Polemics Of Contemporary Kinetic Art History: Duration, Systems Aesthetics and the Virtual.

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ABSTRACT

This thesis addresses a number of roles and effects of kinetic art in contemporary art history. Even though the use of actual movement is common across a variety of artistic disciplines, the term ‘kinetic art’ has often been regarded as a forgotten and obsolete avant-garde practice that has come to be considered in art history as a modern mechanical precursor to contemporary media art practices. Recently, however, a number of artists and art institutions have focused on avant-garde and contemporary kinetic art to capture some of the changing conceptions of temporality and inform a consciousness of contemporaneity today. This renewed attention to kinesis in art highlights some of the misconceptions that are central to considering kineticism as an antiquated historical practice, such as Michel Fried’s resistance to duration in art, Jack Burnham’s appropriation of general systems theory, and Frank Popper’s approach to demateriality and virtuality. By drawing from artists that use movement to expand the perceptions of temporality in their art, such as Jean Tinguely, Hans Haacke, Anthony McCall, László Moholy-Nagy and Olafur Eliasson, this thesis argues that the effects of movement can be both material and immaterial, emergent and incipient with the ability to communicate systems aesthetics. This approach to kinetic art also contributes to understanding a broader consciousness of time in contemporary art and is relevant to those interested in ongoing conceptualisations of temporality in art, contemporary art history, media art theory, modernity, contemporaneity, and kinetic sculpture.
DECLARATION

Having completed my course of study and research towards the degree of Doctor of Philosophy, I hereby submit my thesis for examination in accordance with the regulations and declare that the thesis is my own composition, all sources have been acknowledged and my contribution is clearly identified in the thesis.
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INTRODUCTION

A PECULIAR CONSCIOUSNESS OF TIME


Exhibiting Kinetic Sculpture to Contemporary Audiences

This thesis focuses on how kinetic sculpture can provide a consciousness of temporality in art history today. The term ‘kinetic sculpture’ is often used in contemporary art history to refer to the work of avant-garde artists who were interested in the orchestration of movement with mechanical media.¹ For example, the exhibitions Force Fields, Phases of the Kinetic (2000) was publicised as ‘an investigation of movement in art, which in the mid-twentieth century became obscured by waves of more fashionable movements’.²

Similarly, *Ghosts in the Machine* at the New Museum in New York (2012) was projected as ‘an unsystematic archive’ that displayed a ‘cabinet of curiosities’ made by artists of past technological ages. In these instances the term ‘kinetic’ is coded as an historical and formal experimentation with an industrial machine aesthetic in art, one that reached a climax in popularity during the 1960s, and is now remembered with nostalgia as a trend ‘rooted in another age’ that came and went quicker than a ‘flash in the pan’ in the 1960s. Even though the use of actual movement in art is common to a variety of contemporary art practices, the terms ‘kinesis’, ‘kinetic’, and ‘kineticism’ have been used to describe the movement of industrial machines in art that acts as an art historical precursor to the ‘more refined’ contemporary media art practices.

The view that kinetic art is an obsolete modern antiquated practice that has little relevance to contemporary society has been long-standing, and has contributed to what Arnauld Pierre has described as a long-standing ‘flagrant dearth’ of critical and historical engagement with kinetic art. One of the first art historians to consider kineticism as an outdated practice was Jack Burnham in *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of this Century*. Burnham argued that prior to 1968 kineticism had the potential to become a dominant artistic practice that intersected with science, art and technology. However according to Burnham, artists were ultimately ‘unrequited’ in their aims because many of them did not reflect on the emerging technological aesthetic at the time and became marginalised by emerging artistic practices, theory, and criticism.

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9 Burnham, *Beyond Modern Sculpture*, pp. 218-221.
In addition to this, Burnham’s essay ‘Systems Esthetics’ focuses on the new emerging conceptual and technological tendencies in art during the 1960s that has influenced contemporary approaches to kinetic sculpture and systems theory in art.\(^\text{10}\) In both publications Burnham argues that kinetic artists were unable to remain relevant to the emerging tendencies in art at the time. Even though Burnham retired as an art critic and historian shortly after the publication of *Beyond Modern Sculpture*, his arguments in relation to art, science, and technology have remained influential in the field of media art history\(^\text{11}\) and contemporary art criticism. As Caroline Jones recently wrote in *Artforum*, Burnham’s work has come ‘to define some of the most significant cultural developments of our time’ that ‘suffuses the art world as we know it’.\(^\text{12}\) Considering this, Burnham’s approach to modern sculpture affects not only an understanding of kineticism, but also the wider milieu of contemporary art theory and history.\(^\text{13}\)

