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IRINI PAPADIMITRIOU / EDITORS JONATHAN MUNRO AND ÖZDEN ŞAHİN

Touch and Go is published in collaboration with Watermans and Goldsmiths College in occasion of the Watermans' International Festival of Digital Art, 2012, which coincides with the Olympics and Paralympics in London. The issue explores the impact of technology in art as well as the meaning, possibilities and issues around human interaction and engagement. *Touch and Go* investigates interactivity and participation, as well as light art and new media approaches to the public space as tools that foster engagement and shared forms of participation.



TOUCH AND GO

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LEONARDO ELECTRONIC ALMANAC, VOLUME 18 ISSUE 3

Touch and Go

VOLUME EDITORS

LANFRANCO ACETI, JANIS JEFFERIES, IRINI PAPADIMITRIOU

EDITORS

JONATHAN MUNRO, ÖZDEN ŞAHİN

Watermans International Festival of Digital Art, 2012

Touch and Go is a title that I chose together with Irini Papadimitriou for this LEA special issue. On my part with this title I wanted to stress several aspects that characterize that branch of contemporary art in love with interaction, be it delivered by allowing the audience to touch the art object or by becoming part of a complex electronic sensory experience in which the artwork may somehow respond and touch back in return.

With the above statement, I wanted to deliberately avoid the terminology 'interactive art' in order to not fall in the trap of characterizing art that has an element of interaction as principally defined by the word interactive; as if this were the only way to describe contemporary art that elicits interactions and responses between the artist, the audience and the art objects.

I remember when I was at Central Saint Martins writing a paper on the sub-distinctions within contemporary media arts and tracing the debates that distinguished between electronic art, robotic art, new media art, digital art, computer art, computer based art, internet art, web art... At some point of that analysis and argument I realized that the common thread that characterized all of these sub-genres of aesthetic representations was the word art and it did not matter (at least not that much in my opinion) if the manifestation was material or immaterial, conceptual or physical, electronic or painterly, analogue or digital.

I increasingly felt that this rejection of the technical component would be necessary in order for the electronic-robotic-new-media-digital-computer-based-internet art object to re-gain entry within the field of fine art. Mine was a reaction to an hyper-fragmented

and indeed extensive and in-depth taxonomy that seemed to have as its main effect that of pushing these experimental and innovative art forms – through the emphasis of their technological characterization – away from the fine arts and into a ghetto of isolation and self-reference. Steve Dietz's question – *Why Have There Been No Great Net Artists?*¹ – remains unanswered, but I believe that there are changes that are happening – albeit slowly – that will see the sensorial and technical elements become important parts of the aesthetic aspects of the art object as much as the brush technique of Vincent Willem van Gogh or the sculptural fluidity of Henry Moore.

Hence the substitution in the title of this special issue of the word interactivity with the word touch, with the desire of looking at the artwork as something that can be touched in material and immaterial ways, interfered with, interacted with and 'touched and reprocessed' with the help of media tools but that can also 'touch' us back in return, both individually and collectively. I also wanted to stress the fast interrelation between the art object and the consumer in a commodified relationship that is based on immediate engagement and fast disengagement, touch and go. But a fast food approach is perhaps incorrect if we consider as part of the interactivity equation the viewers' mediated processes of consumption and memorization of both the image and the public experience.

Nevertheless, the problems and issues that interactivity and its multiple definitions and interpretations in the 20th and 21st century raise cannot be overlooked, as much as cannot be dismissed the complex set of emotive and digital interactions that can be set in motion by artworks that reach and engage large groups of people within the public space. These interactions

generate public shows in which the space of the city becomes the background to an experiential event that is characterized by impermanence and memorization. It is a process in which thousands of people engage, capture data, memorize and at times memorialize the event and re-process, mash-up, re-disseminate and re-contextualize the images within multiple media contexts.

The possibility of capturing, viewing and understanding the entire mass of data produced by these aesthetic sensory experiences becomes an impossible task due to easy access to an unprecedented amount of media and an unprecedented multiplication of data, as Lev Manovich argues.²

In *Digital Baroque: New Media Art and Cinematic Folds* Timothy Murray writes that "the retrospective nature of repetition and digital coding—how initial images, forms, and narratives are refigured through their contemplative re-citation and re-presentation—consistently inscribes the new media in the memory and memorization of its antecedents, cinema and video."³

The difference between memorization and memorialization may be one of the further aspects in which the interaction evolves – beyond the artwork but still linked to it. The memory of the event with its happening and performative elements, its traces and records both official and unofficial, the re-processing and mash-ups; all of these elements become part of and contribute to a collective narrative and pattern of engagement and interaction.

These are issues and problems that the artists and writers of this LEA special issue have analyzed from a variety of perspectives and backgrounds, offering to the reader the opportunity of a glimpse into the complexity of today's art interactions within the contemporary social and cultural media landscapes.

Touch and Go is one of those issues that are truly born from a collaborative effort and in which all editors have contributed and worked hard in order to

deliver a documentation of contemporary art research, thought and aesthetic able to stand on the international scene.

For this reason I wish to thank Prof. Janis Jefferies and Irini Papadimitriou together with Jonathan Munro and Özden Şahin for their efforts. The design is by Deniz Cem Önduygu who as LEA's Art Director continues to deliver brilliantly designed issues.

