

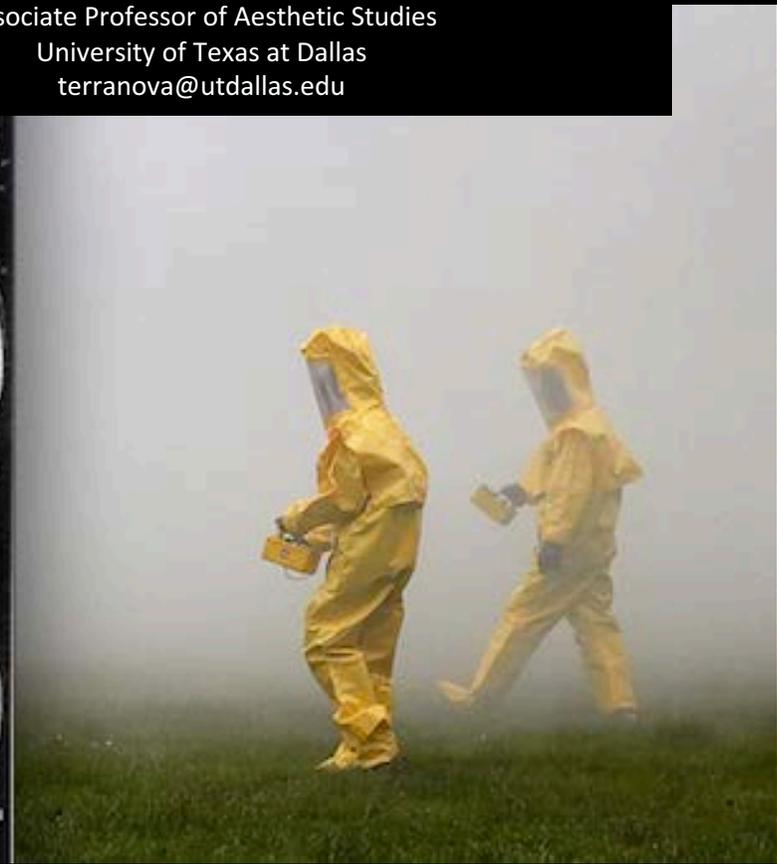
AHST 4342-091 (55717)
History of Media and New Media Art
Summer 2017 July 10-August 9, 2017
Dr. Charissa N. Terranova
University of Texas at Dallas
Arts & Humanities
M-W 1:00-5:15

Monday August 7, 2017

Genetics and Biology in Art and Design

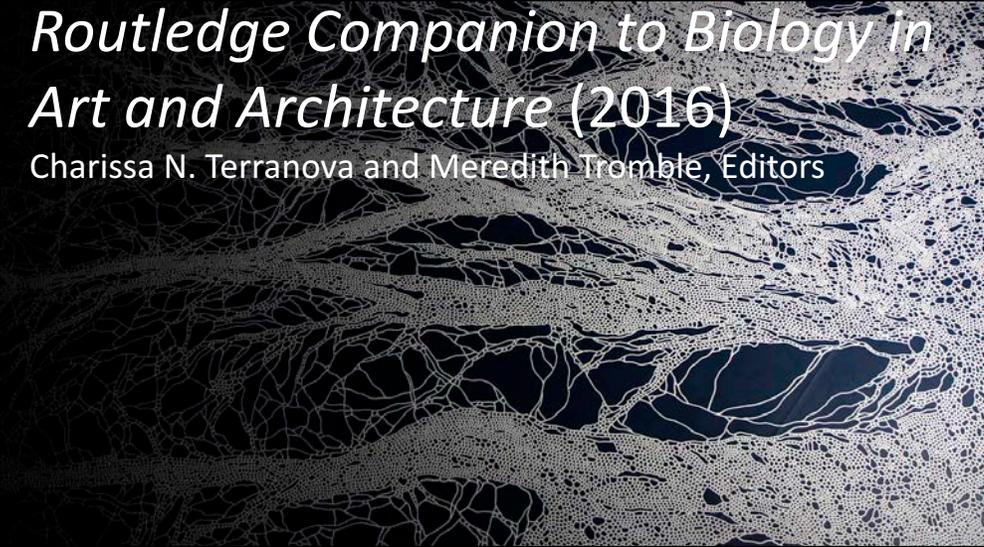
Bioart and Biology in Art: A Study in Elective Affinities

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*Routledge Companion to Biology in
Art and Architecture (2016)*

Charissa N. Terranova and Meredith Tromble, Editors



Motoi Yamamoto, *Floating Garden*, Salt, 8x8m, 2011, Seoul Museum of Art, Korea 2011

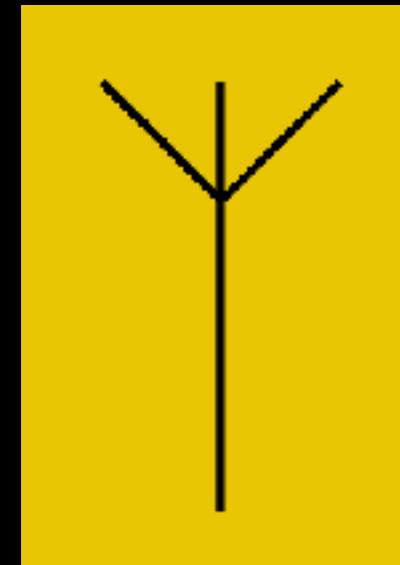
 ROUTLEDGE
COMPANIONS



The Routledge Companion
to Biology in Art and
Architecture

Edited by Charissa N. Terranova and Meredith Tromble

BIOART



Microvenus bitmap

Microvenus icon

Joe Davis is an artist who works not only with paints or pastels, but also with genes and bacteria. In 1986, he collaborated with geneticist Dan Boyd to encode a symbol for life and femininity into an E. coli bacterium. The piece, called Microvenus, was the first artwork to use the tools and techniques of molecular biology. Since then, bioart has become one of several contemporary art forms (including reclamation art and nanoart) that apply scientific methods and technology to explore living systems as artistic subjects. As a result of a motorcycle crash three decades ago, he's got a peg leg that he sculpted himself out of an aluminum baseball bat, parts of two lamps, and a synthetic rubber stopper normally used to seal laboratory flasks .

Read more at: <http://phys.org/news/2015-11-bioart-introduction.html#jCp>
Short documentary: <https://www.youtube.com/watch?v=7GkZt00Qics>



A workbench at Davis's home is jammed with dozens of tools, parts, and electronic works in progress.

<http://discovermagazine.com/2013/april/18-creating-art-from-microbes-and-molecules>

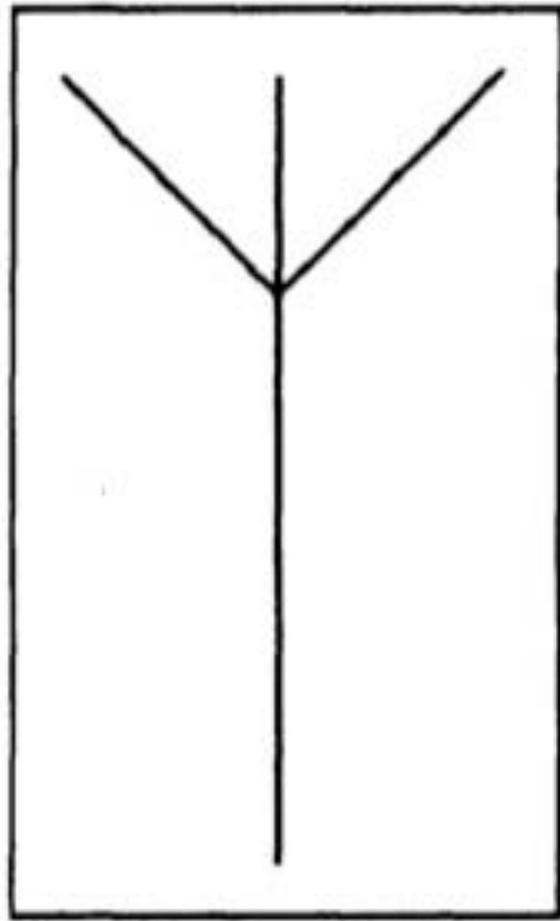
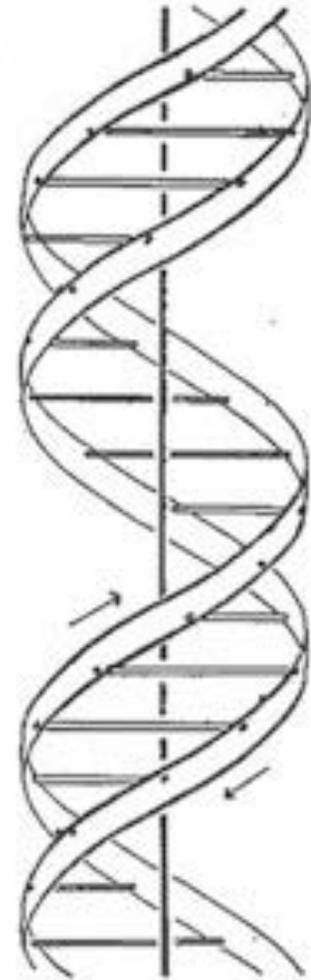


