Aesthetics of Rationality in Early Ages of Computational Art

MAT 200A Final Project

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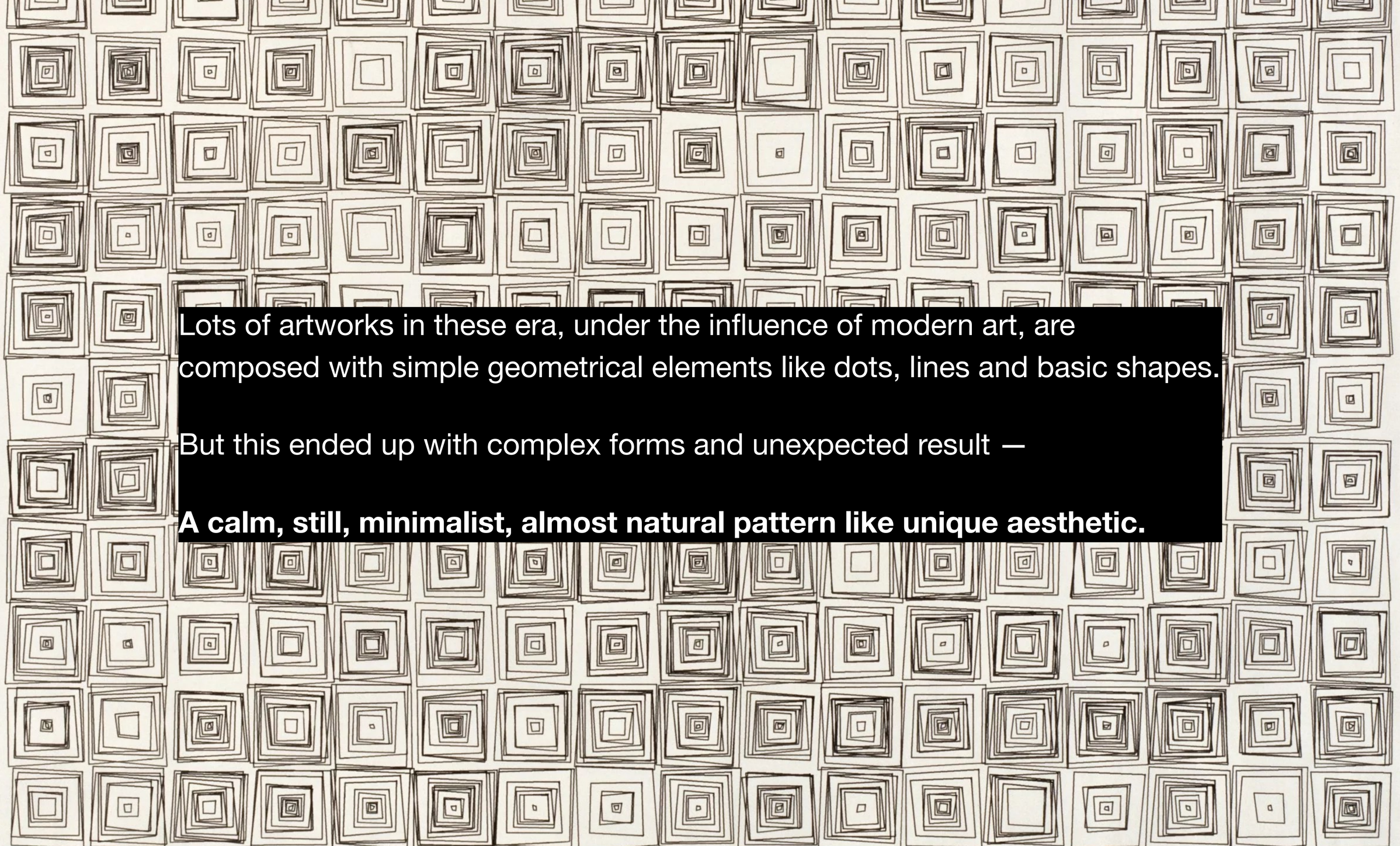
The heated debate on how AI and machine learning reshaped our everyday life and art is sometimes frustrating.

But it is very shocking of how easily we tend forget only a few decades ago, the idea of having computer in every home or in artist's studio was also completely outlandish, **which generated same level of anxiety about the future of labour and creativity**. [1]

However artists of that early age managed to audaciously expand the boundary of creativity and created unique aesthetic — ***the Aesthetic of Rationality***.

This history is inspiring and should not be overlooked, and we can continue to learn from it.



Lots of artworks in these era, under the influence of modern art, are composed with simple geometrical elements like dots, lines and basic shapes.

But this ended up with complex forms and unexpected result —

A calm, still, minimalist, almost natural pattern like unique aesthetic.

Two Categories of Computer graphic [2]

1. Those which approximate to pure design or art;

2. Those which are not made with any aesthetic end in view but which serve to visualize complex physical phenomena.

This presentation will be divide into three sections:

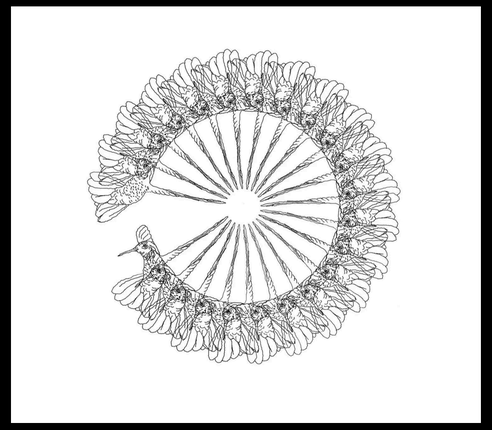
1. Computational visualization artworks with a clear intent or theme

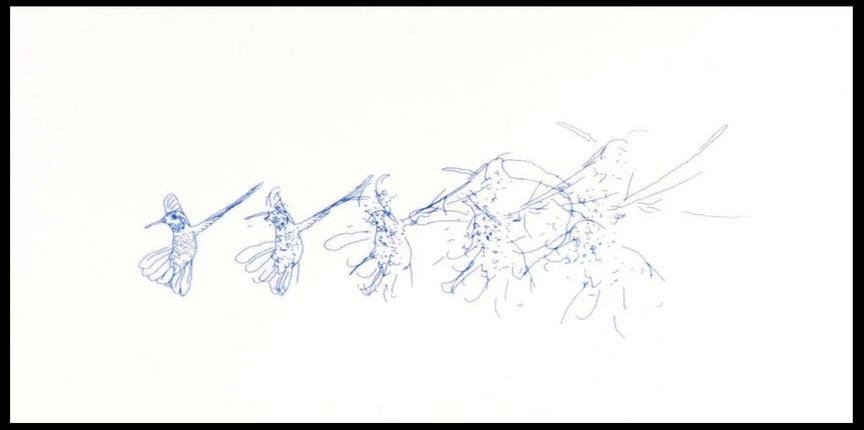
2. More abstract artworks made by artist’s dialogue and co-working with computer

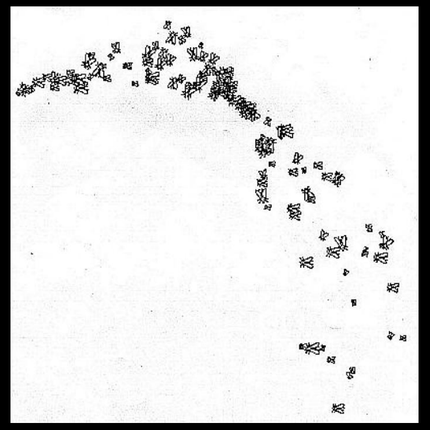
3. Machine generated artworks with little or no intent beforehand