Lanfranco Aceti

Editor in Chief, *Leonardo Electronic Almanac*
Director, Kasa Gallery



1. "Nevertheless, there is this constant apparently inherent need to try and categorize and classify. In *Beyond Interface*, an exhibition I organized in 1998, I 'datamined' ten categories: net.art, storytelling, socio-cultural, biographical, tools, performance, analog-hybrid, interactive art, interfacers + artificers. David Ross, in his lecture here at the CAD-RE Laboratory for New Media, suggested 21 characteristics of net art. Stephen Wilson, a pioneering practitioner, has a virtual – albeit well-ordered – jungle of categories. Rhizome has developed a list of dozens of keyword categories for its ArtBase. Lev Manovich, in his *Computing Culture: Defining New Media Genres* symposium focused on the categories of database, interface, spatialization, and navigation. To my mind, there is no question that such categorization is useful, especially in a distributed system like the Internet. But, in truth, to paraphrase Barnett Newman, "ornithology is for the birds what categorization is for the artist." Perhaps especially at a time of rapid change and explosive growth of the underlying infrastructure and toolsets, it is critical that description follow practice and not vice versa." Steve Dietz, *Why Have There Been No Great Net Artists? Web Walker Daily* 28, April 4, 2000, <http://bit.ly/QJEWIY> (accessed July 1, 2012).
2. This link to a Google+ conversation is an example of this argument on massive data and multiple media engagements across diverse platforms: <http://bit.ly/pGgDsS> (accessed July 1, 2012).
3. Timothy Murray, *Digital Baroque: New Media Art and Cinematic Folds* (Minneapolis: University of Minnesota Press, 2008), 138.

Touch and Go: The Magic Touch Of Contemporary Art

It is with some excitement that I write this preface to Watermans International Festival of Digital Art, 2012. It has been a monumental achievement by the curator Irini Papadimitriou to pull together 6 groundbreaking installations exploring interactivity, viewer participation, collaboration and the use or importance of new and emerging technologies in Media and Digital Art.

From an initial call in December 2010 over 500 submissions arrived in our inboxes in March 2011. It was rather an overwhelming and daunting task to review, look and encounter a diverse range of submissions that were additionally asked to reflect on the London 2012 Olympic and Paralympic Games. Submissions came from all over the world, from Africa and Korea, Austria and Australia, China and the UK, Latvia and Canada and ranged from the spectacularly complicated to the imaginatively humorous. Of course each selector, me, onedotzero, London's leading digital media innovation organization, the curatorial team at Athens Video Art Festival and Irini herself, had particular favorites and attachments but the final grouping I believe does reflect a sense of the challenges and opportunities that such an open competition offers. It is though a significant move on behalf of the curator that each work is given the Watermans space for 6 weeks which enables people to take part in the cultural activities surrounding each installation, fulfilling, promoting and incorporating the Cultural Olympiad themes and values 'inspiration, participation and creativity.'

Some, like Gail Pearce's *Going with the Flow* was made because rowing at the 2012 Olympics will be held near Egham and it was an opportunity to respond and create an installation offering the public a more interactive way of rowing, while remaining on dry land, not only watching but also participating and having an effect on the images by their actions. On the other hand, Michele Barker and Anna Munster's collaborative *Hocus Pocus* will be a 3-screen interactive artwork that uses illusionistic and performative aspects of magical tricks to explore human perception, senses and movement. As they have suggested, "Magic – like interactivity – relies on shifting the perceptual relations between vision and movement, focusing and diverting attention at key moments. Participants will become aware of this relation as their perception catches up with the audiovisual illusion(s)" (artists statement, February 2011). Ugochukwu-Smooth Nzewi and Emeka Ogboh are artists who also work collaboratively and working under name of One-Room Shack. *UNITY* is built like a navigable labyrinth to reflect the idea of unity in diversity that the Games signify. In an increasingly globalized world they are interested in the ways in which the discourse of globalization opens up and closes off discursive space whereas Suguru Goto is a musician who creates real spaces that are both metaphysical and spiritual. *Cymatics* is a kinetic sculpture and sound installation. Wave patterns are created on liquid as a result of sound vibrations generated by visitors. Another sound work is Phoebe Hui's *Granular Graph*, a sound instrument about musical gesture and its notation.


Audiences are invited to become a living pendulum. The apparatus itself can create geometric images to represent harmonies and intervals in musical scales. Finally, Joseph Farbrook's *Strata-caster* explores the topography of power, prestige, and position through an art installation, which exists in the virtual world of Second Life, a place populated by over 50,000 people at any given moment.

Goldsmiths, as the leading academic partner, has been working closely with Watermans in developing a series of seminars and events to coincide with the 2012 Festival. I am the artistic director of Goldsmiths Digital Studios (GDS), which is dedicated to multi-disciplinary research and practice across arts, technologies and cultural studies. GDS engages in a number of research projects and provides its own postgraduate teaching through the PhD in Arts and Computational Technology, the MFA in Computational Studio Arts and the MA in Computational Art. Irini is also an alumni of the MFA in *Curating* (Goldsmiths, University of London) and it has been an exceptional pleasure working with her generating ideas and platforms that can form an artistic legacy long after the Games and the Festival have ended. The catalogue and detailed blogging/documentation and social networking will be one of our responsibilities but another of mine is to ensure that the next generation of practitioners test the conventions of the white cube gallery, reconsider and reevaluate artistic productions, their information structure and significance; engage in the museum sector whilst at the same time challenging the spaces for the reception of 'public' art. In addition those who wish to increase an audience's interaction and enjoyment of their work have a firm grounding in artistic practice and computing skills.

Consequently, I am particularly excited that the 2012 Festival Watermans will introduce a mentoring scheme for students interested in participatory interactive digital / new media work. The mentoring scheme involves video interviews with the 6 selected artists and their work, briefly introduced earlier in this preface, and discussions initiated by the student. As so often debated in our seminars at Goldsmiths and

elsewhere, what are the expectations of the audience, the viewer, the spectator, and the engager? How do exhibitions and festival celebrations revisit the traditional roles of performer/artist and audiences? Can they facilitate collaborative approaches to creativity? How do sound works get curated in exhibitions that include interactive objects, physical performances and screens? What are the issues around technical support? How are the ways of working online and off, including collaboration and social networking, affecting physical forms of display and publishing?

As I write this in Wollongong during the wettest New South Wales summer for 50 years, I want to end with a quote used by the Australia, Sydney based conjurers Michele Barker and Anna Munster

Illusions occur when the physical reality does not match the perception. 

The world is upside down in so many alarming ways but perhaps 2012 at Watermans will offer some momentary ideas of unity in diversity that the Games signify and *UNITY* proposes. Such anticipation and such promise!