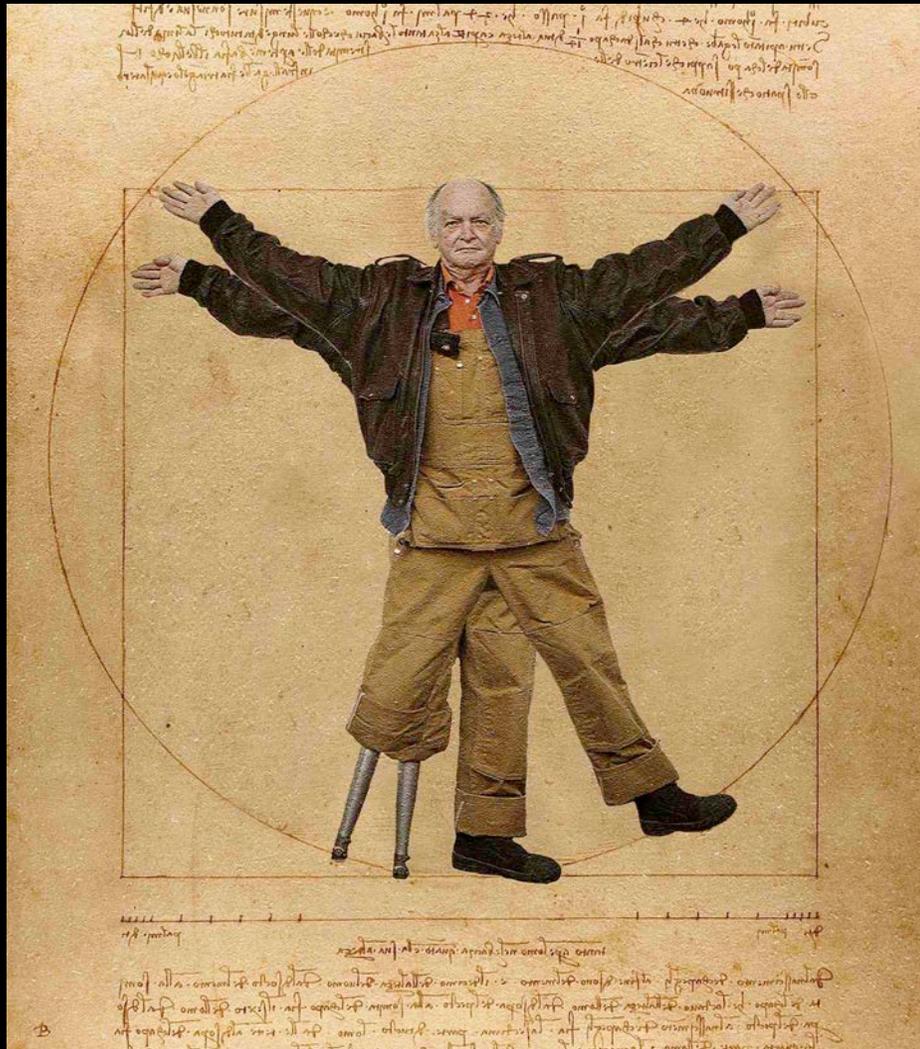
FIG. 1 *Microvenus* icon.



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01110
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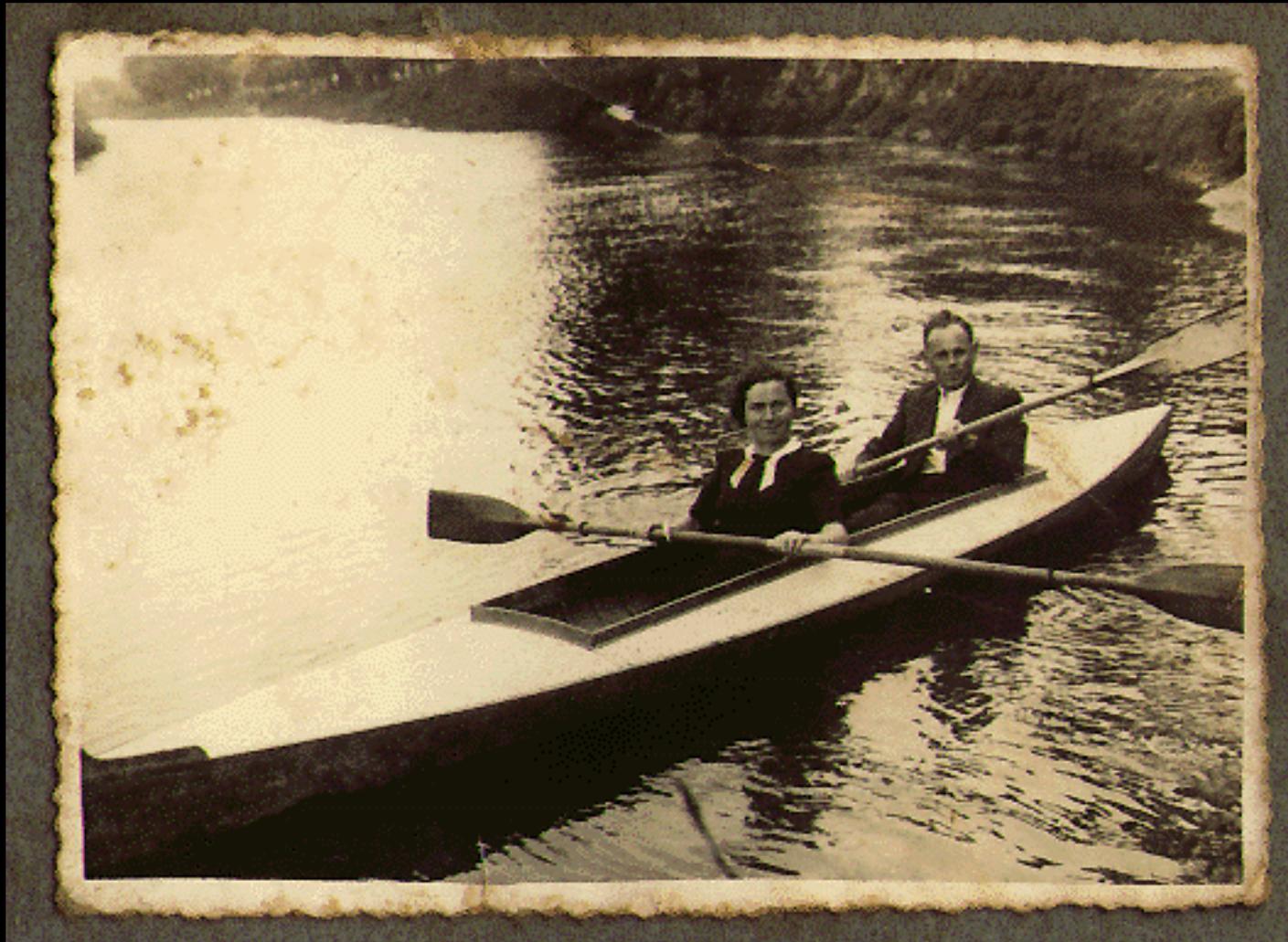


"Microvenus, [is] a project in protest of the censorship of radio messages sent into deep space." Davis' idea is to put the human genome into a hardy strain of bacteria and send it into deep space. "The spores of *B. subtilis* can last indefinitely" in deep space, according to Davis. So far he has coded information of vaginal contractions, in protest of what he calls the "man and Barbie" version of humanity sent by radio messages into deep space. Davis, evidently a committed believer in extraterrestrial life adds, "And they wonder why they come and experiment on our sex organs."



Polypych paintings by Joe Davis of his 28-mer Microvenus DNA molecule (2006 Exhibition in Greece at Athens School of Fine Arts)

<https://www.youtube.com/watch?v=7GkZt00Qics>



One of the seven sepia-toned photographs -- family mementos -- shot in Eastern Europe in the 1930s that are part of "Time Capsule" by Eduardo Kac (1997) <http://www.ekac.org/perla.html>



Eduardo Kac inserted a microchip into his ankle as part of “Time Capsule” (1997)

<http://www.ekac.org/timcap.html>





Eduardo Kac, Genesis, 1999

Transgenic Art

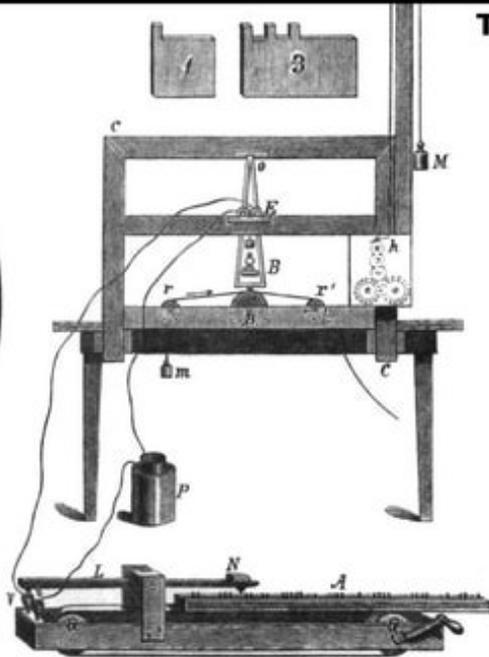
transgenic: adjective., of, relating to, or denoting an organism that contains genetic material into which DNA from an unrelated organism has been artificially introduced.