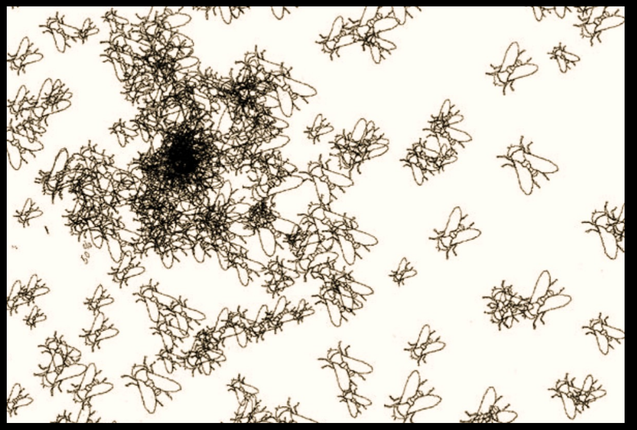

Visualizing the Existence

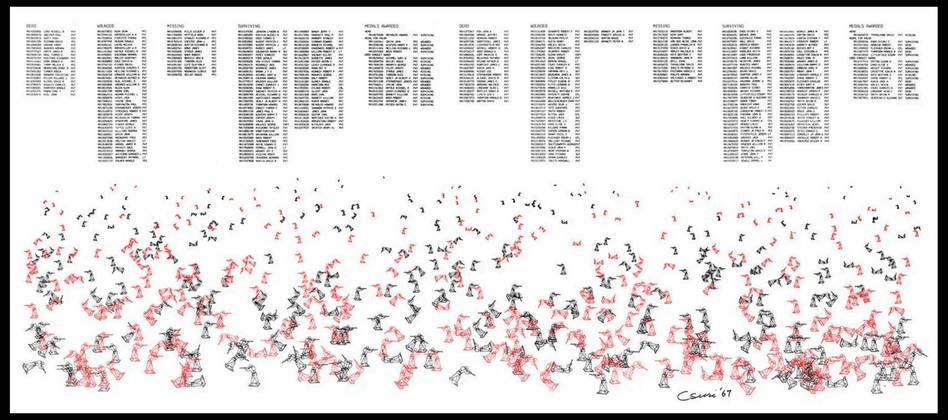
Existing Object











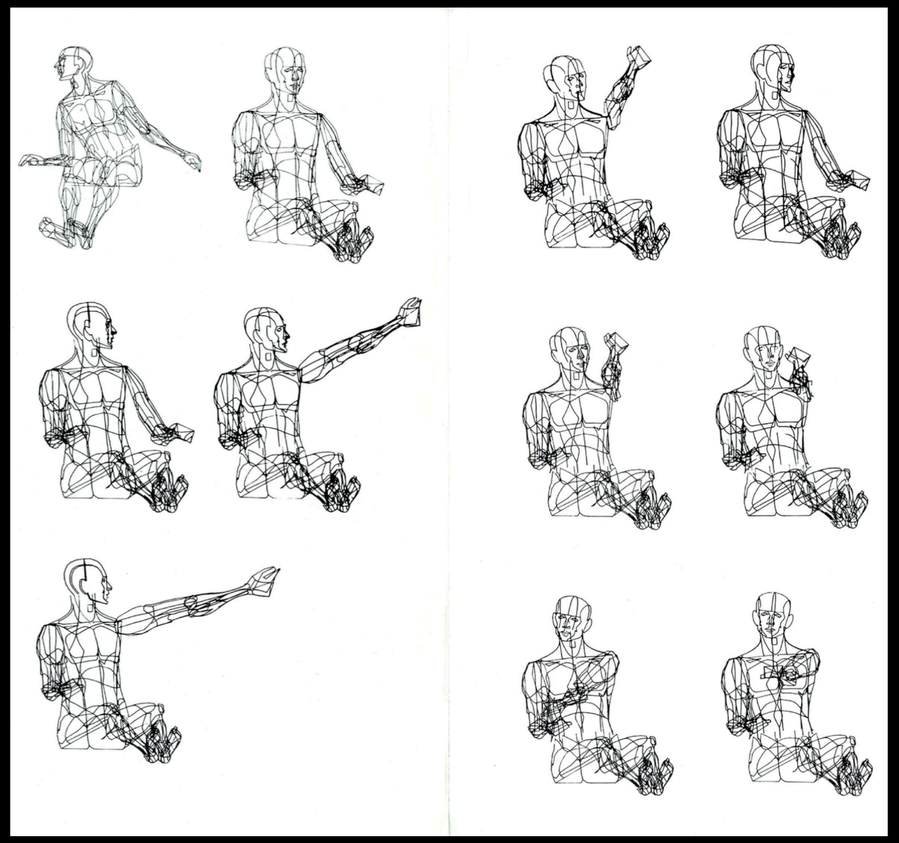
Charles A. Csuri

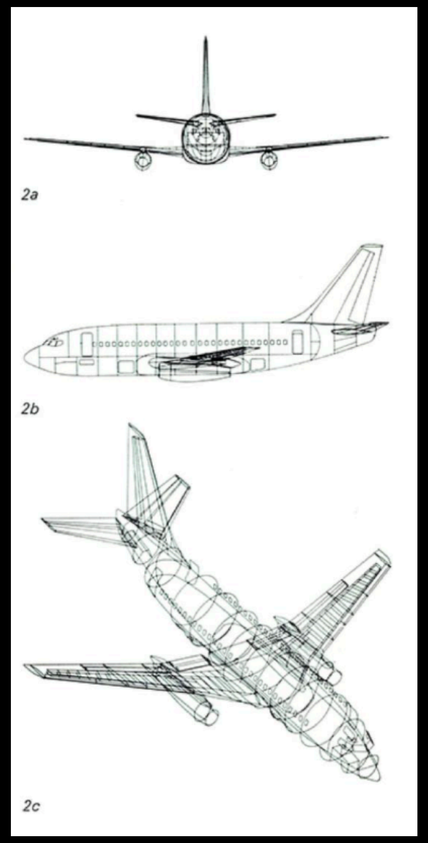
***Humming birds*, 1967 (Upper Left)**
First computer films to include non-abstract figures [5]

***Random War*, 1967 (Lower Left to the Left)**
Computer generating with pseudo-random number

***Sine Curve Man*, 1967 (Lower Left to the Right)**

***Flies*, 1966 (Above)**



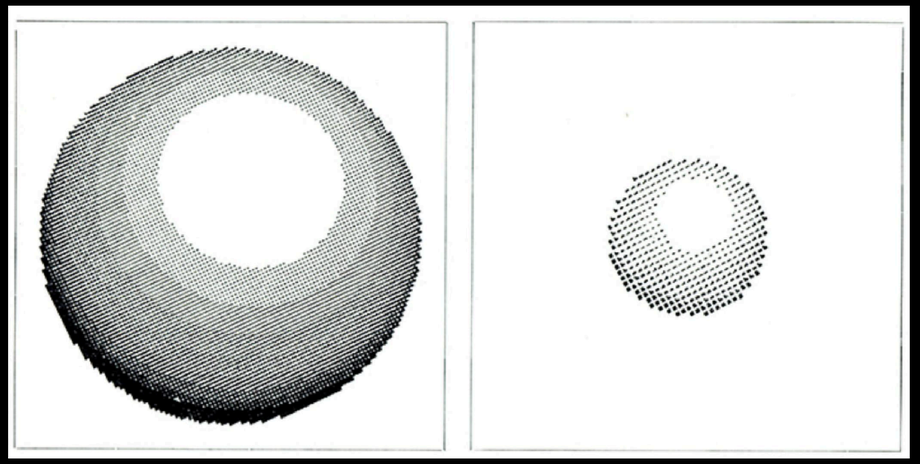


Boeing Computer Graphics

***Human Figure* (Left)**
Keypunch, IBM 1400C reader printer, IBM 7094 computer, Gerber plotter.

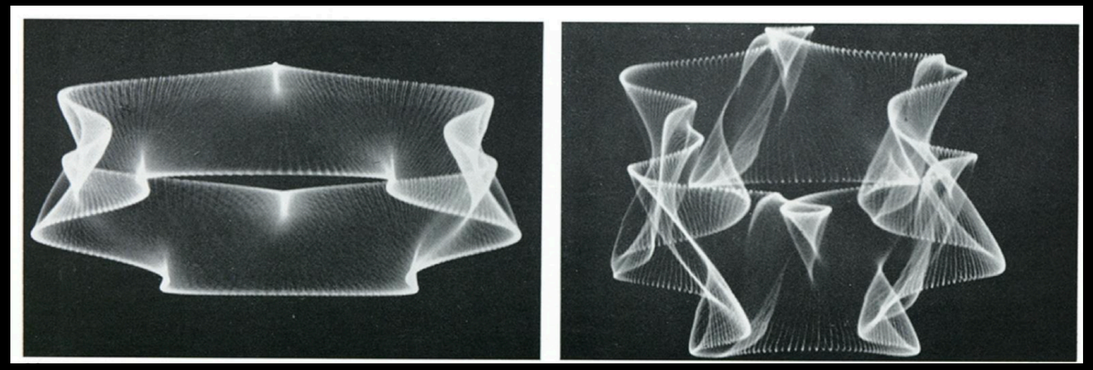
***Boeing 737 Project* (Right)**
Keypunch, IBM 1400C reader printer, IBM 7094 computer, Gerber plotter.