Janis Jefferies

*Professor of Visual Arts
Goldsmiths
University of London, UK*

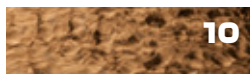
23rd Dec 2011, University of Wollongong, NSW, Australia

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1. Stephen L. Malnik and Susana Martinez-Conde, *Sleights of Mind: What the Neuroscience of Magic Reveals about our Everyday Deceptions* (New York: Henry Holt and Company, 2010), 8.

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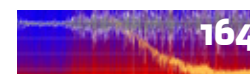


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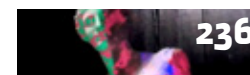


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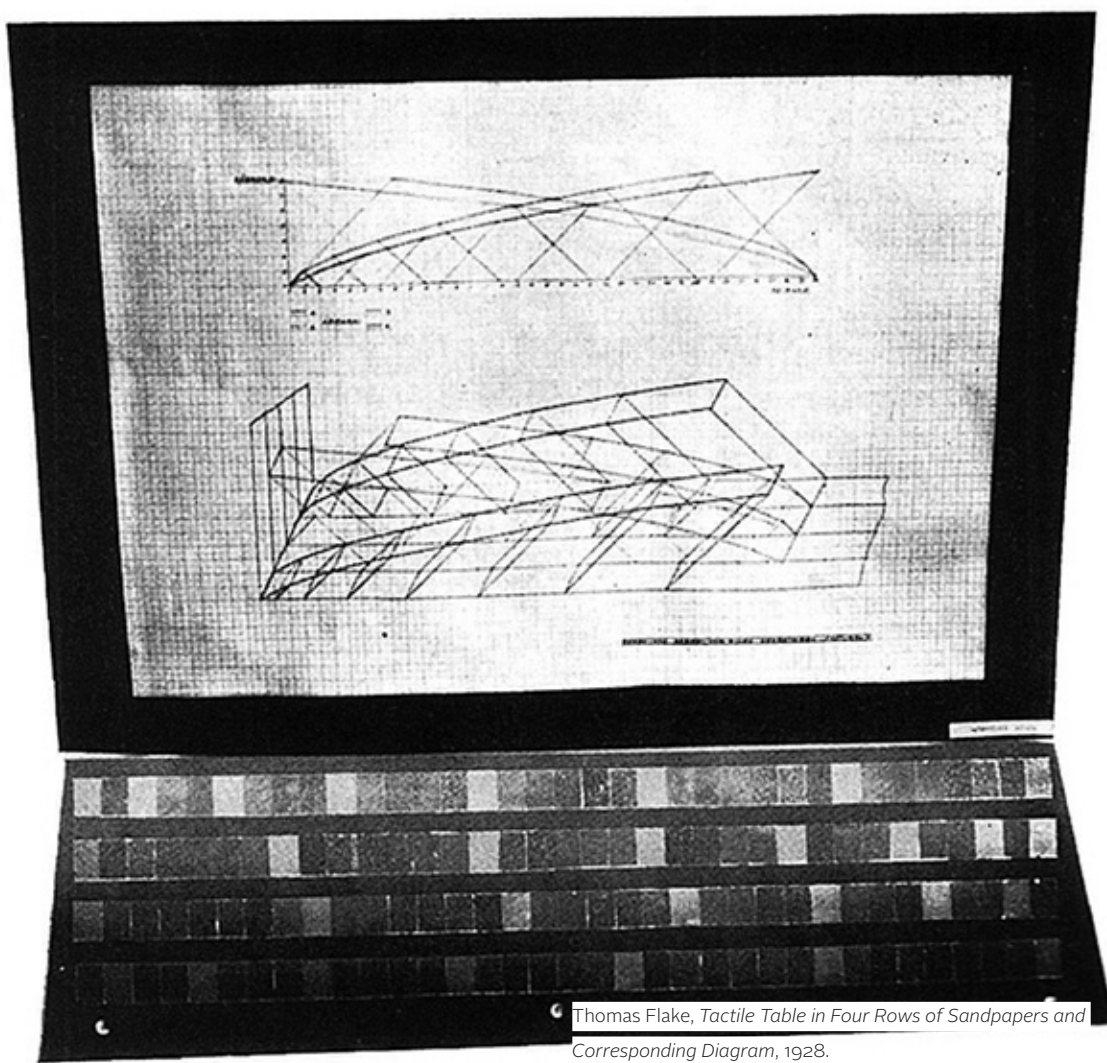
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HAPTIC UNCONSCIOUS

A Prehistory of Affectivity in Moholy-Nagy's Pedagogy at the New Bauhaus



Thomas Flake, *Tactile Table in Four Rows of Sandpapers and Corresponding Diagram*, 1928.

ABSTRACT

This essay is an historical analysis of new media theory in particular the idea of affectivity as it took form in the 1930s in what I call the “haptic unconscious.” Taking a cue from Walter Benjamin, this phrase describes the bio-materialist and body-based curriculum and philosophy of the New Bauhaus (later known as the Chicago School of Design and Institute of Design) under the directorship of Laszlo Moholy-Nagy from 1937 to 1946. The essay focuses on Moholy-Nagy’s materialist teaching praxis as it was rooted in the ideas of Raoul Francé, the Logical Positivism of the Vienna Circle, and John Dewey. The ideas coalesced here are the ballast and founding logic of Moholy-Nagy’s sense of ‘vision’ and, by connection, an experiential aesthetic of the artistic image as it is produced, constituted, and mediated by photo-optics, kinesthesia, and the broad base of technology, both analogue and digital.