Samuel FB Morse, Gallery of the Louvre, 1831-33 Oil on canvas, 73 $\frac{3}{4}$ " x 108"



**Samuel Morse &
The Original Telegraph**



The Morse Code Alphabet

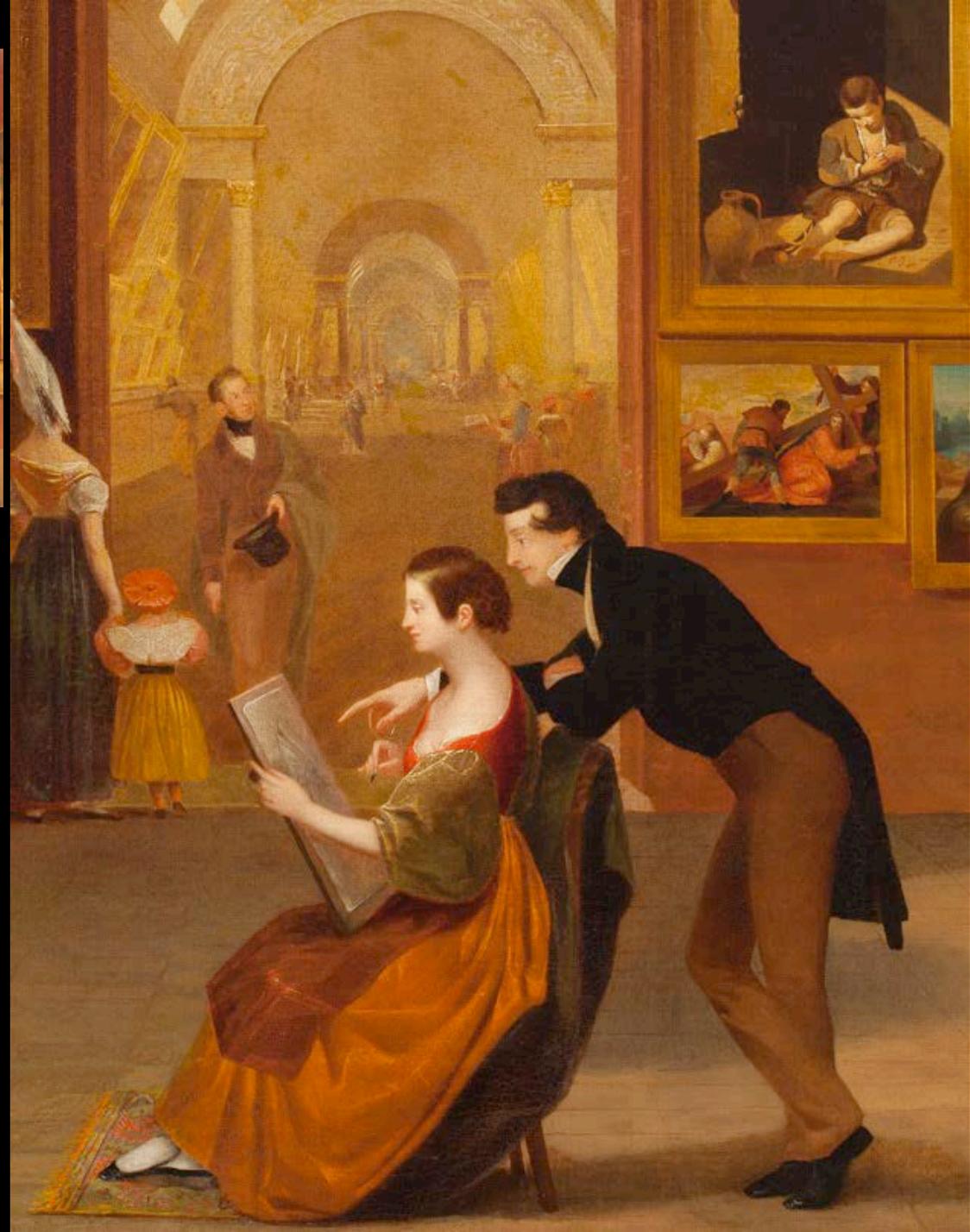
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**Samuel Morse Telegraph
Receiver – Used to receive
the message, "What hath
God wrought" during the
demonstration to
Congress in 1844.**



- mechanical imitation
- intellectual imitation





Critical Art Ensemble in Halle/Saale, Germany performing "Radiation Burn: A Temporary Monument to Public Safety," 10/15/2010

<http://radiation.superbendy.com/angst-in-form>

ART-SCIENCE-DESIGN/ASD

What is the relationship between imitation and mass reproduction?

How would we compare Morse's ideas about "imitation" to Duchamp's concept of the "readymade"?

What happens to art when we begin to hew it more closely to design?

Does art cease to be art when seen in conjunction with design? When art fuses with design, does art fundamentally change?

Does art cease to be art when see in conjunction with science? When art fuses with science, does art fundamentally change?

BIOLOGY IN ART



Recapitulation
Theory or
Biogenetic Law

Ontogeny
follows
Phylogeny

1866

Drawings of Vertebrate Embryos (1874) by Ernst Haeckel [1834-1919]

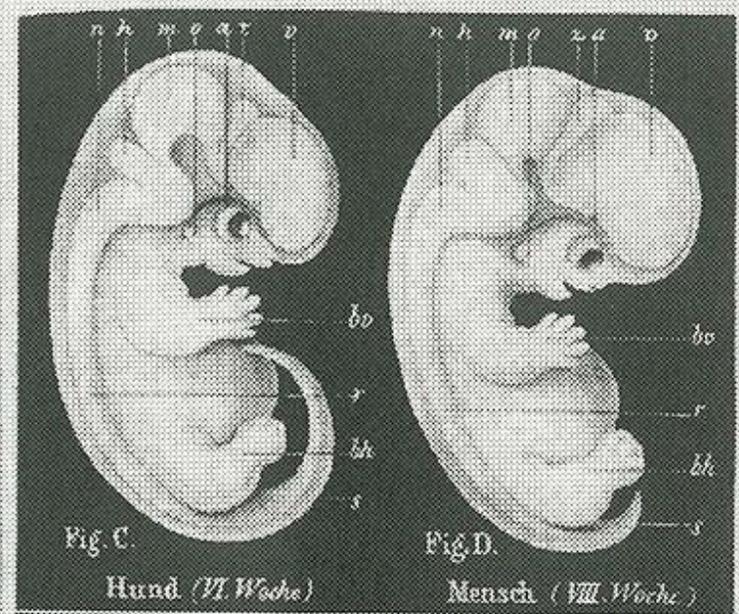
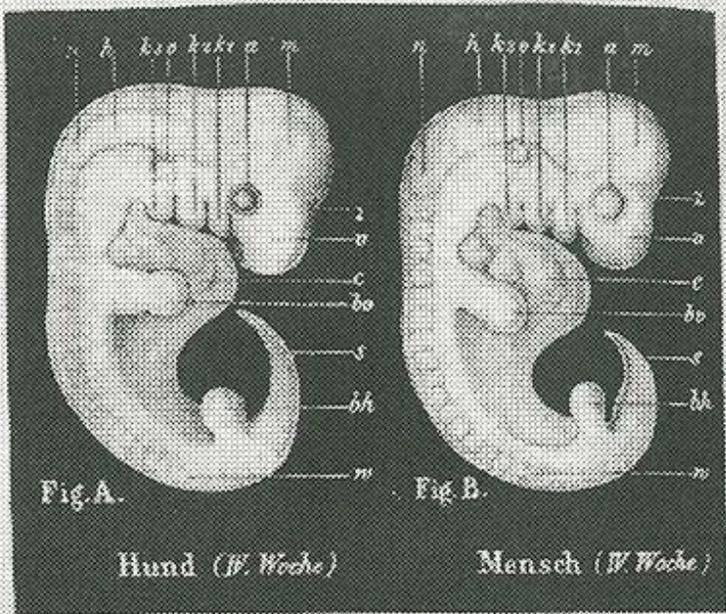
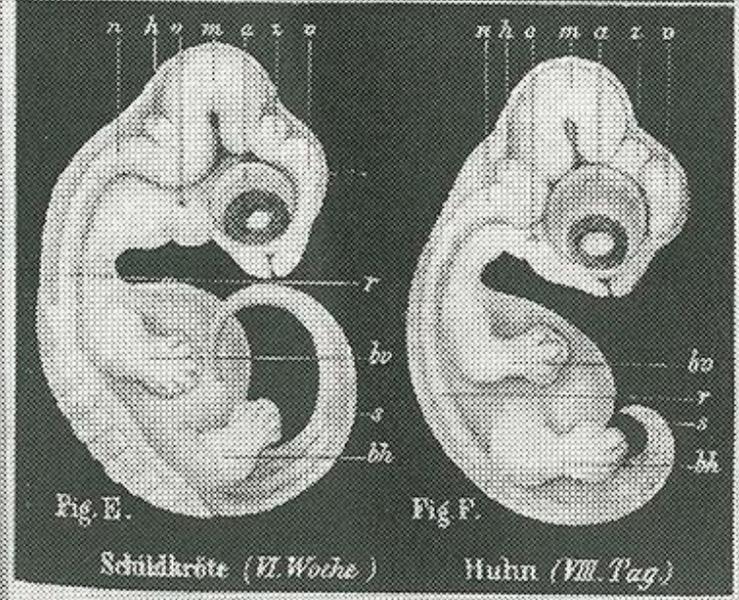
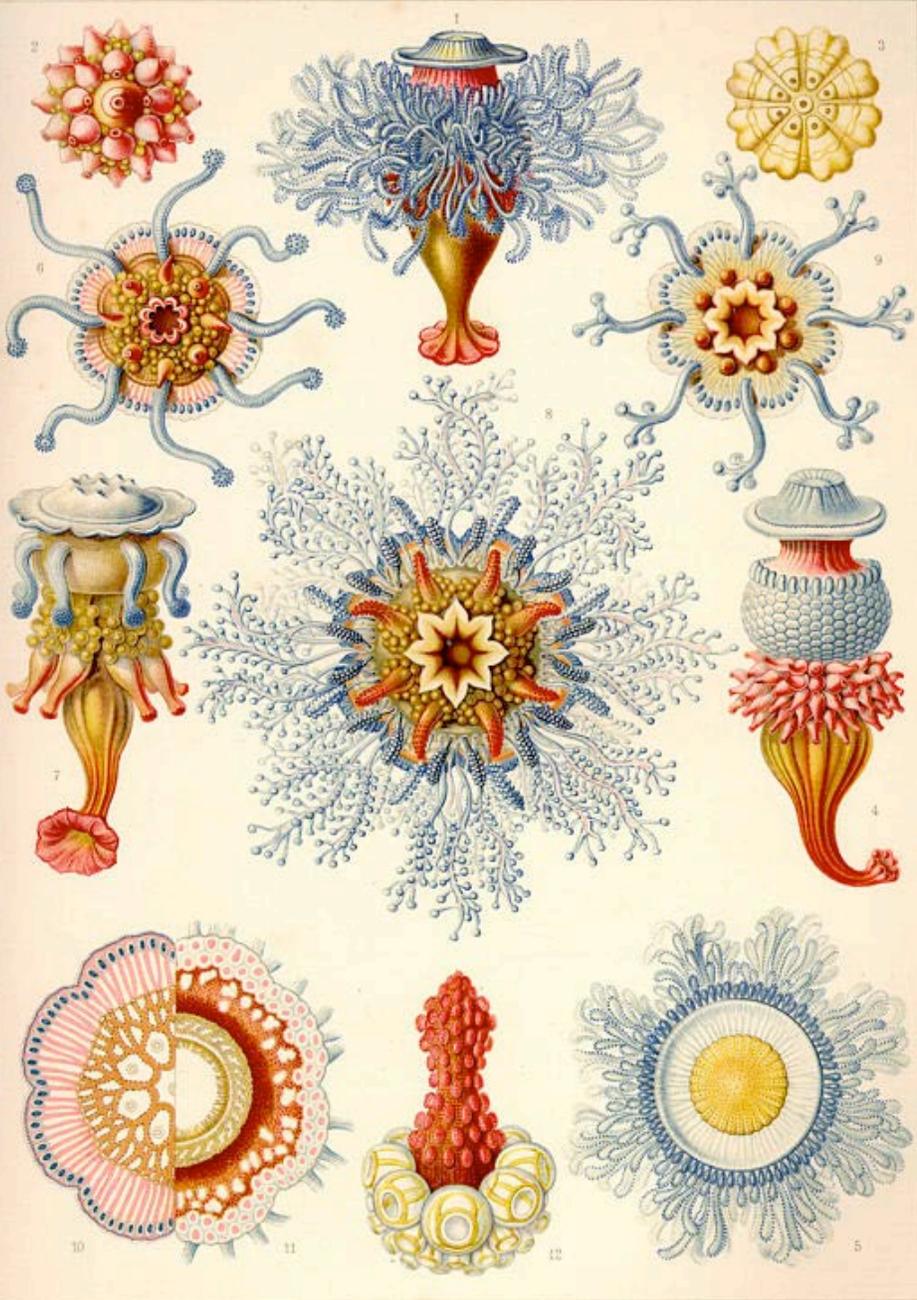


