movement of the Gerbils continuously changed the position of the blocks.

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A video camera tracked the changes made by the Gerbils. Following instructions programmed by the authors, the robotic arm automatically rearranged the blocks in more grid-like patterns of the Gerbils' designs, using a moveable electromagnet.

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Other Artists/Works

- Other overtly technological projects involved constantly broadcasting poetry on an AM frequency, turning the glass windows into of the museum into low-power speakers, and offering access to various data streams and interactive computer programs via Teletype and CRT.
- **Burnham wrote:** “it may not be, and probably is not, the province of **computers** and other **telecommunications devices** to produce art as we know it; but they will, in fact, be instrumental in **redefining the entire area of esthetic awareness.**”

Systems Theory

- Early 1930s, Ludwig van Bertalanffy grouped the **organizational properties** of organic entities into the category, **systems**.
- **Systems** were multileveled **organizational structures** of living forms; very *diverse systems* could have very *strong similarities* according to the way they were organized.
- **Systems** and **Cybernetics** coincide because Cybernetics **is** the analysis of **linked and interacting systems** -- precisely Bertalanffy's view of biological activity.
- Both natural and man-made systems, *if equipped with similar organizational properties*, elicit **related behavioral responses**.

Systems Esthetics

- We are now in transition from an **object-oriented** to a **systems-oriented** culture. Here change emanates, not from *things*, but from the *way things are done*.
- E. S. Quade, has stated that "**Systems analysis**, particularly the type required for military decisions, is still largely **a form of art**. Art can be taught in part, but not by the means of fixed rules.... "
- Through the early stages of industrialism it remained possible for decorative media, including painting and sculpture, to embody the **esthetic impulse**; but as technology progresses this impulse *must identify itself with the means of research and production*.


Systems Esthetics continued ...

- The specific function of **modern didactic art** has been to show that art does not reside in material entities, but in **relations between people** and **between people and the components of their environment**.
- In an advanced technological culture the most important **artist best succeeds by liquidating his position as artist vis-a-vis society**.
- The significant artist strives to **reduce the technical and psychical distance** between his **artistic output** and the **productive means of society**. (*Duchamp, Benjamin, Warhol*)

Systems Esthetics continued ...

- This strategy transforms **artistic** and **technological** decision-making into **a single activity** -- at least it presents that alternative in inescapable terms.
- Scientists and technicians are not converted into "artists," rather **the artist becomes a symptom of the schism between art and technics.**
- The need to make ultrasensitive **judgments as to the uses of technology and scientific information becomes "art"** in the most literal sense.
- In systems perspective there are **no contrived confines** such as the *theater proscenium* or *picture frame*.
- A system is a "complex of **components in interaction.**"

Systems Esthetics continued ...

- Moholy-Nagy fabricated a set of enamel on metal paintings by **telephoning precise instructions** to a manufacturer.
- "Art by Telephone," Museum of Contemporary Art, Chicago, Jan van der Marck (1969): the **recorded conversation** between artist and manufacturer was to *become part of the displayed work of art.** 
- **Information**, in whatever form conveyed, becomes a viable esthetic consideration. (*How information is communicated is the emphasis; the artist's "hand" is removed altogether.*)

Systems Esthetics continued ...

- For critics, **mass art undermined** art's fetish **aura**; reproducing an art object *ad infinitum* is absurd; rather than making quality available to a large number of people, **it signals the end of concrete objects embodying visual metaphor.**
- In a system, all phases of the life cycle of a system are relevant. There is no end product that is primarily visual; its **esthetic is revealed in the reorganization of the natural environment.**