1. INTRODUCTION: DEFINING THE HAPTIC UNCONSCIOUS

by

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Certain postmodern aesthetic theories of perception and art were built on caricatures of modernist ideas of vision. One prominent take argues that modern vision, as it materialized in the ideas of critics and abstract painters working in the early and mid twentieth century, was simply a matter of the purity of sight. Abstraction in the form of absolute non-objectivity in painting was coeval with clear, clean sight, which in turn signified enlightenment and ratiocination. In like terms, the phrase ‘modernist painting’ meant autonomy: optical purity, painting untouched by the world of popular and political reference, and hemmed in closely to its own logic of medium-specificity. At once elegant and bombastic, persuasive and extreme, the idea of modernist vision as singly a matter of purist optics has overshadowed alternative understand-

ings of vision from the twentieth century and its place within the sensual seat of the body. By way of an idea of the techno-psychic dwelling of the body, we return to a corpus of art and aesthetic theory that has gone lost in the penumbra of the monolith and mono-logic of modernist vision as purist optics.

Writing in her 1994 book *The Optical Unconscious*, Rosalind Krauss framed modernist optics precisely in terms of purity and cool cogency, as an “oath sworn with rationalism.”² Creating something of a straw man for her own deconstructivist needs, she looks to the high Victorian writer John Ruskin who, in pondering the sea, articulates “a special kind of medium for modernism because of its...opening onto a visual plenitude that is somehow heightened and pure, but a limitless expanse and a sameness, flattening it into nothing, into the no-space of sensory deprivation.”³ While modernism no doubt bore within it a prominent and persuasive force of purist optics, it was not the force of influence behind all modernist visual practices. What follows is not so much an alternative story of modernist vision singled out from the other senses, but of a certain strain of modernist vision that functioned integrally within the body, as part of an organic totality. I call this perceptual matrix the “haptic unconscious.” The haptic unconscious is the complex and hairy underside of the idea that modernist vision was hegemonic, spectacular, and solely a matter of the unpolluted and pristine space of seeing and rumination.⁴ It emerged as a philosophical force in the pedagogy of Laszlo Moholy-Nagy at the Bauhaus at Weimar, Germany in the 1920s and, starting in 1937 at the New Bauhaus in Chicago, became the lodestar in a body-based aesthetic theory that would guide and inform light, kinetic, op, conceptual, and early computer artists well into the second half of the twentieth century.

While a modernist concept in history, the haptic unconscious bears remarkable parallels to contemporary ideas within new media theory. Far from the distorted take on modernist vision, the haptic unconscious describes the unforeseen emotional responses of the human body extended beyond its fleshy being and made kinetic by the union of art and technology. Together, the words brings to the fore the existential life

of technological proprioception, or what new media theorist Mark B. N. Hansen calls “affective proprioception.”⁵ It is an idea layered in time, an aesthetic concept formed by several fashionable theoretical influences of the present moment while, at the same time, existing within a deeper history of art, technology, and the body eighty years ago, in particular the ruminations of the Freudo-Marxist philosopher Walter Benjamin and pedagogical practices of the kinetic-light artist and Bauhausler Laszlo Moholy-Nagy. As an idea and aesthetic of modernism, the haptic unconscious is *in time*, casting a historical glow onto the often timeless sense of the digital present. It gives form to a techno-kinetic sense of the image just before the omnipresent digital image, as it was a protean and porous gestalt within an affective network of relations. It is evidence of an open-ended totality in the work of mid-twentieth-century light, kinetic, and op artists that has simply been overlooked, and, at the same time, tells of the historicity of the new media discourse unfolding under the banner of affectivity.

In defining the techno-aesthetics of affectivity, Hansen helps give sense to the haptic unconscious. Hansen says that affectivity is “the capacity of the body to experience itself as ‘more than itself’ and thus to deploy its sensorimotor power to create the unpredictable, the experimental, the new.”⁶ Yet, the possibility of the body to be felt beyond itself through the mechanisms of imagination, mirroring, and technology have been with us for millennia, since the deep past of clay golem figures and the water clock, or clepsydra, of Ctesibius.⁷ In the more recent, low tides of the past, Benjamin wrote, similarly to Hansen, of the way in which technology works to show us our full range of vision and to extend that fullness even further outward. In the canonical essay *The Work of Art in the*

Epoch of its Technical Reproducibility published in 1936, Benjamin describes not merely the revolutionary transformations brought on by the camera, the way it facilitates the body's extension beyond itself, but the way that expansion creates a play of boundaries between knowing and unknowing, conscious perception and unconscious perception, and empiricism and emotions. Speaking of the kinetic and existential optics of the camera, he wrote:

What becomes palpable is that a different nature speaks to the camera than to the eye. It is different above all because in the place of a space consciously navigated by human beings, an unconsciously navigated one appears. Even though we