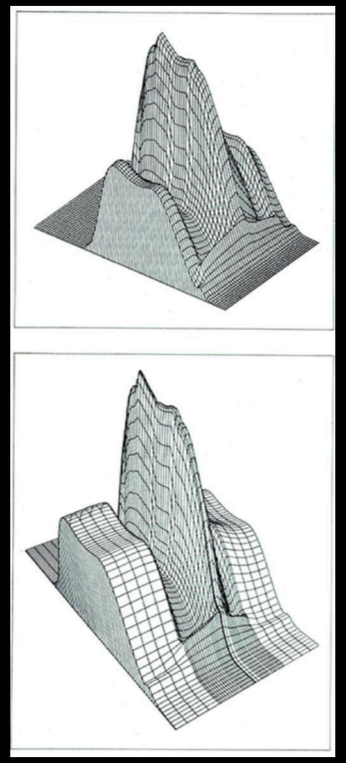
Alan Parkin
***How to Draw a Ball*, 1968**
Elliott 4120, Rapidograph pen 0.2

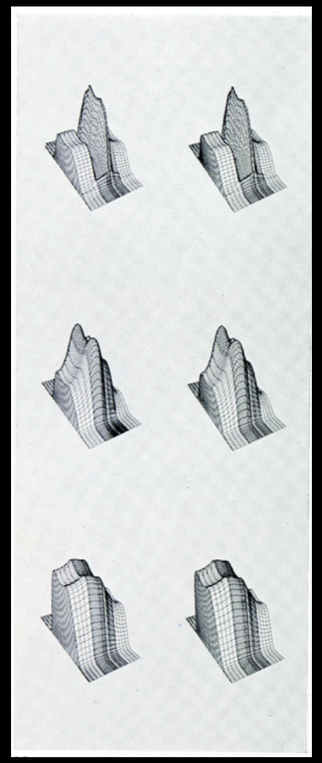


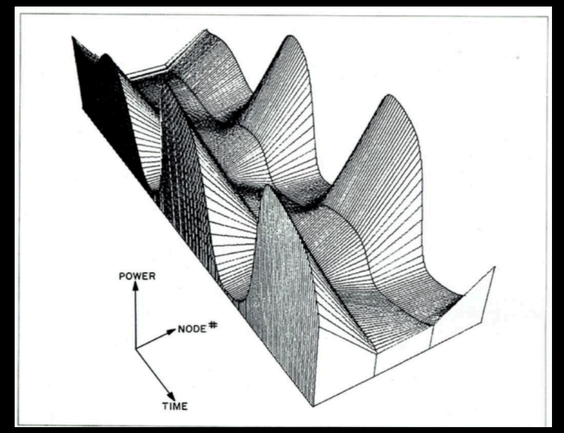
Physical Phenomenon / Mathematical Concepts

Hugh Riddle and Anthony Pritchett
***Sidebands*, 1968**
Stills of a kinetic sequence generated by an analogue system
Lissajous figure for frequency measurement
Use line to substitute classic Lissajous figure







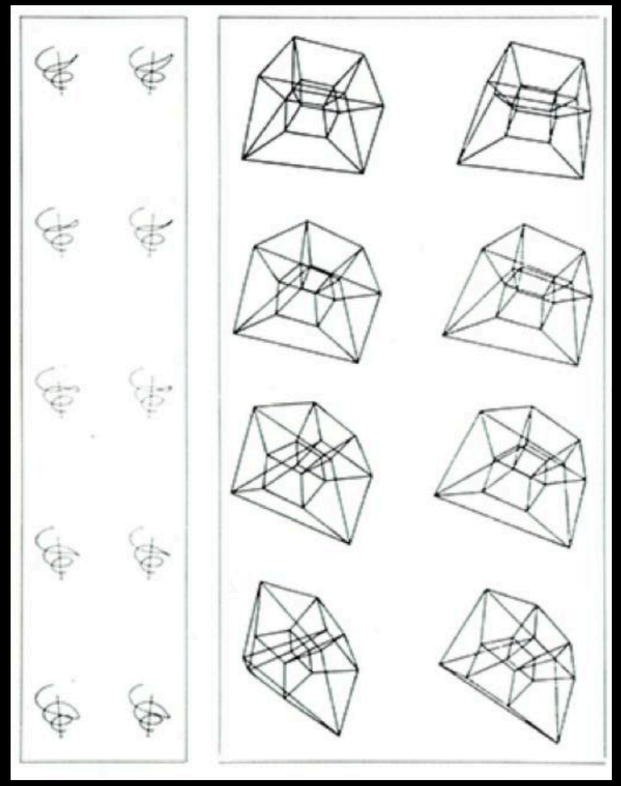


D. J. DiLeonardo
Isometric view of neutron distribution

Perspective views of the neutron distribution in a reactor (Left)

Actual stereo pairs (Middle)

Perspective view of the reactor power as a function of time at several reactor core locations (Right)



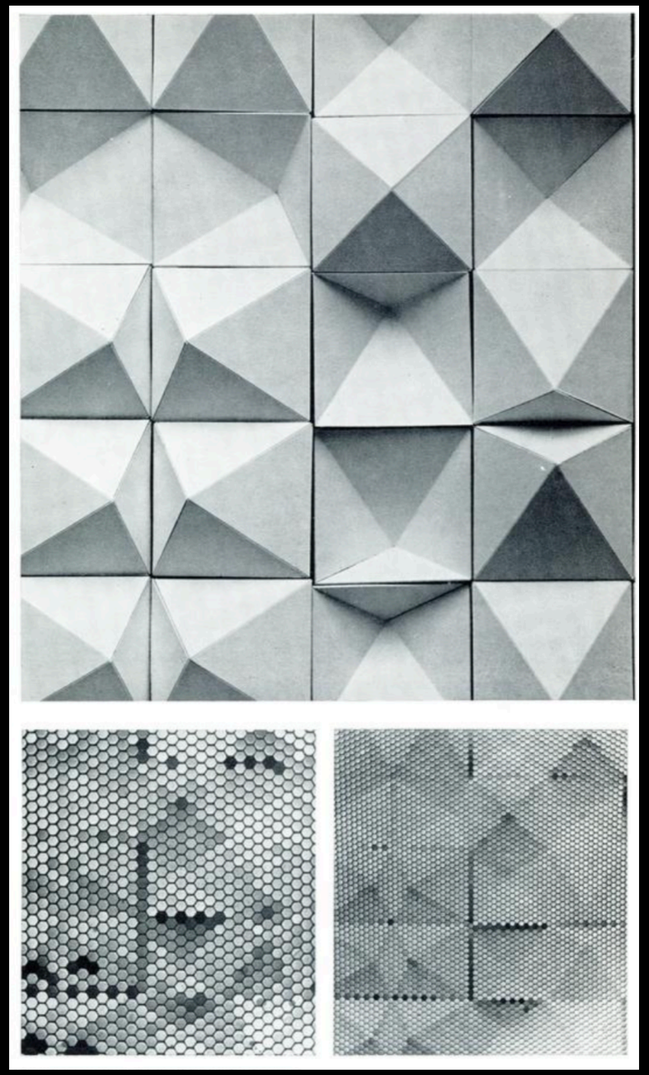
A. Michael Noll
***Simulated basilar membrane motion* (Left)**
Basilar membrane of the inner ear

