

Not Just Smoke and Mirrors:

A Brief History of Light and Motion in Art in Relation to the Work of rAndom International

Edward A. Shanken

Investigations into the nature and perception of motion, light, time and space form a nexus at which art, science and philosophy are deeply intertwined. Significant innovations – from perspective to photography to virtual reality – have occurred at this complex interdisciplinary crossroads. As rapid technological advances and corresponding social practices force further conceptual and aesthetic shifts, the work of rAndom International pushes the limits of expression, perception, cognition, and human-machine relations. Such artistic experiments constitute a “psychic dress-rehearsal for the future.”¹

Since the Paleolithic cave paintings of running animals at Lascaux, artists have used static media to imply and represent the vitality of entities in motion. Drawing on the physiological phenomenon known as persistence of vision, eighteenth and nineteenth century inventions such as zoetropes and kinoscopes animated a sequence of drawings, enabling the viewer to perceive motion smoothly unfolding over time, laying the foundation for the development of cinema in the mid-1980s. Photographer Eadweard Muybridge, who experimented with such stroboscopic devices, accomplished the reverse in the 1870s through high-speed chronophotography. His stop-action techniques – like those of contemporary Etienne Jules Marey – captured motion as a sequence of still images, metaphorically freezing time and enabling perception of micro-temporal instants beyond the capacity of the naked eye.

A combination of technological and scientific developments in the nineteenth century resulted in new understandings of light and visual perception. This provoked substantial innovations in art. Amidst the popularization of photography, many artists shifted focus from rendering likenesses of objects and the effects of light on them to capturing and giving visual form to the sensate experience of how light affects the human

¹ Jack Burnham, *Beyond Modern Sculpture*, 1968, p 376.

eye. Impressionist painting, for example, was bound up in scientific understandings of perception that recognized the subjectivity of vision as mediated by the eyes and brain of the viewer. The faddish success of stereo-photography beginning in the 1870s, which enabled viewers to experience 3-D images through stereoscopes, reinforced the popular conception of visual perception as a highly mediated act. Correspondingly, Impressionism, and later, Pointillism, demanded that viewers play an active role in the perception of art, forming coherent images from dabs or dots of paint. In this respect, the growing emphasis today on the phenomenology of immediate experience, and on interactivity and participation, can be seen as an outgrowth of developments in science, art, and popular culture, occurring over 100 years ago.

Building on these 19th century aesthetic shifts, artists have used various forms of electric light as a genuine artistic medium since 1920. They have, moreover, explicitly integrated motion and duration into works that can only properly be perceived as a temporal experience. The traditions of kinetic and op art, experimental music and film, happenings and performance, and diverse strains of art and technology, have become increasingly incorporated into contemporary art practices. In this lineage, rAndom International (rAI) responds to recent developments in cognitive science and emerging technological media by creating work that examines the limits of human perception and that explores the phenomenology of embodied behaviour and interaction.

Marcel Duchamp's *Rotary Glass Plates (Precision Optics)* (1920) incorporated a series of five painted glass plates mounted on a motorized shaft. Spinning at high speeds, this early artistic experiment in human perception created the appearance of a spiral in motion, twisting outward from the centre. The work thus required motion and time to produce a dizzying effect in the viewer, creating, as well, an awareness of the interdependence of motion, duration, and perception. Building on an enduring fascination with synaesthesia and light-organs, Thomas Wilfred's *Clavilux* (1922) enabled the artist to perform with light; the movement, hue and intensity of which he modulated via an organ keyboard controlling six projectors and an array of reflectors. Wilfred's later *Lumia* cabinets, the visual equivalent of player-pianos, displayed complex compositions of coloured light on an integrated screen. Such devices anticipated light shows at rock concerts beginning in the 1960s and the

visualization software that transforms digital music files into undulating patterns on computer screens. In common with rAI, these artistic experiments with and popularizations of synaesthesia and optical phenomena seek to expand human perception.

Considering the work of rAndom International in the context of these and other precursors offers insights into the significance of the group's work. Lazslo Moholy-Nagy's *Light-Space Modulator* (1923-30) not only pushes the temporal dimensions of art but expands its spatial dimensions into the entire environment, including the viewer, who becomes a surface onto which light is reflected. Electric motors set Moholy's shiny steel sculpture in motion while electrical illumination in the gallery reflected light off of it and into its surroundings. Similarly, in various iterations of Otto Piene's *Light Ballet* (1959-60), electric light shone through perforated cardboard, appearing in "manifold projections" that danced and floated "around entire rooms." Variations in the projections were introduced either manually by Piene and others or mechanically. Of key importance to the artist were the physical and emotional experiences of the viewers, who expressed "feelings of tranquility, suspension of normal balance and an increased sensation of space ... after finding themselves in the center of the event."² Piene's *Light Ballet* shares an important goal of rAI: "to evoke emotion through movement in the viewer,"³ to make us more aware of ourselves, our bodies, and our perceptions as a result of encountering and interacting with their work. He claimed that the mechanical version of the Light Ballet "lost spontaneity and gained steadiness." In losing an aspect of its humanity, it was not able to engage the audience as deeply. rAndom International merges the mechanical and the organic in order to create compellingly spontaneous interactive experiences. Indeed, the capitalization of the letters "A" and "I" in the collective's name suggests the abbreviation for artificial intelligence, popularly known as AI: a field of computer science devoted to emulating human cognition through mechanical means. rAI's software is carefully designed and calibrated in such a way that their works respond in ways that are sufficiently steady but always possess an organic quality that engages the viewer. In this way, rAI seeks to evoke human emotion in the audience through the simulated emotion programmed into their installations.