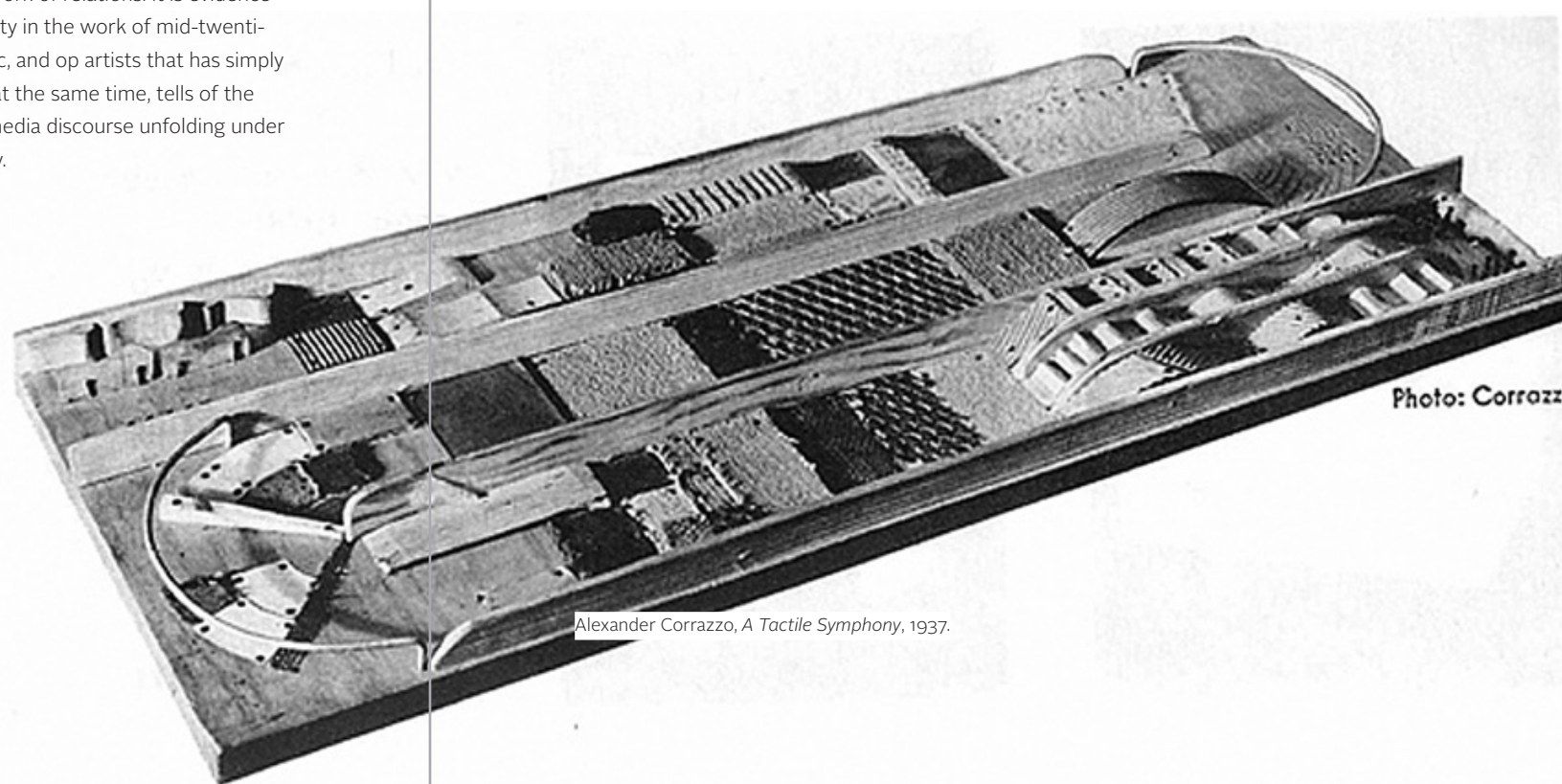


Photo: Corrazzo

Alexander Corrazzo, *A Tactile Symphony*, 1937.

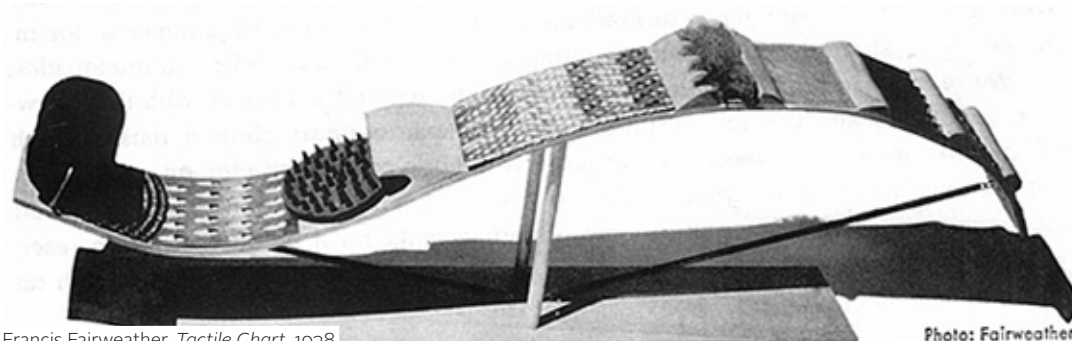
Francis Fairweather, *Tactile Chart*, 1938.

Photo: Fairweather

are more or less accustomed to seeing the walking gait of people, we certainly know nothing of our posture in the second-by-second progression of our stride. Even though we are more or less used to reaching for a lighter or a soup spoon, nonetheless we scarcely know what really plays out between hand and metal, let alone how this varies in accordance with the various moods we find ourselves in. Here the camera intervenes with its means of assistance, its falling and rising, its interrupting and isolating, its extension and time-lapse photography, its enlargement and diminution. We first experience the optic-unconscious through it, as we experience the drive-unconscious through psychoanalysis.³

I quote Benjamin's essay at length in order to underscore the twofold – kinetic and affective – bond between the body and technology in the technological making of an image by a camera. First, the camera gives shape and space to the full capacity of vision, revealing in photographic and filmic pictures the full breadth of human vision, that is to say, the conscious elements on which one focuses as well as the unconscious elements that go unnoticed in the peripheries of regular, unmediated vision. Second, in addition to this science of an empiricism in oblivion – what the eye observes without knowing – the camera shifts its focus and perception as a human fluctuates in mood and temperament. In identifying the technologically revealed unconscious of vision, Benjamin underscores at the same time the existentially fraught territory of technological empiricism in particular as it unfolds by way of and on the camera-human body hybrid. Tools extend the body, enabling the human to be “more than itself,” to quote Hansen again, and in so doing

extend the body's emotions. Technological extensions work subjectively as well as objectively, bringing the body out into the world emotionally and physically.

In *The Optical Unconscious*, Krauss connects Benjamin's designation of a mechanized enlargement of vision to Freud's citation of “technological advances... as a set of ‘prosthetic limbs’ that expand the power of the individual,” which he outlined in *Civilization and Its Discontents*.⁴ In reading Benjamin and Freud closely together, Krauss devises an alternative category of modern art, one not so much rooted in the imagination as a prosthetic, but rather in which the certitudes of sight – truth, clarity, and autonomous form – are set into grave doubt. If for Krauss, the phrase “optical unconscious” refers to artists who worked out an alternative path within modernism, one in which the truth of pure vision was *not* its earmark, then the haptic unconscious looks to the way in which the art-and-technology fusion functions outside and beyond the problematic of ‘good’ and ‘bad,’ ‘pure’ and ‘impure’ vision and the related linguistic construction that is *truth* itself. Rather, the haptic unconscious concerns new modes of perception, sensibility, and tactility instantiated by technologically mediated aesthetic experiences.