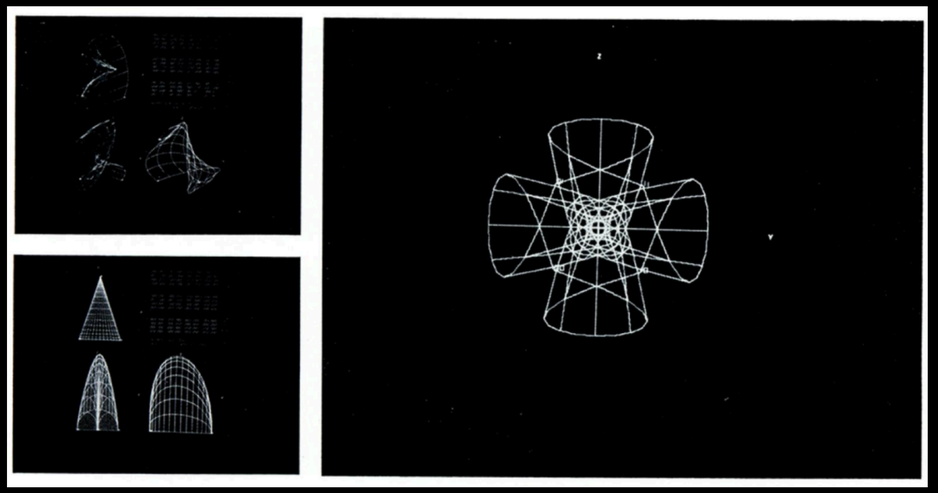
***Four successive stereo pairs* (Right)**
Four dimensional cube

Robert Dick, H*exagonalized Pictures*
Picture-to-magnetic tape device

Relief surface used for brightness translation (Uper)

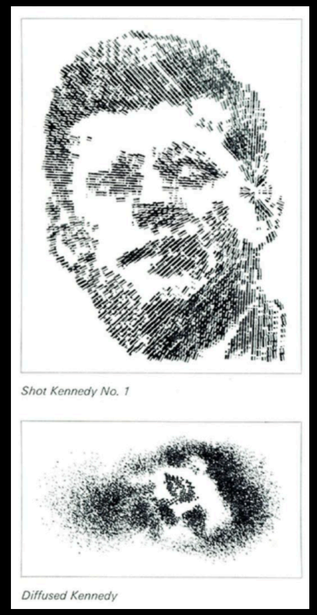
Hexagonalized value translation(Lower)



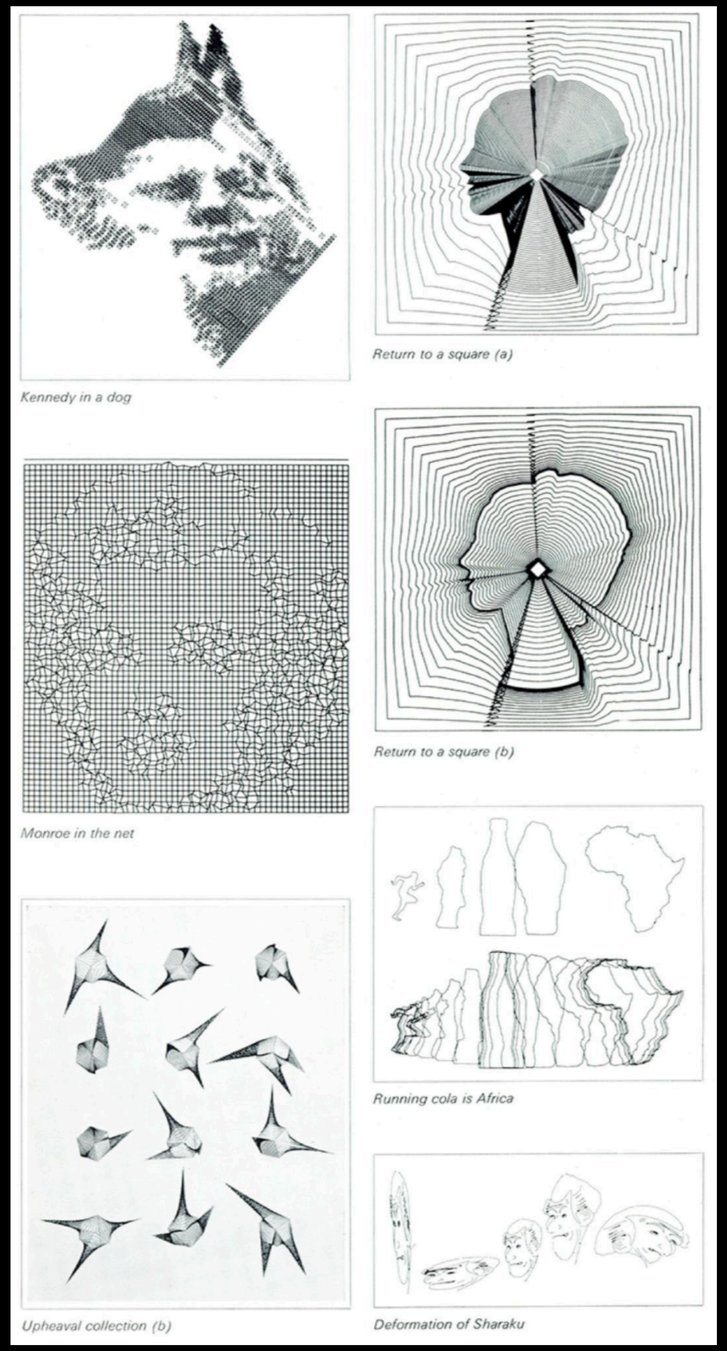


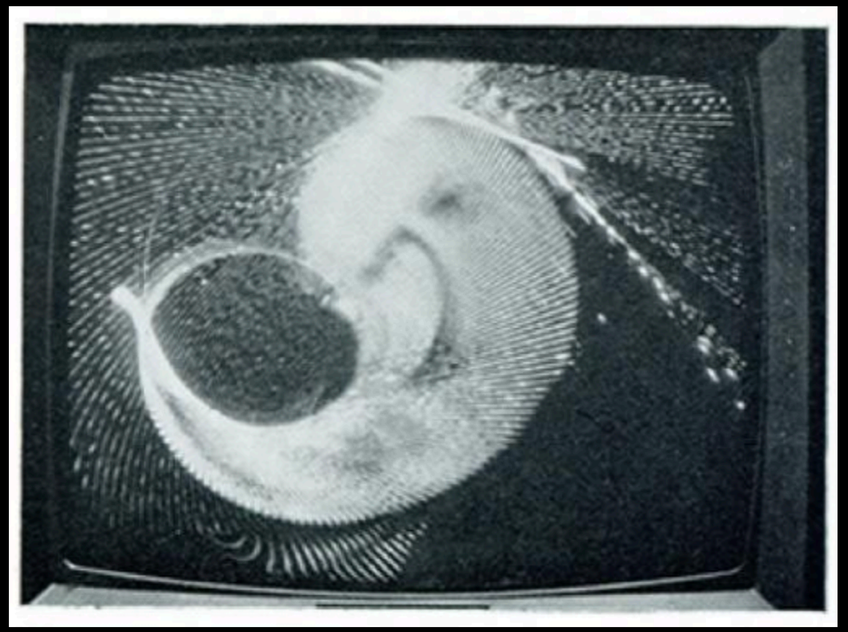
A.R. Forrest, *Mathematically Defined surfaces*