Fig. A. Keim des Hundes, 5'' lang (aus der vierten Woche). Fig. B. Keim des Menschen, 5'' lang (aus der vierten Woche). Fig. C. Keim des Hundes, 8½'' lang (aus der sechsten Woche). Fig. D. Keim des Menschen, 8½'' lang (aus der achten Woche). Fig. E. Keim der Schildkröte, 7'' lang (aus der sechsten Woche). Fig. F. Keim des Huhns, 7'' lang (acht Tage alt). Fig. A und B sind 5mal, Fig. C—F 4mal vergrössert. Die Buchstaben haben in allen sechs Figuren dieselbe Bedeutung: r Vorderhirn, z Zwischenhirn, m Mittelhirn, k Hinterhirn, a Nachhirn, v Rückenmark, a Auge, e Ohr, k1, k2, k3 erster, zweiter und dritter Kiemenbogen, a Wirbel, c Herz, bo Vorderbein, bh Hinterbein, s Schwanz.



Dog and human embryos, looking almost identical at 4 weeks then differing at 6 weeks. Lower right corner shows a 6-week turtle embryo and 8-day hen embryo. Ernst Haeckel (1868)



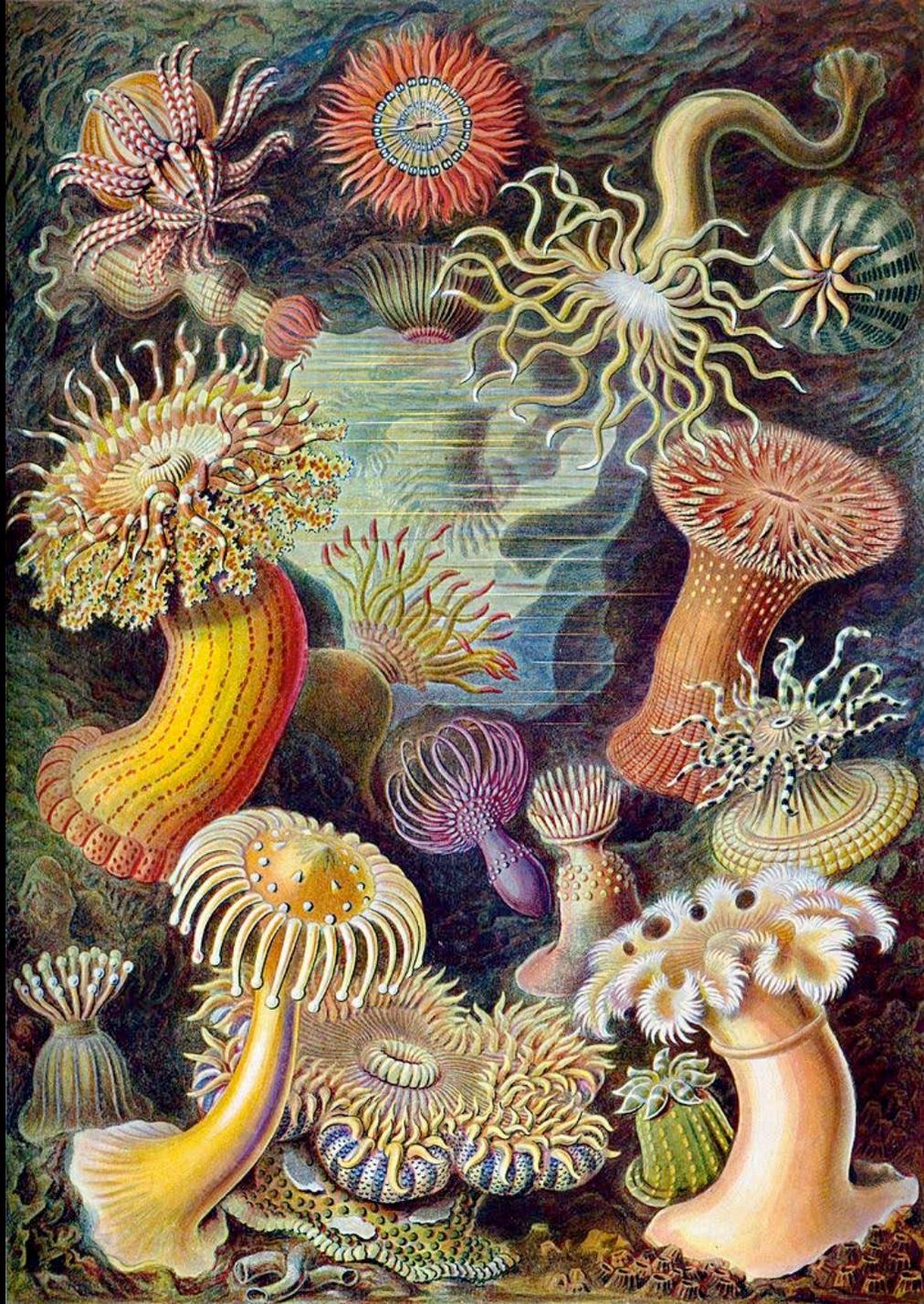
Siphonophorae. — Staatsquallen.

ecology

From the Greek “oikos” meaning house or environment and “logos” knowledge or study of

Coined by Haeckel in 1866, ecology means the scientific study of the interaction of organisms and their environment.

Ernst Haeckel's Radiolaria (1862)



Actiniae, plate 49 from Ernst Haeckel's *Kunstformen der Natur* (1904)

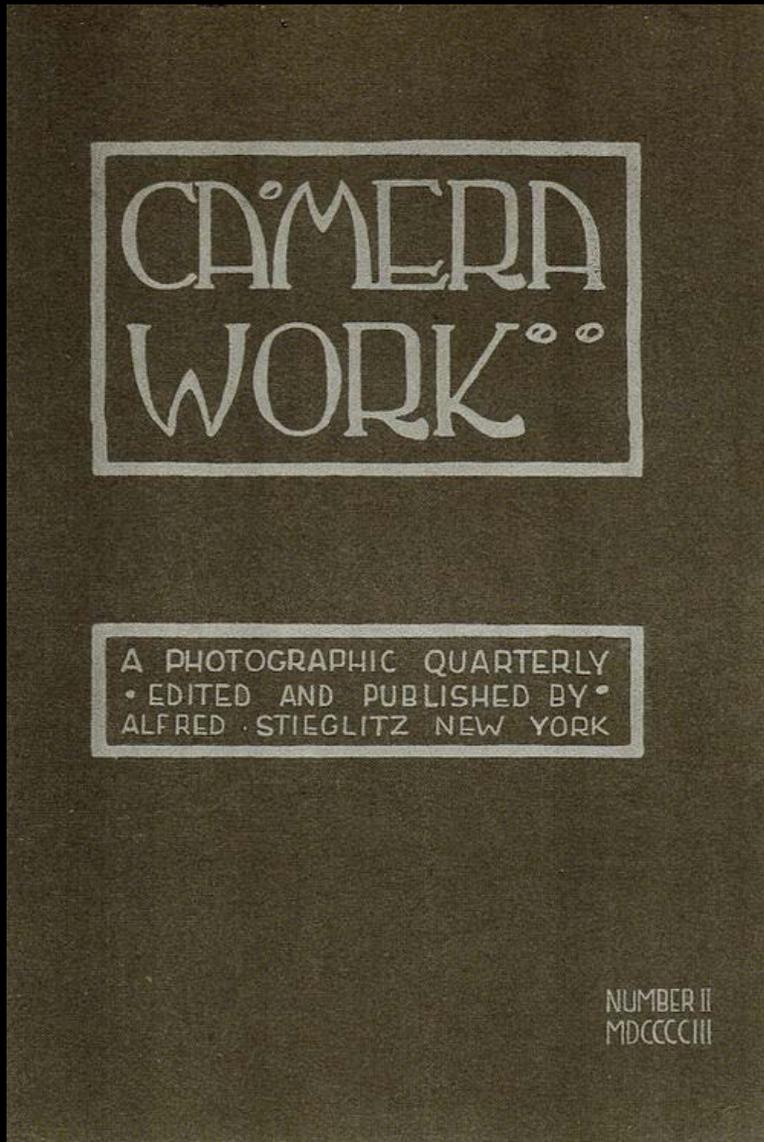


Edward Steichen [1879-1973]



Edward Steichen photographing his flowers, 1936.