The historical narrative of the haptic unconscious starts with Moholy-Nagy's pedagogy of tactility, emotions, and experience at the Bauhaus, or what he called “sensory training.”¹⁰ While in this essay I focus on the idea's origin in the twentieth century in Moholy-Nagy's German and Chicago-based New Bauhaus pedagogy, the haptic unconscious names a specific materialist art practice traceable from Moholy-Nagy's late work at the New Bauhaus in Chicago in the late

1930s, to the unfolding of light, kinetic, and op art at mid century and the experimental union of art and technology sponsored by the Bell Labs in New Jersey in the early 1960s, to Gyorgy Kepes's work at the Center for Advanced Visual Studies at MIT starting in 1967. This loosely aggregated collective of artists shared a curiosity about the rising influence of what Jack Burnham called “systems aesthetics” and a desire to deploy a panoply of technological tools in their art in order to extend the body – from the skin to senses to world – as a means of inscribing another subject position in which language and ideology function along side of technology as forces of a priori formation. The haptic unconscious is the intuitive knowing through technological proprioception that connects person to global political economy by way of a work of art. It gives name to a neo-constructivist politics of the body bearing much in common with contemporary theories of affectivity and attendant discourses of embodiment, cybernetics, second-order cybernetics, and ecology, the primary distinction being that the haptic unconscious emerged in the first half of the twentieth century. Though similar to these ideas, perhaps even their root-source, the haptic unconscious took form in the art practices and modern language of the last century, and as such offers an account of a pre-theoretical and pre-new media studies sense of affectivity.

2. MOHOLY-NAGY'S BIOTECHNOLOGICAL PEDAGOGY OF TOUCH, SENSUALITY AND EMOTION AT THE BAUHAUS

Moholy-Nagy's *The New Vision: Fundamentals of Bauhaus Design, Painting, Sculpture, and Architecture* offers a primer on the concept of the haptic unconscious. Based on his educational experiences and lectures at the Bauhaus and the 1928 publication, *Von material zu Architektur*, *The New Vision* was published in English in the United States, first in 1930 and then

in 1938 in conjunction with his recent post as Director of the New Bauhaus in Chicago (referred to henceforth as the Institute of Design or ID).¹¹ The book functioned as a basic textbook for incoming students of the ID in Chicago, bearing an introduction to the foundations of design. There, the haptic unconscious unfolds in Moholy-Nagy's language of what he called “functional organic design” and his will to embed tactility, the senses, and emotion into the design processes of utilitarian objects.¹²

Offering a layered invocation of sight, the words of the book's title – “new vision” – operate in at least two distinct ways. First, the phrase references Moholy-Nagy's socialist utopianism: the Constructivist influences of El Lissitzky and Theo Van Doesburg from his time in Berlin during the early 1920s, and the concomitant belief, or ‘vision,’ that art is an engine for positive and progressive social change working against the profligacy and injustices of capitalism.¹³ Second, it conveys Moholy-Nagy's thinking on technology. Similar to Benjamin, Moholy-Nagy thought photography, and by connection all modes of technology that interconnected with and mediated art, bodied forth a new fully integrated way of experiencing the world. As a matter of incorporation and totality, the teaching of design for Moholy-Nagy situated emotional response, sensuality, and tactility directly within student's familiarization with the basic materials and technological means of art. Inasmuch as learning to make art meant learning also about product design and display, filmmaking, lighting, architecture, and the latest ideas in science and technology, the act of making was defined according to a bio-technological integration with the world. According to Moholy-Nagy, functional organic design was based on “the practical exercise and pleasure in sensory experiences which lead[s]...to a security of feeling and...the creation of objects which will satisfy human needs which are *spiritual as well as utilitarian*.”¹⁴ He was explicit about the connections

between technological shifts, biological needs, the ability to affect social change, and the democratization of talent borne on the human senses. It is, in fact, here in the shared fabric of the human senses that we locate a central component of Moholy-Nagy's utopianism, for he believed "everyone is equipped by nature to receive and assimilate sensory experiences." Moholy-Nagy waxed philosophically about a democracy of creativity rooted in sensual attunement:

*Everyone is sensitive to the tones and colors, has sure touch and space reactions, etc. This means that by nature everyone is able to participate in all the pleasures of sensory experiences, that any healthy man can also become a musician, painter, sculptor, architect...*¹⁵

The senses, bodily responses to art and the machine, and science together constituted a totality of thought and possibility that, showing flickers of a socialist past,



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would constitute Moholy-Nagy's subtle form of resistance to and reform of American ways of capitalism and, eventually, a reciprocal mode of retaliation and ultimate rejection from the industrialists who made up the board of directors of the ID in Chicago.

Because the connecting point for humans in such totalizing integration was located in the individual senses, training at the ID began with tactile exercises based on a full range of physiological responses: the enteroceptive, or sensations coming from the outer world, proprioceptive, those from the muscles, "adjacent deep structures and from the labyrinth," and interoceptive, those arising from the internal organs.¹⁶ Several images of quasi-scientific works of art, variations on the "tactile meter," from both the German and American Bauhaus in the American version of *The New Vision*, show Moholy-Nagy's cultivation of a union of diverse materials and media and, more precisely, an idea of the art object as the catalyst of an interactive event. He was careful to specify that while the exercises have "nothing to do with scientific aims," they

might nonetheless function as the bases in the future of "more scientific testing in a laboratory."¹⁷ Thomas Flake's "Tactile Table In Four Rows of Sandpapers and Corresponding Diagram" (1928) looks remarkably like a two-dimensional laptop computer from the twenty-first century. [Image 1] Made at the Dessau Bauhaus, Flake's flat object consists of a slightly foreshortened keyboard and a screen-like piece of graph paper framed in black sandpaper. Inviting both looking and touching, there is a faint architectural diagram drawn in the graph paper in the top portion and the keys below are polychromatic, tempting fingers to run across the rough surface of the sandpaper below. From a decade later and the American incarnation of the Bauhaus, Alexander Corazzo's "A Tactile Symphony" (1937) and Francis Fairweather's "Tactile Chart" (1938) are sculptural and architectural in nature, suggestive of touchable and interactive landscape models. [Images 2–3] Sight is counterbalanced by touch as well as smell in Charles Niedringhaus's "Smell-o-meter" (1938), a mask-like device that had six small hoses from which blew six different odors. [Image 4] Each object elicits and embodies a union of the artificial and the organic, the mechanical and biomorphic.