More Abstract Ideas



CTG Group

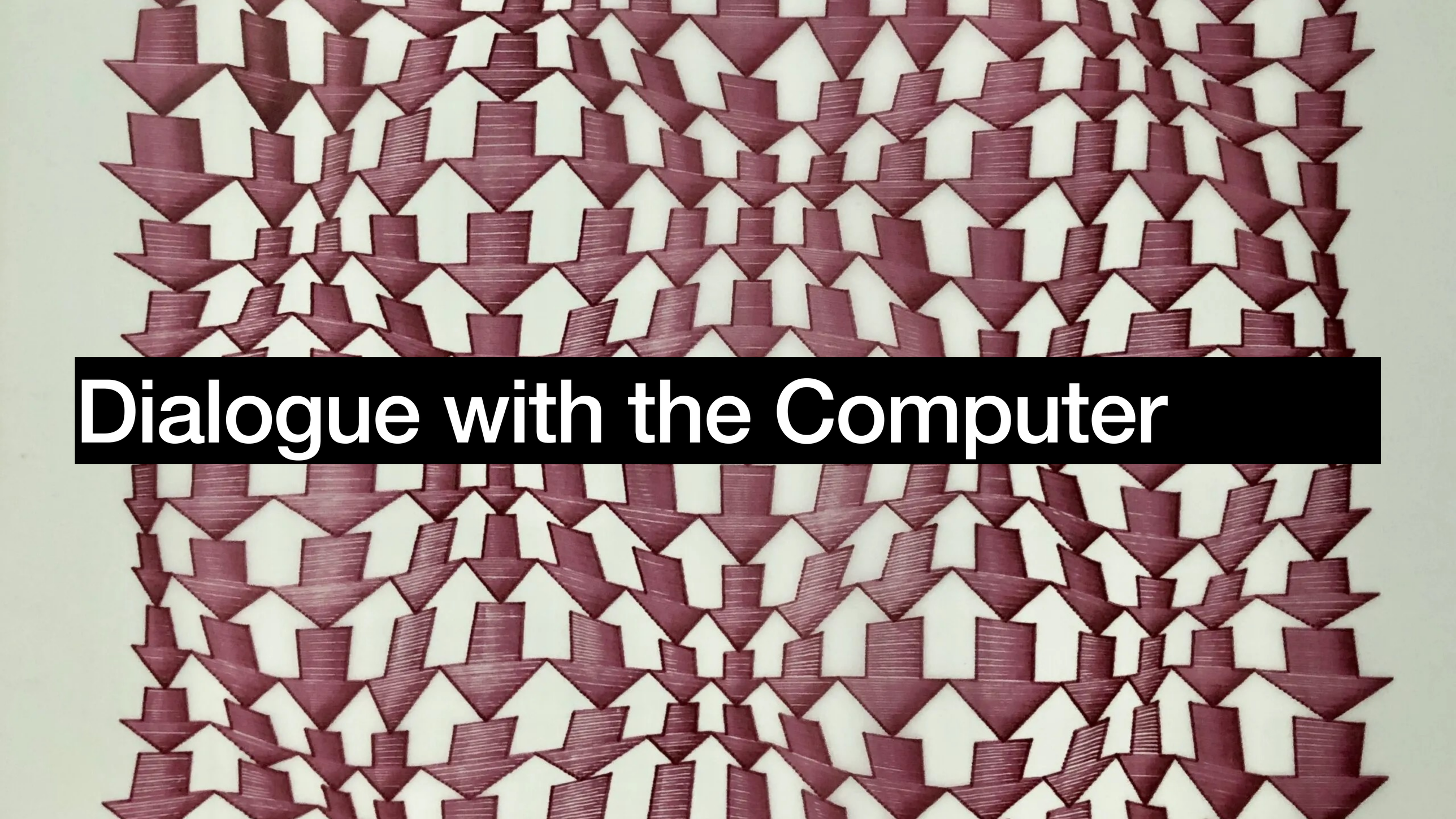




Nam June Paik, *McLuhan caged*

TV (Paint with magnetic field)

$log_a Cage - 3.5\sqrt{McLuhan} = \pm sorry$



Dialogue with the Computer

Stepping further into abstraction, artists from the early ages also explored how to really push the boundaries of visual expression with computation.

One big trend under this theme is the movement of Optical (Op) Art and Kinetic Art. Op art features bold geometric patterns rendered with machine-like perception that playfully (sometimes painfully) tricks the eye, prompting reflection on the nature of visual perception with a futuristic style. [3]

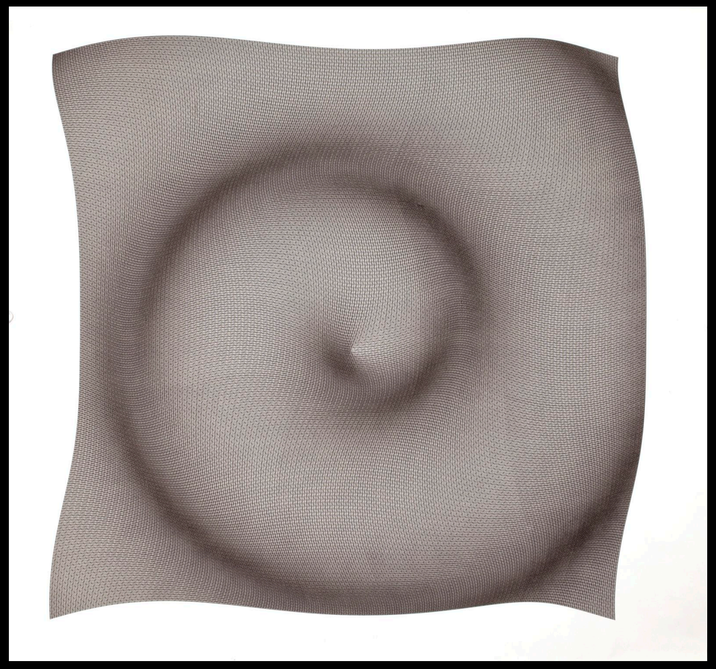
Kinetic Art, use patterns and sculptures with movements in a similar way to creative similar unique visual effects. [3]

There are also artists explore the possibilities of visual expression with multiple ways of experiments with the algorithm. Under this dialogue with machine, a new way of abstraction formed which reflects the aesthetics of rationality.

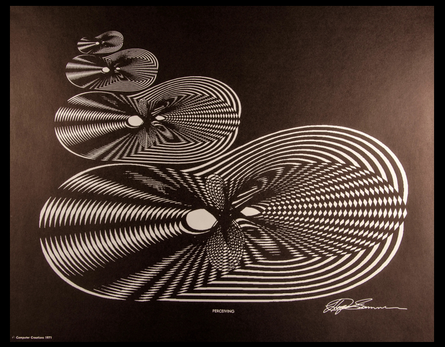
Op Art

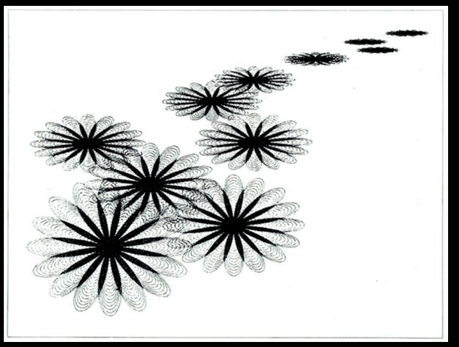
Karl Gerstner, *Lens Picture No.15*, 1964
Plexiglas lens mounted on painted formica with electric light

https://www.instagram.com/reel/DDkRj0ex-h1/



Jean-Pierre Hébert, *Spiral Dilation*, 1988

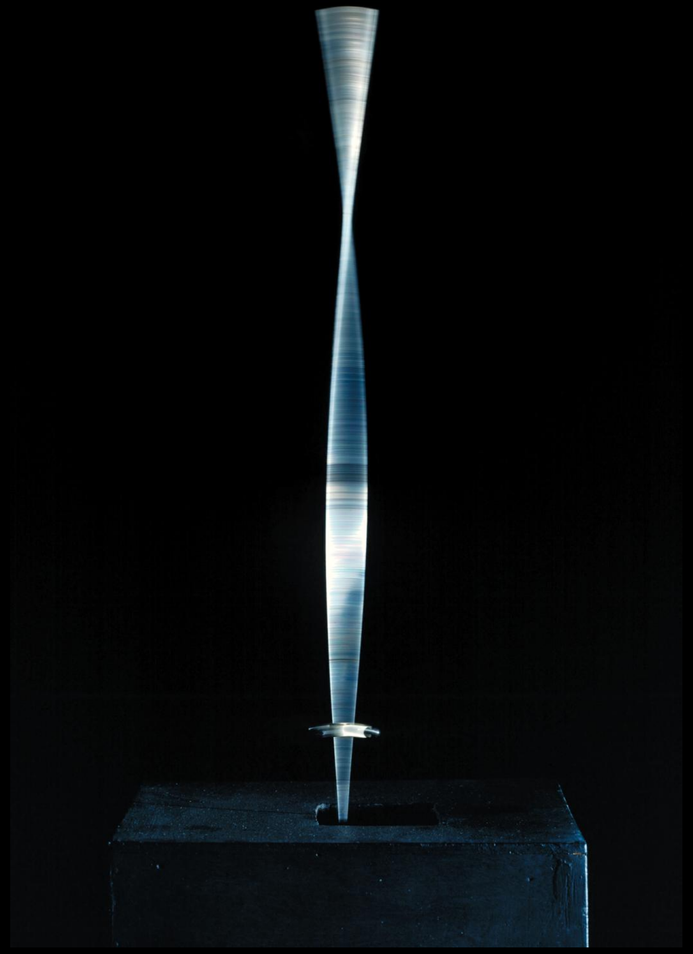




Llyod Summer
***Perceiving*, 1971 (Left)**

***Friendly Flowers of Time and Space* (Right)**

Kinetic Art



Naum Gabo
Standing Wave, 1919 (Left)
Linear No.2, 1962 (Right)