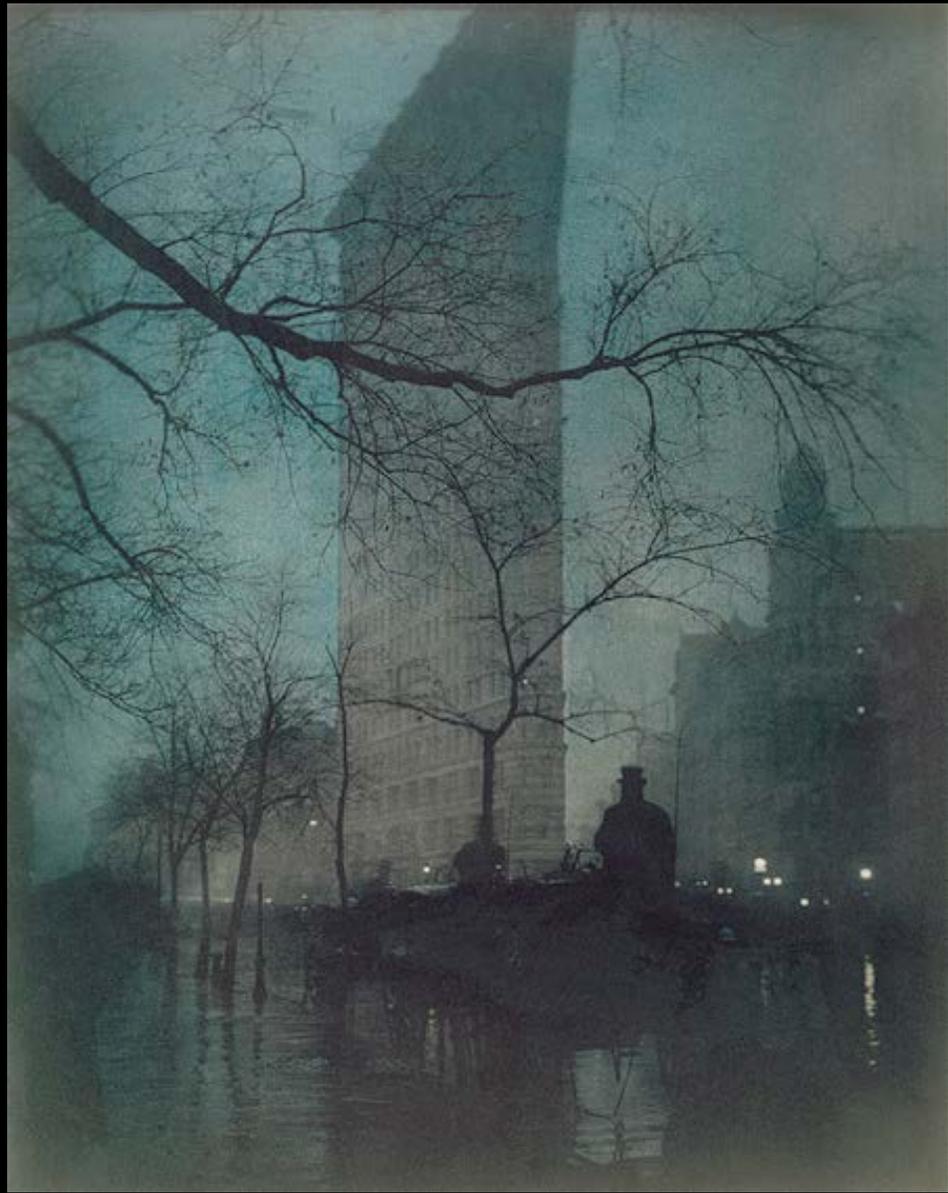




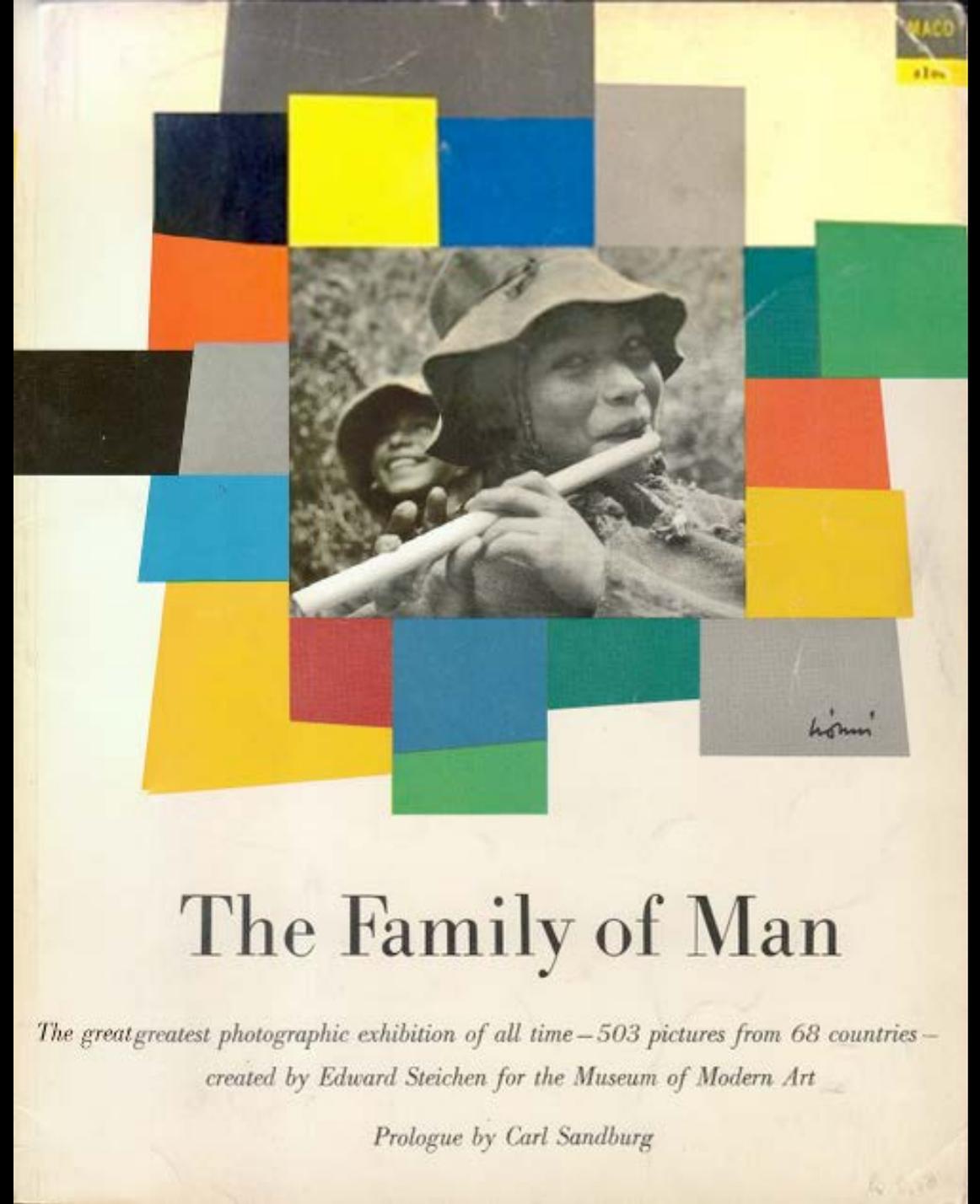
Cover of *Camera Work*, No 2, 1903.
Cover design by Edward Steichen.



The Pond—Moonlight by Edward Steichen, 1904
Pictorialist Photography



Steichen, Flatiron Building, 1904





Edward Steichen [1879-1973]



Edward Steichen photographing his flowers, 1936.





Installation view of the exhibition, *Edward Steichen's Delphiniums*. June 24, 1936 through July 1, 1936. The Museum of Modern Art, New York. Photograph by Edward Steichen



Edward Steichen with delphiniums (c. 1938), Umpawaug House (Redding, Connecticut). Photo by Dana Steichen.



In the early 1930s, after leaving his position as chief of photography for the Condé Nast publications—including *Vogue* and *Vanity Fair*—and more than 10 years before beginning his career as Director of the Department of Photography at MoMA, he retired to his Connecticut farm to raise flowers. Among the delphinium breeds Steichen hybridized there were “Carl Sandburg,” named for his brother-in-law and close friend (and Nobel Prize-winning poet and author), and, in the 1960s, “Connecticut Yankees.”



Goethe
Elective Affinities

1809

Bioart and Biology in Art

Of Elective Affinity.

AN important law of affinity, which is the basis of almost all chemical theory, is, that one body has not the same force of affinity towards a number of others, but attracts them unequally. Thus A will combine with B in preference to C, even when these two bodies are presented to it under equally favourable circumstances. Or, when A is united with C, the application of B will detach A from C, and we shall have a new compound consisting of A and B, C being set at liberty.

“elective affinities”



Johann Heimlich Wilhelm Tischbein, *Goethe in the Roman Campagna*, 1787

Elective Affinities is supposed to be the first work to model human relationships as chemical reactions or chemical processes since the aphorism of the classical Greek philosopher Empedocles: “people who love each other mix like water and wine; people who hate each other segregate like water and oil.”

chemical affinities: dissimilar chemical species are capable of forming chemical compounds

What does situating bioart under the rubric of biology in art do for us?

Where does this take us?

Art is a mode of critical thinking.