Moholy-Nagy referred to this uniting of seemingly opposite forces as a "method of creative activity" called "biotechnics."¹⁸ Based on the ideas of the Viennese botanist and biologist Raoul Francé (1874–1943), the teachings of biotechnics encouraged students to look for prototypes of functionalism in nature, the key being that these prototypes were dynamic systems in flux. Francé defined the "biotechnik," Moholy-Nagy's preferred and the scientist's own word for what is today commonly referred to as "bionics," as "the study of living and life-like systems, with the goal to discover new principles, techniques and processes to be applied to man-made technology."¹⁹ Mentioned by Moholy-Nagy in two different sections of *The New Vision*, Francé's systems-based take on the bionic was

a conceptual building block in the greater edifice of his "doctrine of life," a totalizing ontological notion parallel to Moholy-Nagy's integration of sensual experience, materials, science and technology in the teaching of art.²⁰ For Francé, the life of the biotechnical organism was equally a matter of duration and the developmental unfolding of time. Rooted in Darwinian selection, Francé's concept of bionics linked the creation of engineering models to the *longue durée* of changes in nature because, in its teleological movement toward ever-better, ever-stronger realization and, hence survival, of form, a given slice of nature "enforces a selection mechanism to achieve optimal functioning."²¹

Francé's doctrine of life was a proto-ecological perspective in which he attempted to solve the problem of the expansion of civilization across the planet by connecting cellular and sensual properties in different species, showing the shared qualities, for example, in plants and mammals. By revealing the similarities between flora and fauna, Francé sought to interconnect seemingly divergent species in a horizontal rather than vertical network of being. Detlef Mertins links Francé's holistic and totalizing idea to the German penchant for a *Lebenslehre*, "a doctrine of life, a way of living, knowledge of how to live, and how to live well – in his terms, a healthy life too."²² For Moholy-Nagy, the integration of art, science, and technology promised a similar kind of organic equilibrium and happiness.

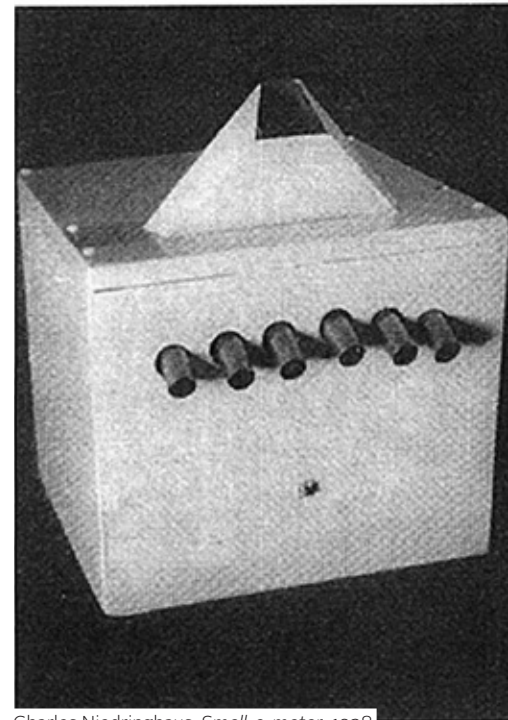
Moholy-Nagy brought biotechnics into the classroom with the hopes of propagating a new ecological relationship between humans and the world mediated by experimental art forms. Instead of isolated and consumable things, objects of industrial design and architecture might be considered as part of a continuum of affects and utility combined. In *The New Vision*, Moholy-Nagy quoted Francé, reinforcing to the students of the Bauhaus his idea that "all technical forms can be deduced from forms in nature."²³ It is an idea that further resonates with fellow Chicagoan Louis Sullivan's highly influential credo of the same era that "form (ever) follows function."²⁴ But unlike Sullivan's compact dictum, Moholy-Nagy included within his concept of organic functionalism forces of intuition, emotion, and existentialism, looking to Francé's psychobiology of plants for motivation. Known primarily for his research on plant life and soil ecology,

or edaphology, Francé found that common instances of “spontaneity” in plants and humans revealed shared “psychological capabilities.”²⁵ Francé’s thinking began to set in relief a concept of the ‘will’ for plant life. A force so unique, virtually a contradiction in terms, the will of a plant might teach humans about the will of the self. Moholy-Nagy’s thinking on the sensate and psychological artist was, thus, in part rooted in the psychological capabilities of plant life as deduced by Francé. At the same time, the ‘organic’ side of functionalism meant for Moholy-Nagy a panoply of existential response rooted in a political materialism, which included intuitive spontaneity as well as information about political economy, or as he put it “the psychological, social, and economical components of a given time.”²⁶

Though certainly a powerful force of influence on Moholy-Nagy, Francé’s thinking was not the only point of view informing his ideas of organic integration. The roots of Moholy-Nagy’s total vision of life, his personal and pedagogical *Lebenslehre*, are manifold, no doubt traceable to the nineteenth-century Wagnerian idea of the *Gesamtkunstwerk*, or total work of art, that became a contentious catalyst for architectural modernism tout court. In his later years living in Chicago, there were new and diverse philosophical influences modeling his idea of total educational integration, most of which emerged from the faculty of the University of Chicago. While in part coalescing from the ideas of professors teaching in Chicago, local Chicago industrialists supporting the ID would find fault with Moholy-Nagy’s lofty intellectual curriculum, pushing him to simplify an art school coursework that had become increasingly complex with its esoteric inclusions of science and philosophy.