Abstraction exploration through dialogue with the machine

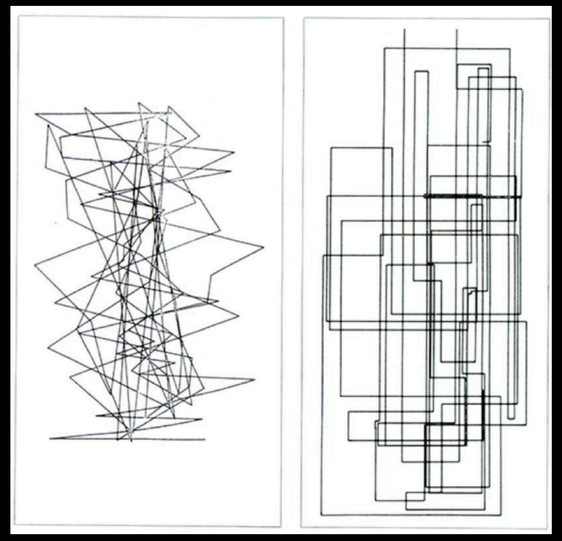
It's only one step from Mondrian to the computer.
—Georg Nees, 1969 [4]

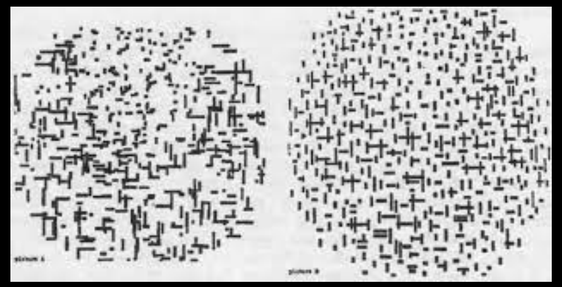
The worst state of affairs is when science begins to concern itself with art. — Paul Klee, 1906 [4]

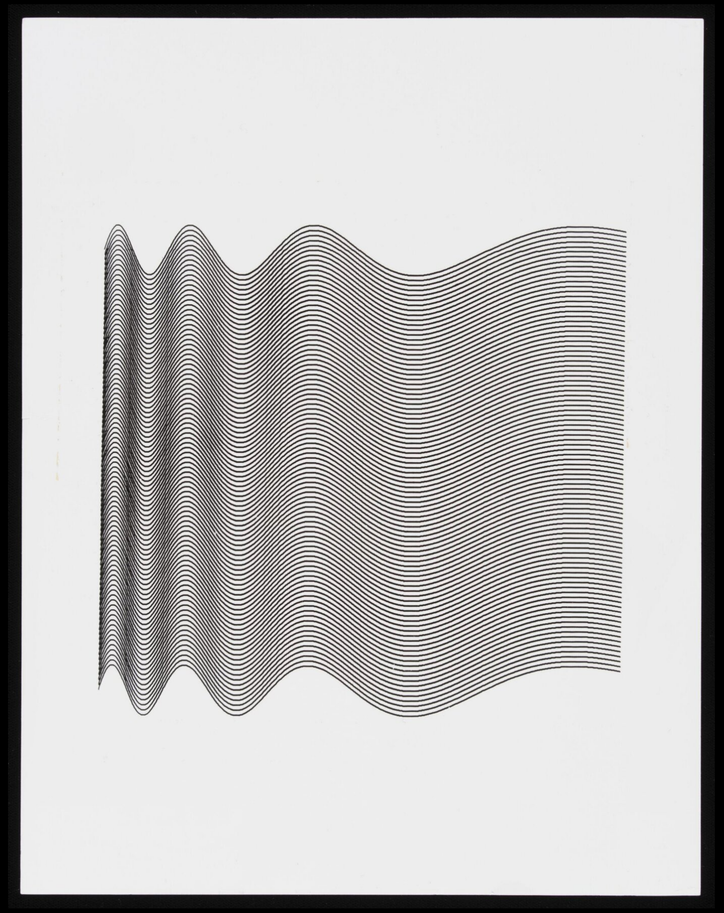
It has been questioned if computer art is art since the first attempts are made by scientists, engineers and artists rely a lot on them at earlier time. And lot of themes are related to mathematical curves like Fibonacci spirals or Lissajpis figures.

Ben F. Laosky was the first to recognize the aesthetic potential of these scientific patterns. [4]

Ben Laposky, *Electronic Abstractions Series*, 1952
Lissajous curves made with light





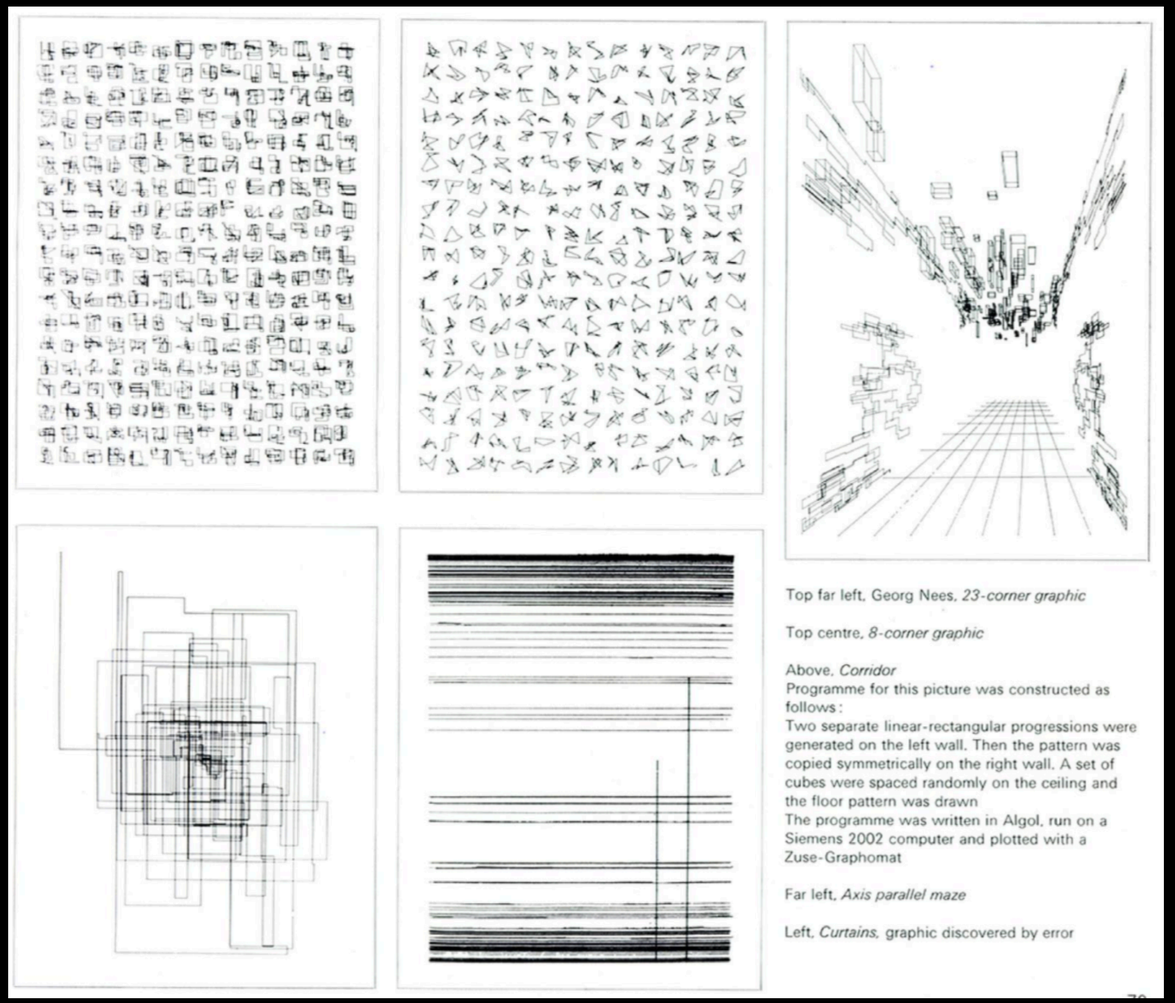


A. Michael Noll (Bell Labs)
Gaussian Quadratic (Upper Left)

Comparison with Mondrian, 1964 (Lower Left)
IBM 7094, Programmed in FORTRAN

Ninety parallel sinusoids with linearly increasing period, 1964 (Right)