Alba, the fluorescent bunny, aka GFP ("green fluorescent protein") Bunny, by Eduardo Kac (2000) Photo: Chrystelle Fontaine

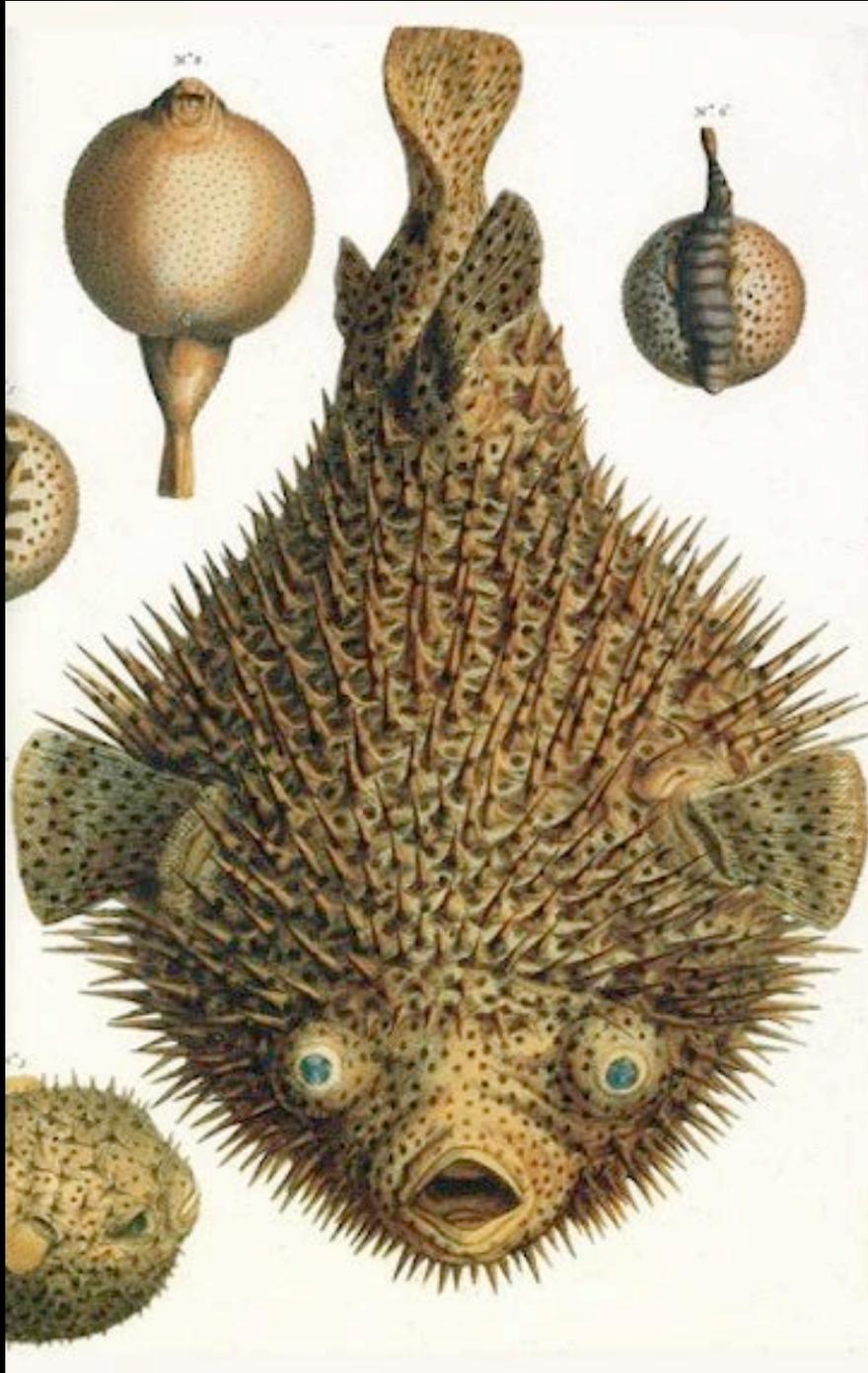
Bioart

- performs critique of genetic engineering in humans and food (transgenic art)
- performs critique of bio-pharmaceutical industries
- performs critique of Enlightenment-based meta-narratives of progress through rational thinking
- performs critique of reductionism in science

Biology in Art

- critical consciousness through wonder with science
- critical consciousness through awe at scientific facts
- critical consciousness through passion for scientific complex systems
- critical agency through basic scientific literacy
- understanding how scientific debates shape our collective reality

Scott F. Gilbert and Marion Faber, "Looking at Embryos: The Visual and Conceptual Aesthetics of Emerging Form," in *The Elusive Synthesis: Aesthetics and Science*, ed. Alfred I. Tauber (Dordrecht, NL: Kluwer Academic Publishers, 1997) 125-152.



PUFFER FISH, copperplate engraving by Albertus Seba, 1665-1736. "Cabinet of Natural Curiosities: Thesaurus," Amsterdam, 1734-65: Volume II: Plate 23.

Use science in art; use art in science – in a feedback loop.



ART as **organism**

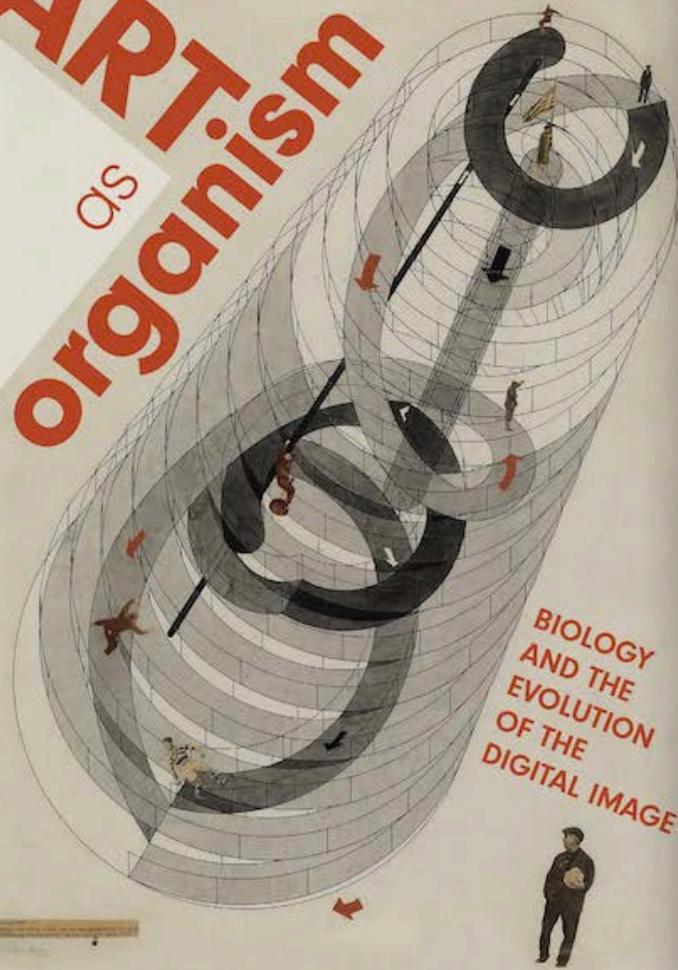
BIOLOGY AND THE
EVOLUTION OF
THE DIGITAL IMAGE

Charissa N Terranova



I.B. TAURIS

ART as **organism**



BIOLOGY
AND THE
EVOLUTION
OF THE
DIGITAL IMAGE

Charissa N Terranova

What if modernism had been characterised by evolving, interconnected and multi-sensory images – rather than by the monolithic objects often described by its artists and theorists? In this groundbreaking book, Charissa Terranova unearths a forgotten narrative of modernism, which charts the influence that biology, General Systems Theory and cybernetics had on art in the twentieth century. From kinetic and interactive art to early computer art and installations spanning an entire city, she shows that the digital image was a rich and expansive artistic medium of modernism.

This book links the emergence of the digital image to the dispersion of biocentric aesthetic philosophies developed by Bauhaus pedagogue László Moholy-Nagy, from 1920s Berlin to the Massachusetts Institute of Technology in the 1970s. It uncovers seminal but overlooked references to biology, the organism, feedback loops, emotions and the Gestalt, along with an intricate genealogy of related thinkers across disciplines.

Terranova interprets anew major art movements such as the Bauhaus, Op Art and Experiments in Art and Technology (E.A.T.), by referencing contemporary insights from architects, embryologists, electrical engineers and computer scientists, among others. This book reveals the complex connections between visual culture, science and technology that comprise the deep history of twentieth-century art.

CHARISSA N. TERRANOVA is Associate Professor of Aesthetic Studies at The University of Texas at Dallas. She is the author of *Automotive Prosthetic* (2014) and has published articles in *Leonardo*, *Art Journal*, *Urban History Review* and *Journal of Urban History*.

Cover design: Alicia Freije, Tango Media
www.tangomedia.com.au

Picture credit:
László Moholy-Nagy
and István Sebök,
*Kinetic-Constructive
System: Structure with
Movement Track for
Play and Conveyance*,
1922, courtesy of the
Theaterwissenschaftliche
Sammlung, University of
Cologne.