3. INTEGRATION/DISINTEGRATION: MOHOLY-NAGY’S VISION AS A MODE OF RESISTANCE

Thus far in this essay I have explained the idea of the haptic unconscious as it emerged from Moholy-Nagy’s sensory-based organic functionalism at the Bauhaus. In like terms, the haptic unconscious is an integrative, connective, and ecological aesthetic concept, placing artists at the center of a sensual nexus, bio-technically connecting body to the world. While Moholy-Nagy’s life was cut short in 1946 at the age of 51, his colleague, friend, and fellow Hungarian Gyorgy Kepes carried forth these ideas after his death, teaching the aesthetic of the haptic unconscious in his years at the ID and after at the Center for Advanced Visual Studies [CAVS] at MIT until 1974 and publishing a related set of theories on vision, first in the ID textbook *Language of Vision* (1944) and later in the six-book *Vision + Value* series (1965–66). In the final part of this essay, I would like to link the haptic unconscious to the implicit politics of resistance at work in Moholy-Nagy’s integrated curriculum and development of an ecological sense of creative production. Resistance in the form of intellectual obduracy and ecological vision finds a spot in one half of dialectic, the back-and-forth of integration and disintegration, which in many ways describes Moholy-Nagy’s time in Chicago. Here, I link the difficult challenges of slow thought and biotechnics as it took form in Moholy-Nagy’s integrated curriculum to his subtle if not silent resistance to industrial capitalism. While he continued to find support for his ideas of a broadened and integrated curriculum of art, science, and technology in the collaboration of Rudolf Carnap, Charles Morris, and John Dewey, professors at the University of Chicago, the Chicago industrialists who financially backed the ID felt increasingly alienated by those very ideas.²⁷ They were two dynamic and necessary forces in the life of the ID under Moholy-Nagy’s brief aegis, one of intellectual influence and the other of economic possibility.



Charles Niedringhaus, *Smell-o-meter*, 1938.



By the mid 1930s, the American incarnation of the European-based unified science movement had taken hold at the University of Chicago. Lead by Rudolf Carnap, an actual veteran of the Viennese logical positivist movement from which it emerged, and the American Charles Morris, the unified science movement was an association of thinkers connected by their vehement anti-metaphysics and call for a lingua franca among all sciences rooted in a linguistic functionalism reminiscent of Ludwig Wittgenstein’s philosophy of language.²⁸ Unlike Moholy-Nagy’s organic and fluid sense of integration, the unified science movement was hardened by a scientific determinism, or what Viennese economist Otto Neurath called “physicalism.”²⁹ Yet, at the same time, the will to totalize present in the coupling of terms “unified science” brings to mind Moholy-Nagy’s vast vision of integration. Intellectuals in his arsenal of integration, Carnap and Morris taught at the ID under Moholy-Nagy’s directorship. Less tinged by such determinism and softened by an irrefutable sense of metaphysics, John Dewey’s philosophy of art as experience also encouraged Moholy-Nagy in his ongoing development of a broad-based interdisciplinary curriculum. Dewey, similarly teaching in the Philosophy Department of the University of Chicago, was a supporter of the ID and friend and advisor

to Moholy-Nagy.³⁰ That Dewey placed a philosophy of aesthetics at the center of his tentacular concept of experience, and that this sense of experience was part of a continuum of organic participation, modifications, and further concatenated experience, would have appealed strongly to Moholy-Nagy’s sense of ecological interconnection.³¹

At the same time, there was another sense of the dialectic at work in Moholy-Nagy’s complex and integrated curriculum. In what was to local supporters of the ID an abstruse and unnecessary obstinacy, the curriculum functioned something like the Freud-Marxist philosopher Theodor Adorno’s “negative dialectics.”³² Moholy-Nagy’s curriculum obstructed simple flows of capital in its intensification of artistic training through expanding requirements. As though slowing down assembly-line production, even potentially *negating* any such relationship it might have to laissez-faire capitalism, the demanding and dense nature of Moholy-Nagy’s Bauhaus educational structure instilled a deliberative flow of information and preparatory exercises in the formation of the artist. What were for Moholy-Nagy the necessary steps in the careful creation of an ecological network of connections between the artist, institution, new technologies, and meaningful

form, were cumbersome, complex, and inscrutable to Chicago industrialists. Ultimately, Moholy-Nagy's philosophies went over the heads of the financial backers of the ID. After running out of money the first year of existence in 1937, the New Bauhaus reopened in 1939 as the Chicago School of Design with the financial support of German industrialist and packaging magnate Walter Paepcke. World War II broke out, financial matters grew increasingly worse, and in 1944 the school's name was changed to the Institute of Design. Over these years there grew a stronger push from financial backers for Moholy-Nagy to reinforce the vocational aspect of the curriculum, ridding it of its rhetoric and reality of integration. He resisted this push, holding out for a broad based curriculum of art and science rooted in touch. "We refuse to promise a two-semester training for a breadwinning job," Moholy-Nagy explained to a group in Milwaukee in May 1945.³³ The struggle between an intellectual visionary and wealthy realists went on, and a little over a year later in November 1946, Moholy-Nagy succumbed to the cancer of leukemia, a blood disease that often strikes artists who have worked with toxic materials such as plastic without proper barrier or protection in the form of gloves and a mask. Years before, Moholy-Nagy had experimented with a variety of new grades of plastic in the making of works of art. In 1947, a year after his death, Moholy-Nagy's *Vision in Motion* was published. Though his final work, it is an expansion of long held socialist beliefs that he cultivated in Berlin some two decades prior.³⁴ It also marks the posthumous development of the haptic unconscious, or the idea of a technologically based tactile experience of vision – the image as experience – from light-optics in art to the automobile and highway.³⁵ As a vehicle of integration, that is to say, a book that describes the dynamic forces of art as experience and relation to the world, it bears the fire of resistance in the form of the haptic unconscious and vision as a kinetic unfolding. ■

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