² Otto Piene, *Piene: Light Ballet* (exhibition catalog) New York: Howard Wise Gallery, 1965, p. 3-4. Cited in Burnham, *Beyond Modern Sculpture*, p. 295-6.

³ Hannes Koch, Skype interview with the author, 1 August, 2012.

The historical roots of artistic investigations that emulate (or mirror) cognition and behaviour can be found in a branch of kinetic art that was significantly influenced by the interdisciplinary science of cybernetics. Cybernetics, which conceived of both animals and machines as systems of interconnected feedback loops, was closely affiliated with early research on artificial intelligence and robotics. Neo-constructivist Nicholas Schöffer's sculptural automaton, *CYSP I* (1956), could interact with and move around its environment. Roughly human in scale, it exhibited life-like behavior by responding to sound and motion, drawing the viewer into the experience of the work as an active participator. *CYSP* was first presented as part of a multimedia performance, in which the cybernetic robotic sculpture "danced" with the Maurice Béjart ballet company on the roof of Le Corbusier's Cité Radieuse in Marseille, accompanied by concrete music composed by Pierre Henry. Like *CYSP*'s maiden voyage, and in accord with Piene's observations about the relationship of spontaneity and human emotional response, the premiere of rAI's *Future Self* incorporated dancers choreographed by Wayne McGregor and a responsive music composition by Max Richter. The dancers, whose bodies were doubled as a holographic presence in the LED installation, interacted with each other and with their own reflections in a virtual 3-D mirror, performing a luminous image that joined their gestures in a composite identity. In accord with the founding principles of cybernetics, *CYSP I* and *Future Self* draw parallels between humans and machines, joining them together in a system of interconnected feedback loops that generates spontaneous behaviour and invokes profound emotions in the audience.

The technological means rAI employs – gleaming brass rods, LEDs and Lumiblades, state-of-the-art optical imaging systems - immaculate and pristine in their industrial perfection, provide a striking external interface. Moreover, Artist Mario Merz has described artificial light as the "comprehensible representation of the human mind," which makes it an ideal medium for rAI's interactive installations involving artificial forms of intelligence and emotion. But the inner beauty of their work lies in the ghost in the machine, the artificially intelligent force that animates it, that brings it to life, so to speak. In *Swarm Light* (2010), for example, collective swarming behaviour – a natural phenomenon commonly exhibited by animals - is emulated in thousands of LEDs that respond to sound from the audience, generating a 3-D pattern of light that flows between three virtual cubes suspended from the ceiling. Indeed, it is the humanity of their work's simulated emotions,

the seeming naturalness of its behaviour, that heightens our perceptual awareness, excites our curiosity, and evokes playful, complex, and enduring human emotional responses. As artist Roy Ascott wrote in 1967, “When art is a form of behaviour, software predominates over hardware in the creative sphere. Process replaces product in importance, just as system supersedes structure.” By combining form and function to create a responsive system, rAI provokes us to move our bodies in public, to become unselfconsciously engaged with our environment, to interact with strangers and even stranger machines. Ironically, by mirroring human emotions and behaviour, their work encourages us to “step out of our normal behaviour, to forget ourselves.”⁴

Mirrors function in rAI’s work both metaphorically and concretely. Artist David Rokeby suggests that in the mirror of interactive art we can discover our ‘selves’ in relation to the world:

... an interactive technology is a medium through which we communicate with ourselves... a mirror. The medium not only reflects back, but also refracts what it is given; what is returned is ourselves, transformed and processed. To the degree that the technology reflects ourselves back recognizably, it provides us with a self-image, a sense of self. To the degree that the technology transforms our image in the act of reflection, it provides us with a sense of the relation between this self and the experienced world.⁵

Similarly, psychoanalyst Jacques Lacan theorized that the mirror-stage of human development served to “establish a relation between the organism and its reality – or, as they say, between the *Innenwelt* [inner world] and the *Umwelt* [outer world].”⁶ In the Royal Opera House installation of *Audience* (2008, in a collaboration with Chris O’Shea), the sensing system first selects a particular member of the audience, then an array of 64 mirrors turns to face that individual. As s/he moves, the mirrors change position in synchrony in order to follow the individual with their reflective “gaze.” Although one might imagine strong suspicions, if not concerns, about being surveilled, *Audience* provokes extraordinarily

⁴ Hannes Koch, Skype interview with the author, 1 August, 2012.

⁵ David Rokeby, “Transforming Mirrors: Subjectivity and Control in Interactive Media” in Simon Penny, ed. *Critical Issues in Electronic Media*. (Albany: State University of New York Press, 1995): 133.

⁶ Jacques Lacan, “The mirror stage as formative of the function of the *I* as revealed in psychoanalytic experience” in *Écrits* (Paris: Éditions du Seuil, 1966): 4.

playful responses from the audience. Such work explicitly challenges conventional artistic relationships between viewing subject and viewed object. In *Audience*, the viewing subject is “viewed” by the artwork and is thus transformed into an object in several ways. His/her body is literally incorporated into the piece as an image reflected in the mirrors, as a physical object amidst the installation, and as a data object that triggers the behaviour of the work. The viewer is viewed not only by the *Audience* but also by other members of the audience, all participating in an exploration of the “relation between this self and the experienced world.” Similarly, rAI’s *Study of You* (2011) is an electronic mirror, which, as the artists state, allows viewers “to experiment with [their] own self-perceptions through personal and physical performative actions... to explore a different side of their own reflection and identity; as though looking through a window to another reality.”⁷

⁷ Random International, *Study of You* documentation on artist’s website. <http://random-international.com/work/study-of-you/>