I.B. TAURIS

LONDON · NEW YORK

www.ibtauris.com

László Moholy-Nagy and István Sebök, "Kinetic-Constructive System: Structure with Movement Track for Play and Conveyance," 1922



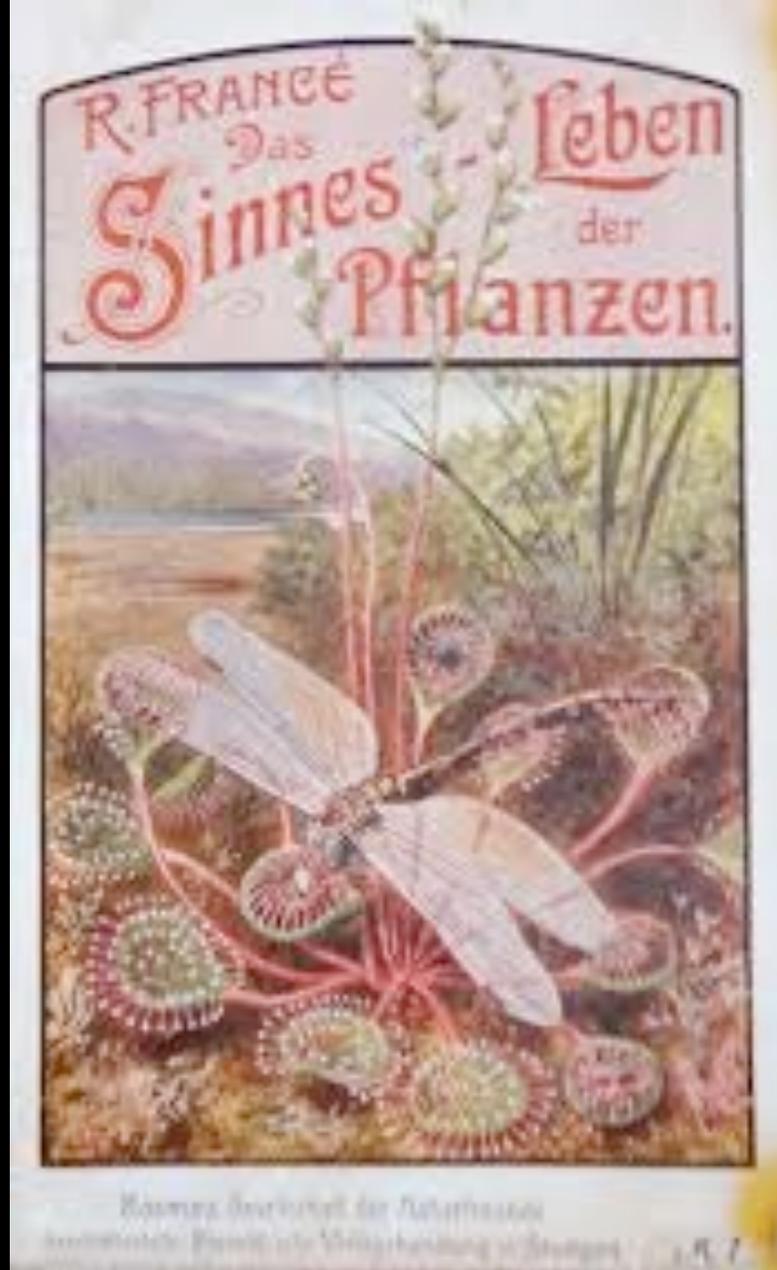
**The experience of space is not a privilege of
the gifted few, but a biological function.**

-- László Moholy-Nagy

Detail of Moholy-Nagy's "Light Prop," 1930



Laszlo Moholy-Nagy, Photogram,
1926



Raoul Francé, *Germs of Mind in Plants*, 1905 [*Das Sinnesleben der Pflanzen*]

R.H. France
**Die Pflanze
als Erfinder**



Kosmos, Gesellschaft der Naturfreunde
Franckh'sche Verlagshandlung·Stuttgart

“Die Pflanze als Erfinder” (The Plant as an Inventor), by Raoul Heinrich Francé, Kosmos, Stuttgart, 1920. It is a popular-scientific version of a more hefty volume -- “Die Technischen Leistungen der Pflanzen” (The Technical Achievements of Plants), Veit & Cie., Leipzig, 1919.

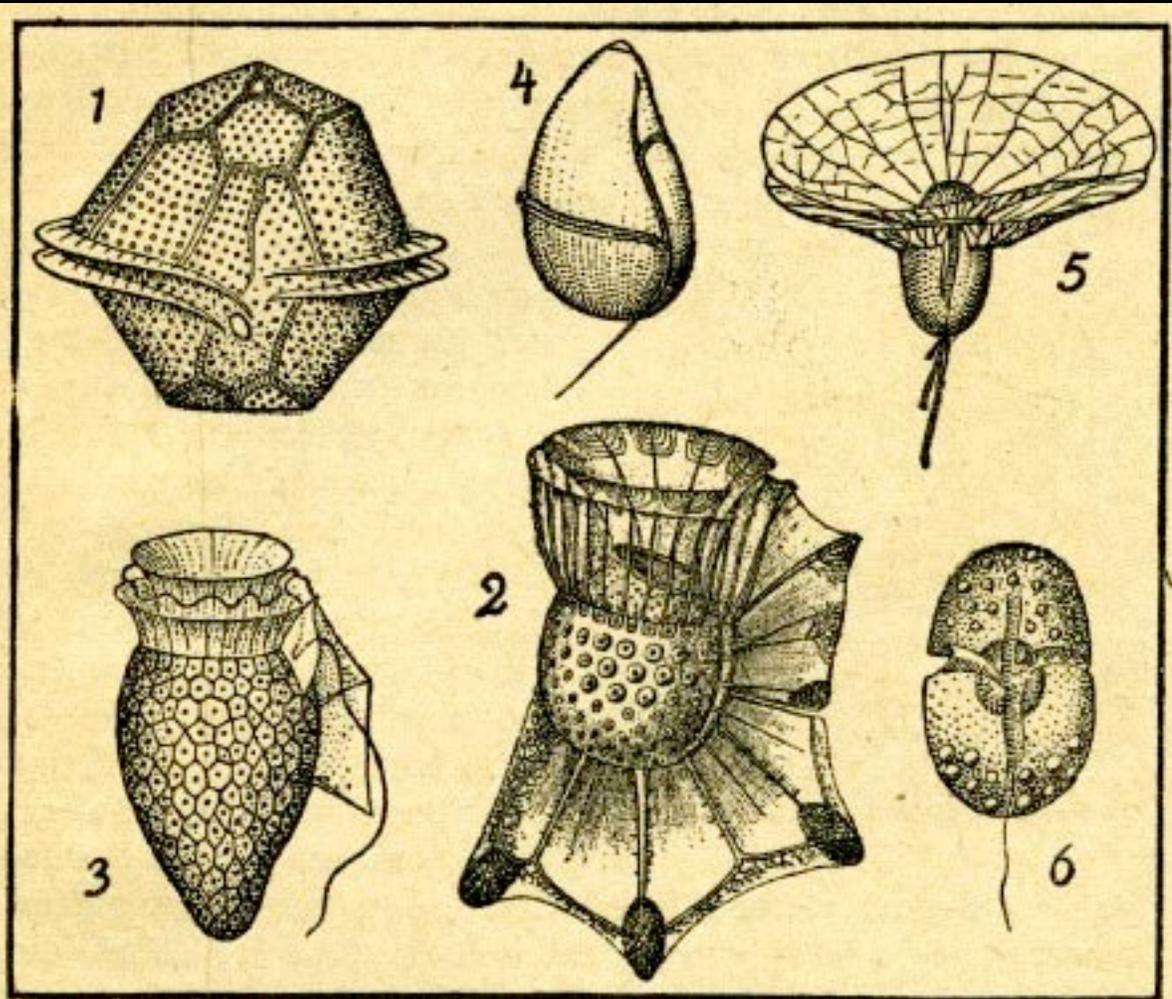
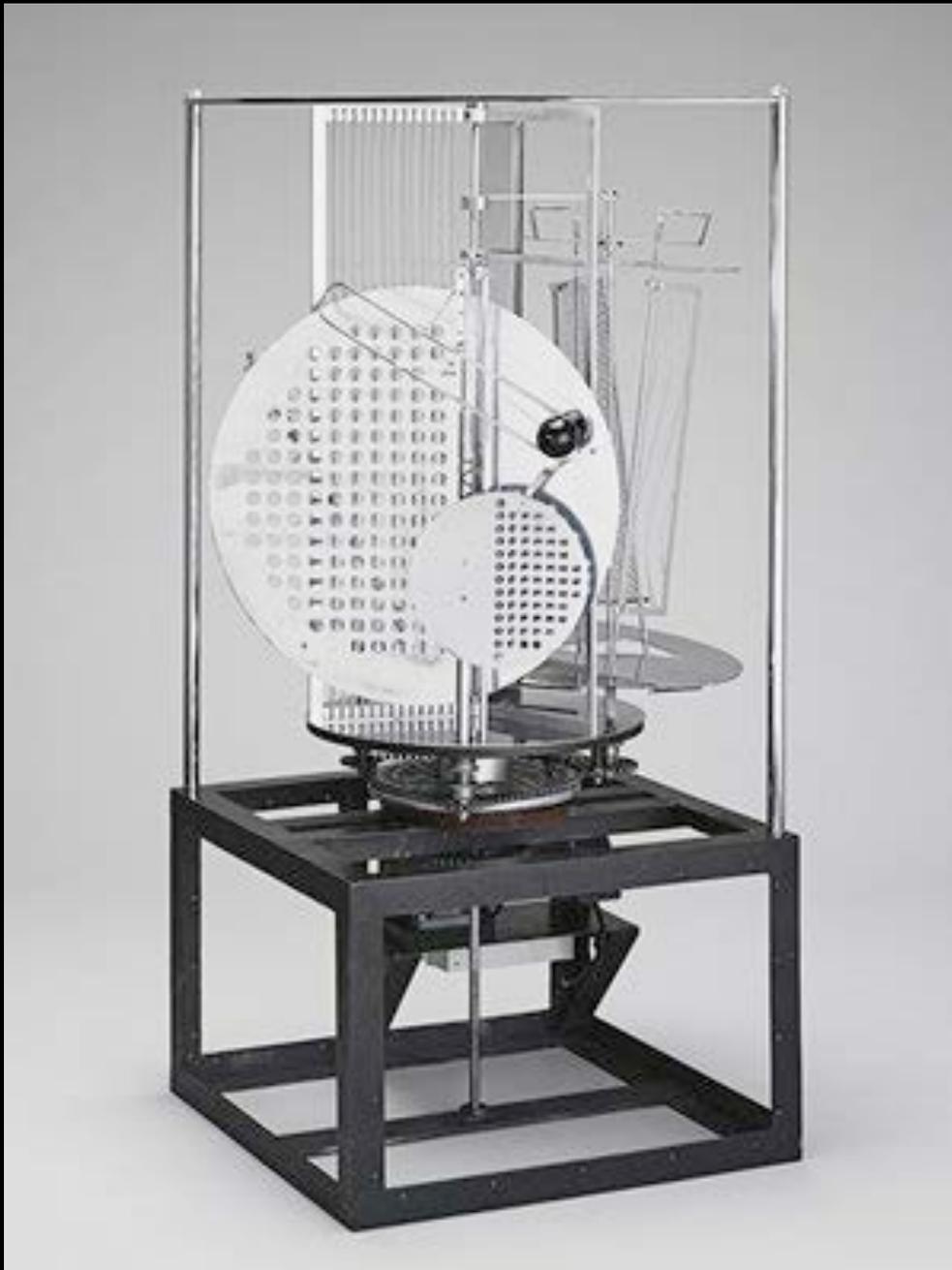


Fig. 128. The seven biotechnical elements: crystal, sphere, cone, plate, strip, rod, and spiral (screw).