Georg Nees



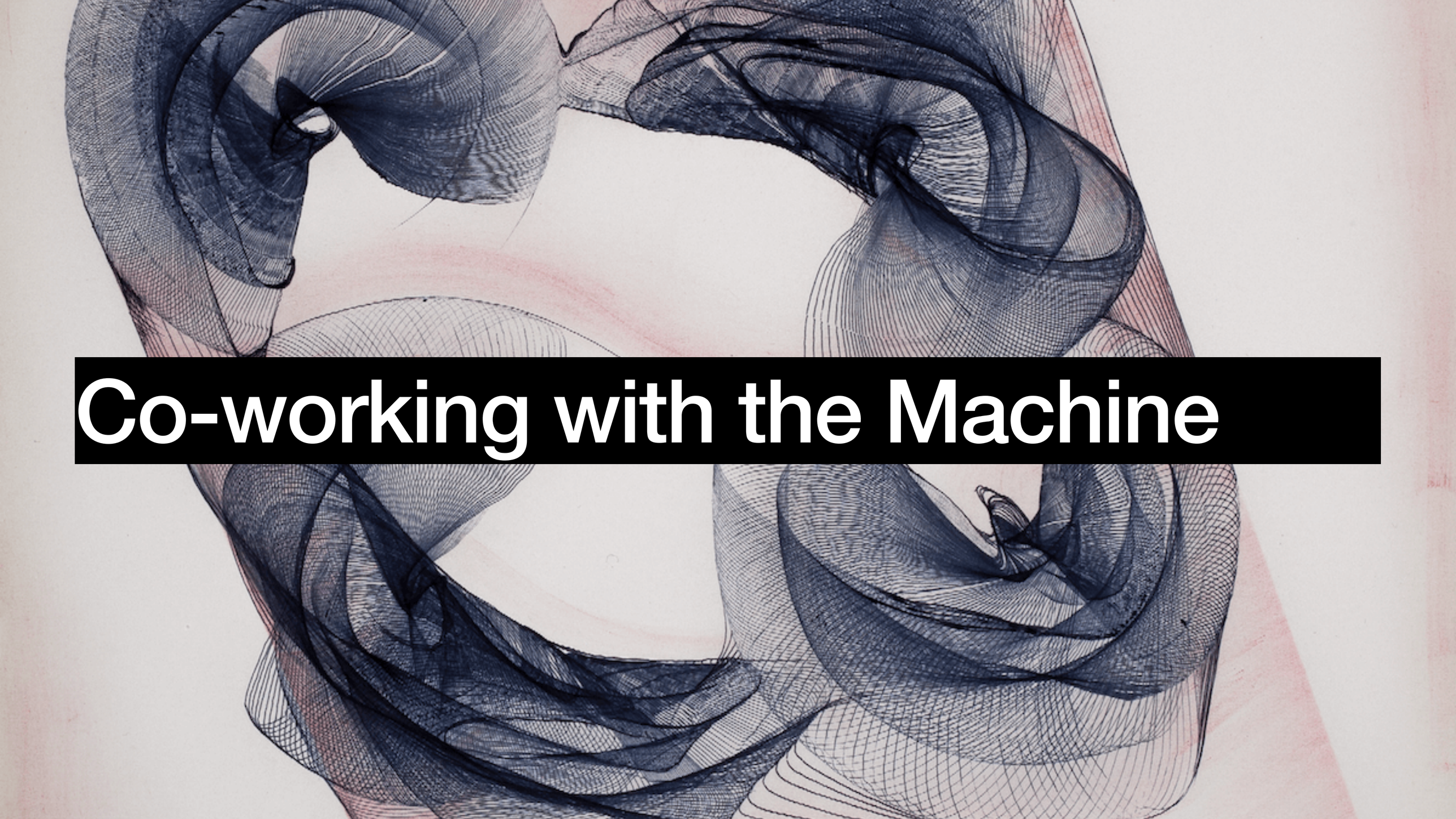
Top far left, Georg Nees, *23-corner graphic*

Top centre, *8-corner graphic*

Above, *Corridor*
Programme for this picture was constructed as follows:
Two separate linear-rectangular progressions were generated on the left wall. Then the pattern was copied symmetrically on the right wall. A set of cubes were spaced randomly on the ceiling and the floor pattern was drawn
The programme was written in Algol, run on a Siemens 2002 computer and plotted with a Zuse-Graphomat

Far left, *Axis parallel maze*

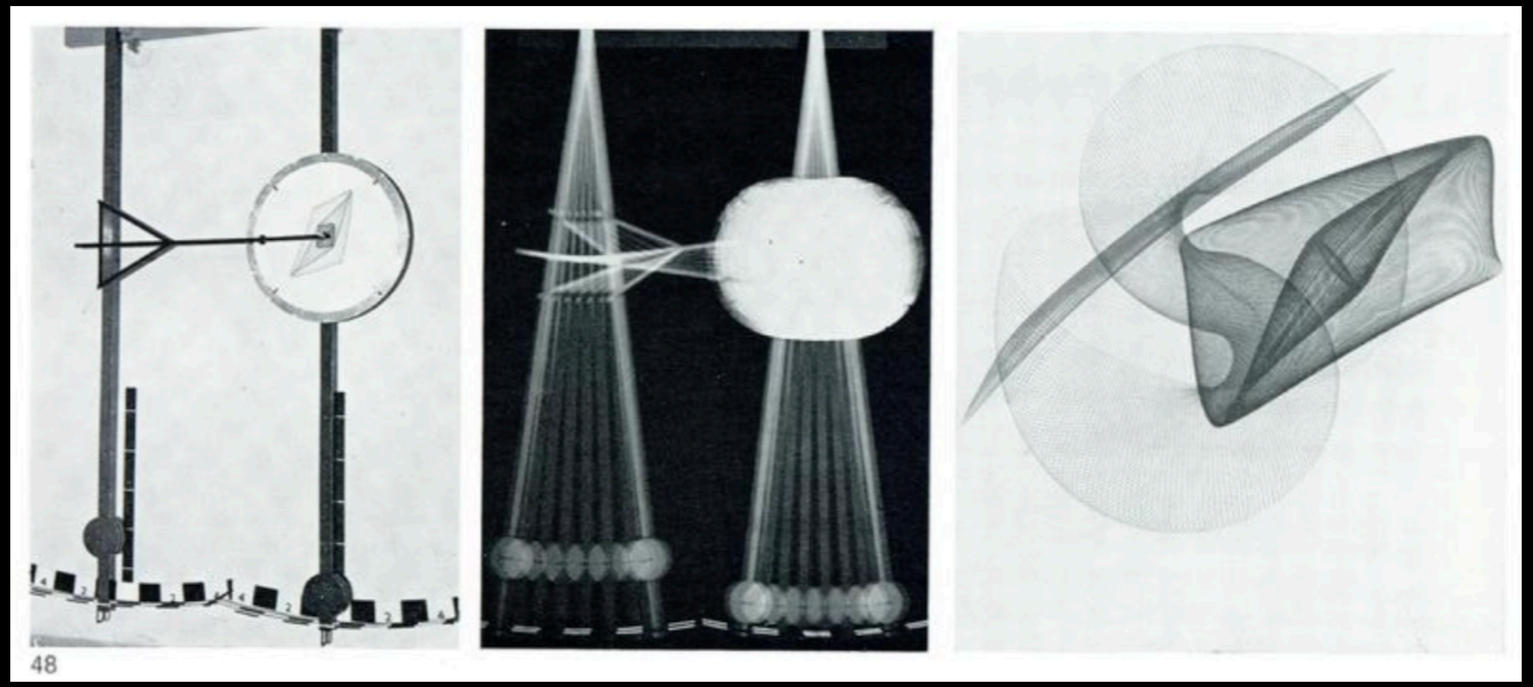
Left, *Curtains*, graphic discovered by error