Donald Judd

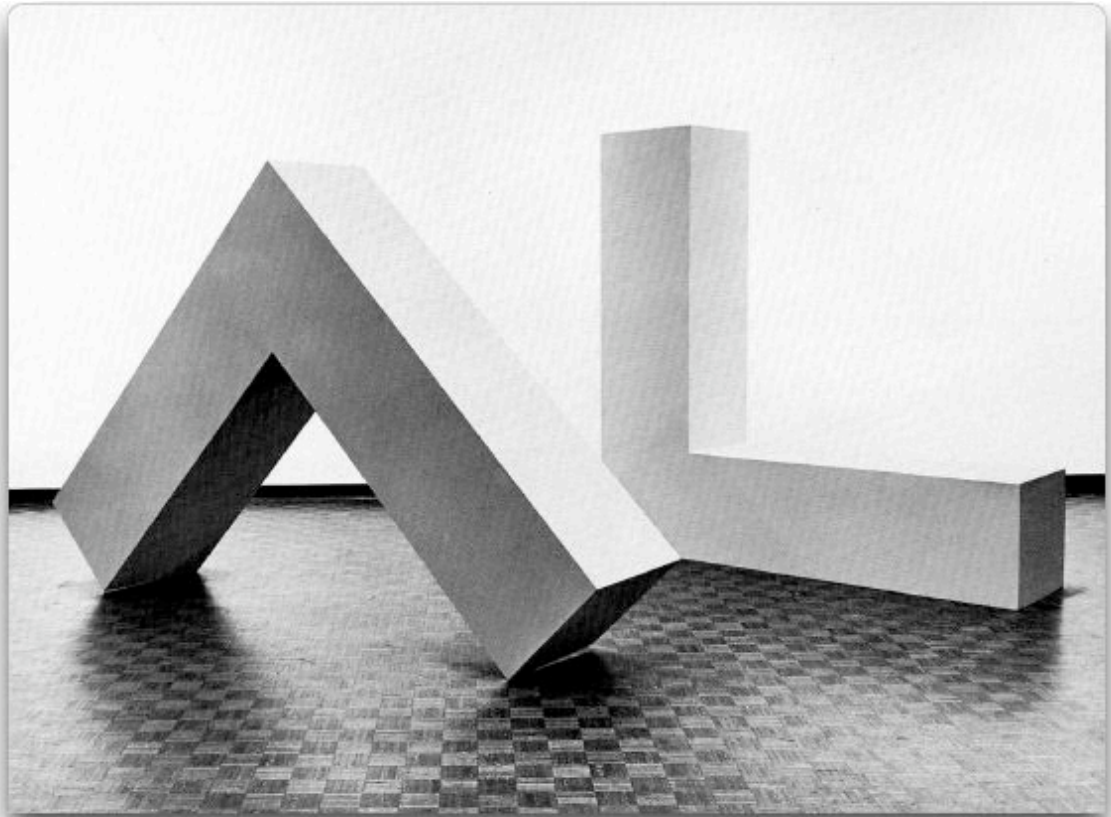
- “Three dimensions are real space. That gets rid of the problem of illusionism...”
- Works combine elements of architecture, sculpture, and painting.
- They are three-dimensional, yet Judd refused to call them sculpture, a term he associated with the hand-crafted art of an earlier era.
- He referred to them as **specific objects** -- a phrase meant to suggest their neutral, discrete nature.

Donald Judd



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Robert Morris



"68th American Show" (1966), Morris sent plans of his pieces to the carpenters at the Chicago museum where they were assembled for less than the cost of shipping the originals from New York. In the context of a systems esthetic, possession of a privately fabricated work is no longer important. **Accurate information takes priority over history and geographical location.**

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Systems Esthetics continued ...

- Systems esthetics presumes that **problems** cannot be solved by a single technical solution, but **must be attacked on a multileveled, interdisciplinary basis.**
- Sculptors no longer think like sculptors, but assume a span of problems more natural to architects, urban planners, civil engineers, electronic technicians, and cultural anthropologists.
- An extension of McLuhan's remark about **Pop Art** when he said that it **was an announcement that the entire environment was ready to become a work of art.**

Les Levine



Clean Machine has no ideal vantage points, no "pieces" to recognize. One is *processed* as in driving through the Holland Tunnel.

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Systems Esthetics continued ...

- Levine's works emphasize that the **context** of art is **fluid**.
- They do not deny art, *they deny scarcity as a legitimate correlative of art.*
- The components of systems -- whether these are artistic or functional -- have no higher meaning or value.
- **Systems** components **derive their value** solely through their assigned **context**.

Hans Haacke



Sky Line, a nylon line kept aloft by hundreds of helium-filled white balloons

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Hans Haacke continued ...

- Boundary situations are central to his thinking. (*In systems perspective there are **no contrived confines.***)
- A "sculpture" that physically reacts to its environment is no longer an object; it is better understood as a "system" of **interdependent processes.**
- These processes evolve without the viewer's empathy. She becomes a **witness.**
- **A system is not imagined, it is real.**

Systems Esthetics and Happenings

- They establish an indivisibility between themselves and **everyday** affairs.
- They consciously **avoid materials and procedures identified with art.**
- They allow for **geographical expansiveness and mobility.**
- They include **experience** and **duration.**
- They emphasize **practical activities** as the most meaningful mode of procedure.
- They emphasize a **participatory esthetic.**

Burnham's Conclusion

- The emerging paradigm in art is one fundamentally concerned with the implementation of the art impulse in an **advanced technological society**.
- As culture producers, our prime role becomes that of **maker of esthetic decisions**.
- **These decisions** -- whether they are made concertedly or not -- **control the quality of all future life on the earth**.

Sources

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