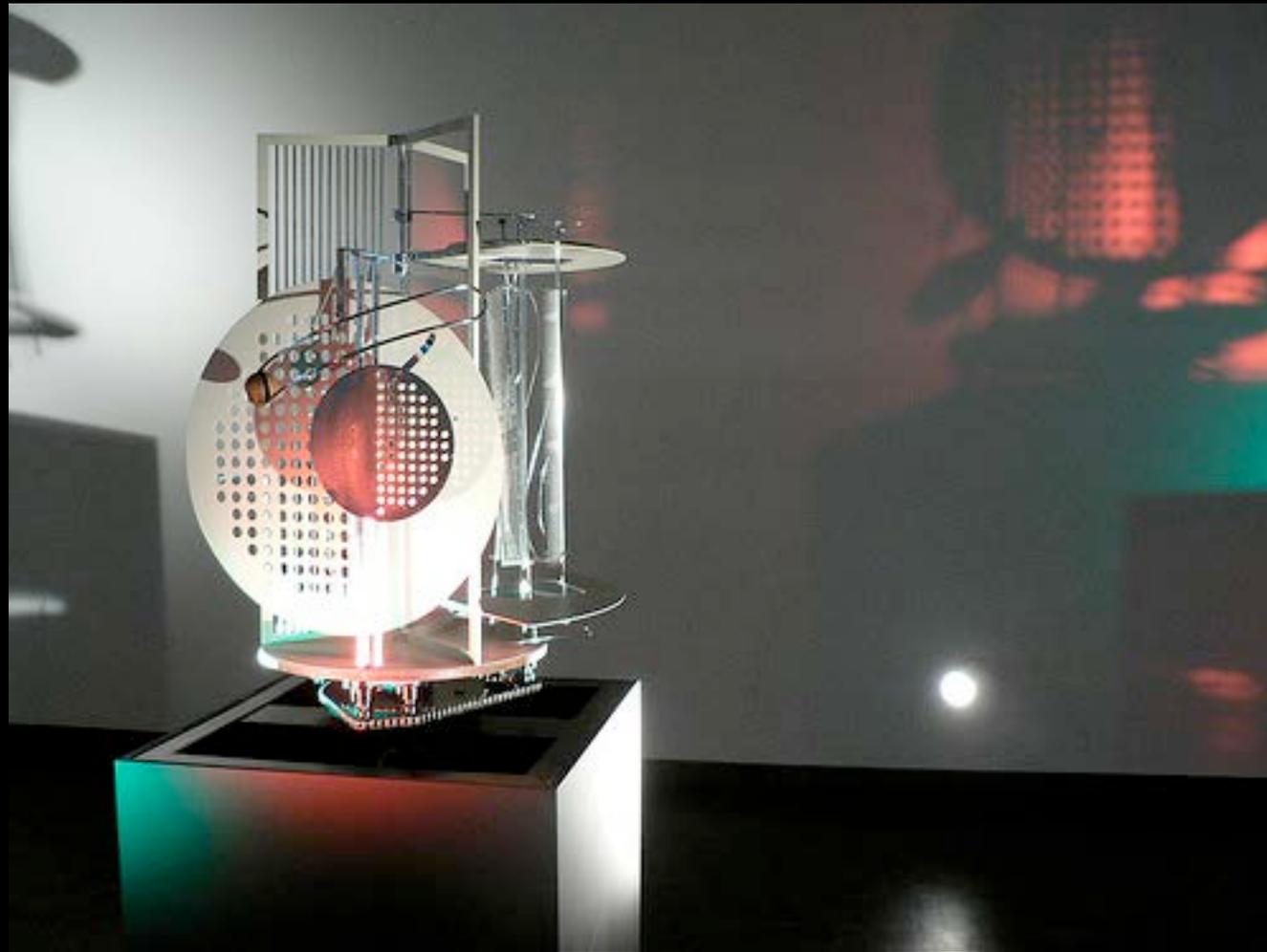


Abb. 11. Peridineen des Meeres, als natürliche Modelle von Turbineneinrichtungen.
 1 *Goniodoma acuminatum*. 2 *Ornithocercus magnificus*. 3 *Dinophysis acuta*. 4 *Gymnodinium spirale*. 5 *Ornitho cercus splendidus*. 6 *Gymnodinium rhomboides*. (Nach Schütt.)



Motion, Duration, Illumination

Laszlo Moholy-Nagy, Light-
Space Modulator, 1923-30

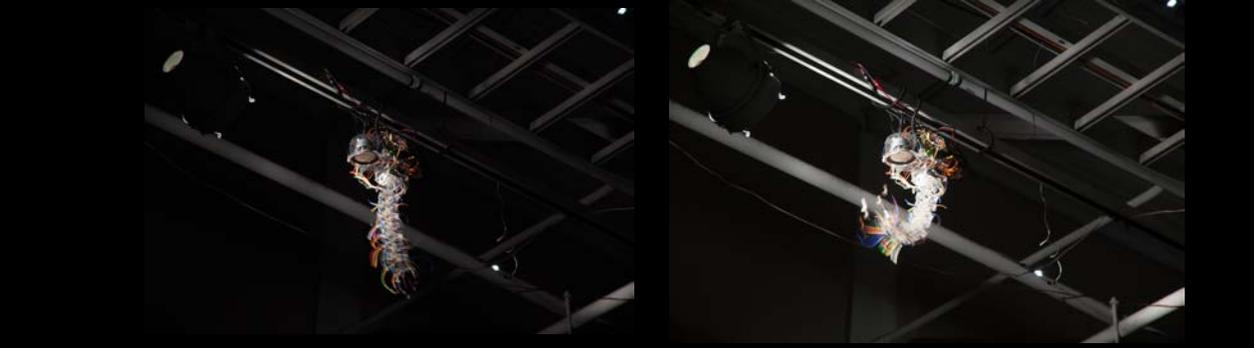


<https://www.youtube.com/watch?v=QYNO3DLIZe0>



At the Beall Center for Art and Technology, University of California at Irvine, curated by David Familian and Jens Hauser





Gilberto Esparza, "Pepenadores" (Gleaners), motors from toys, galvanized wire and technological scraps, 2010-2014



Gilberto Esparza's work is a direct instantiation of the limit biology that is Artificial Life (AI): robotic life that mimics biological life. Esparza's "Pepeñadores" (Gleaners), made from recycled motors of toys, crawl amid mechanical detritus, while "Moscas" (Flies), mechanical insects made from discarded cell phone vibrators attached to invisible metal lines, zigzag above and around viewers' heads.



Thomas Feuerstein, PANCREAS, 2012 glass, brain cells, stainless steel, technical equipment, 230 x 800 x 200 cm; biotechnological realization: Thomas Seppi, Department of Radiotherapy and Radiooncology, Medical University of Innsbruck

The processual sculpture PANCREAS transforms books into sugar (glucose) that feeds human brain cells. The books' paper is shredded, soaked in water, and pressed into an artificial intestine (fermenter), in which bacteria break the cellulose down into glucose. After filtering and purifying, the glucose is fed to the cells growing inside a glass tank (brain in a vat). The feeding of the artificial brain follows a strict diet: the brain food consists exclusively of Hegel's "Phenomenology of Spirit". PANCREAS is a pataphysical machine that uses biotechnologies in order to translate language and books, that is symbols and data, into matter and flesh. Glucose, as a universal fuel of life, which all cells, especially brain cells, feed from, becomes the artistic material for PANCREAS (Gr. pánkreas, pán = "all", kréas = "flesh").



Anna Dumitriu, "Engineered Antibody," 21 amino acids, polymer clay, Coomassie Brilliant Blue dye, jewellery wire, cotton calico, vintage tatted linen lace, silk, and embroidery, Based on research by Liu Lab member Xiang Li. 2015-2016

The shapes and forms of Dumitriu's work elicit meaning within and beyond gender. The artist-scientist collaboration at work in all three pieces embodies an equally if not more powerful meaning-maker than sexual categories, even while the presence of Dumitriu – a woman *and* artist – in the lab is a resounding, even revolutionary, symbol of open frontiers and progressive thinking. A result of her residency working with researchers in the Liu Lab for Synthetic Evolution at the University of California Irvine, Dumitriu's "Engineered Antibody" plays on the metaphor that amino acids are the "beads of life:" the idea that scientists enlist to describe structures of proteins constructed from chains of amino acids. The work is a necklace made up of 452 handmade beads containing the actual 21 amino acids of an antibody purified from the blood of an HIV positive patient.



Art, Design, and the Microbiome

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<http://www.sciartcenter.org/>



THE BRIDGE
experiments in science & art

<http://www.sciartcenter.org/the-bridge.html>



<http://www.sciartcenter.org/gut-instinct.html>