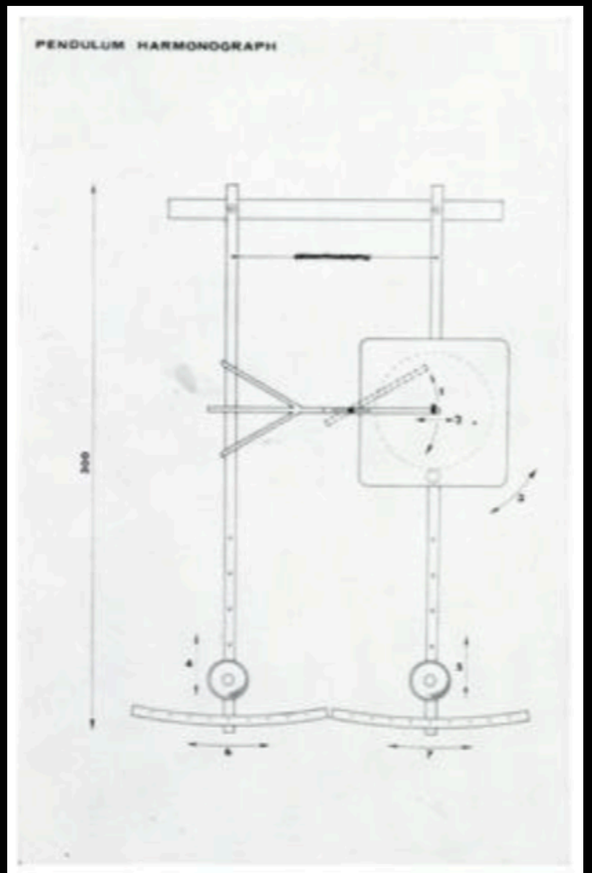
Co-working with the Machine

One of the most audacious attempts in exploring the aesthetics of rationality is to **handle the work very largely or completely to the machine**.

By designing the mechanism and generation algorithm, letting the machine do the work also comes out with unexpected results.

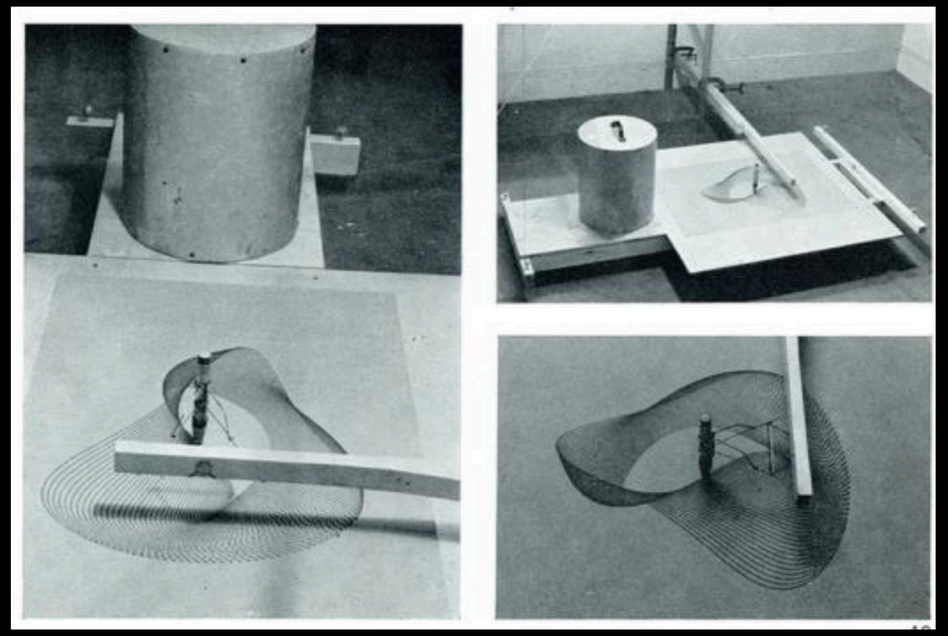


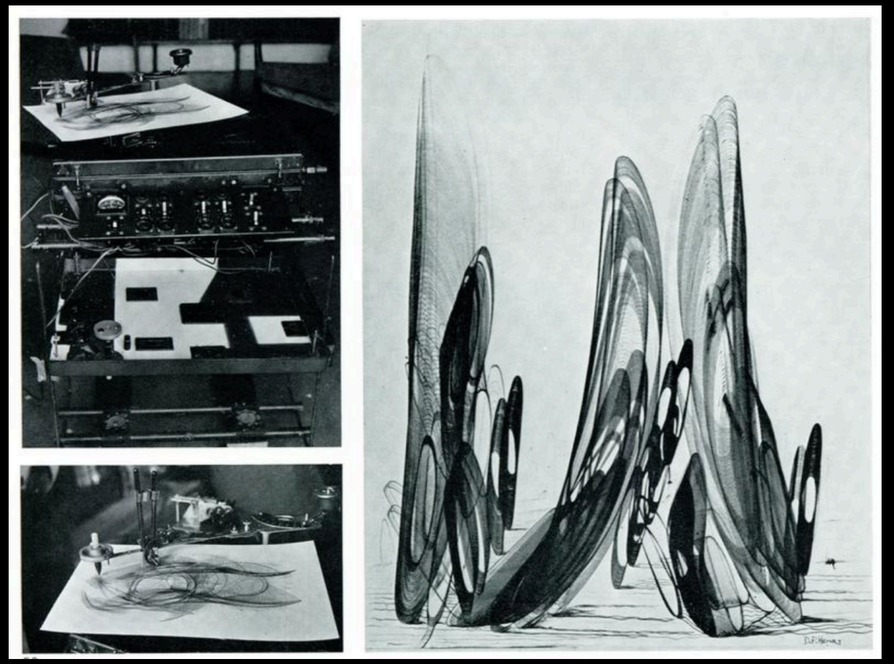
Ivan Moscovich, *The pendulum harmonograph: a drawing machine*, 1951
Aiming at creating abstract creating abstract designs of a more advanced or complex degree than those already existing
Twinpendulum harmonograph



Twin pendulum harmonograph constructed by I. Moscovich, Director of the Museum of Science and Technology in Tel-Aviv.
Features:
1. Angle of arm carrying the pencil
2. Extension of arm carrying the pencil
3. Revolving board holding the paper
4. 5. } Changeable lengths of pendulums
6. 7. } Variable amplitudes
The machine is simple in construction and easily controlled so that a skilled operator can make compositions as big as 30 × 30 inches.

John Ravilious, ***Drawing Machine***
From designing repetitive wall-paper like pattern to draw single pattern





Desmond Paul Henry, ***The Henry Drawing Computer, Untitled,*** **1962**

Consider machine either as an aid in producing drawings, or as a producer of completed drawings

Drawing created by combination of pen movement and table movement

The pen is moved in elliptical paths of various dimensions, and harmonic table-movements aistort the ellipses at selected points, at the same time shifting the paper in a curved path.

Data Source

[1] Friedman, T. (2005). Electric dreams : computers in American culture. New York University Press.

[2] Institute of Contemporary Arts, & Reichardt, J. (1969). *Cybernetic serendipity : the computer and the arts*. Praeger.

[3] Buffalo AKG Art Museum, host institution, Musée d’arts de Nantes, host institution, Sirén, J., Lévy, S., Ryan, T. R., Caplan, L., Valyi-Nagy, Z., & Gaboury, J. (2024). *Electric Op* (First edition.). Buffalo AKG Art Museum.

[4] Jones, L., Los Angeles County Museum of Art, host institution, DelMonico Books, publisher, Ferran, B., Frank, P., Funk, T., Higgins, H., Hoy, M., Logan, J. K., Mark, L. G., McKim, J., Salvesen, B., Shanken, E. A., Steinberger, S., Taylor, G. D., Tigerman, B., & Wood, D. (2023). *Coded : art enters the computer age, 1952-1982*. Los Angeles County Museum of Art.

[5] Shanken, E. A. (Ed.). (2009). *Art and electronic media*. Phaidon Press. http://books.google.com/books?isbn=9780714847825

Thank you