Art historians such as Jeremy Benthall and Frank Popper have cast similar attitudes to Burnham’s criticism, although they were more sensitive to the effects of kinetic art in subsequent media art practices. In 1972 Benthall commented that kineticism inevitably would not continue, but would become a tendency from which new practices would be borne.\(^\text{14}\) Additionally, Frank Popper has argued that kinetic sculpture and installation is remembered as an early mechanical precursor to ‘more refined’ digital and contemporary technological art practices.\(^\text{15}\) Frank Popper’s *Origins and Developments of Kinetic Art* remains the most comprehensive analysis of kineticism in contemporary art history to date. For Popper, kinetic art is centred on the aesthetic of ‘movement expressed by movement

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itself…as an attempt to incorporate the notion of space-time in the plastic work’,\textsuperscript{16} and is considered as an early mechanical experiment that became absorbed by digital art practices such as virtual art. Many contemporary scholars such as Shanken, have since treated Popper as a pioneering historian in the field of art and technology.\textsuperscript{17} Even though the term ‘kinesis’ refers to any form of dynamic movement of any media technology, Burnham, Benthall, and Popper consider kinetic art as an orchestration of movement by modern mechanical media.\textsuperscript{18} This technological distinction therefore restricts kineticism to a specific mechanical age, and is a key contributing reason why kinetic art has been associated as an antiquated aesthetic that has not often continued through to discourses of contemporary art and technology.

Consequently, even though the use of actual movement in art is common to a variety of contemporary art discourses, kineticism is often referred to as the movement of industrial machines in art that forms an art historical precursor contemporary media art practices.\textsuperscript{19} These assumptions are often drawn in contemporary art history to build a genealogy of the influences and artistic milestones that chronologically lead toward the contemporary milieu of media art.\textsuperscript{20} The attitudes projected by Benthall, Burnham, and Popper, have been influential in contemporary media art history. Their influence raises a number of

\textsuperscript{16} Popper, \textit{Origins and Developments of Kinetic Art}, p. 221.


\textsuperscript{19} Popper, \textit{From Technological to Virtual Art}, p. 1. Although contemporary artists often used movement in contemporary sculpture and installation, the term ‘kinetic’ as an historical term is often used to describe efforts of avant-garde mechanical movement. See: J Burnham, \textit{Beyond Modern Sculpture}, p. 219.

\textsuperscript{20} For instance, Peter Weibel has studied kinetic art as an early mechanical experiment to what is now regarded as algorithmic, interactive, and virtual art.. See: Weibel, P, ‘It is Forbidden Not to Touch: Some Remarks on the (Forgotten Parts of The) History of Interactivity and Virtuality’, \textit{MediaArtHistories}, Cambridge, Massachusetts, The MIT Press, 2007.
questions regarding the roles and effects of contemporary kinetic art history, which this thesis moves from.\textsuperscript{21}

A number of recent exhibitions have echoed Burnham’s approach by framing kinetic art as a marginalised and forgotten artistic experiment with mechanical media. At times these exhibitions use the term ‘kinetic’ to refer to a forgotten historical practice that is ‘rooted in another age’.\textsuperscript{22} In some situations, such as \textit{Force Fields: Phases of the Kinetic}, the curator, Guy Brett, returned audiences to a ‘forgotten’ preoccupation with movement by modern artists, in order to reflect on the changing conceptions of movement, time and perception.\textsuperscript{23} Shown at the Museu d’Art Contemporani de Barcelona (MACBA) and the Hayward Gallery in London, Brett aimed to reintroduce audiences to avant-garde kineticism through \textit{Force Fields}.\textsuperscript{24} The exhibition included early European kinetic sculptures such as Marcel Duchamp and Many Ray’s \textit{Rotary Glass Plates [Precision Optics]} (1920), László Moholy-Nagy’s \textit{Light Space Modulator} (1922-1930),\textsuperscript{25} as well as kinetic works by Alexander Calder, Sol LeWitt, Len Lye, Hans Haacke, Jean Tinguely, Lygia Clark, Hélio Oiticica, Julio le Parc, and David Medalla. According to Brett, artists such as these were included to ‘reintroduce us to an investigation of movement in art which in the mid twentieth century became obscured’\textsuperscript{26} and are at times thought of as forgotten misfits.\textsuperscript{27}

Other exhibitions that return to earlier avant-garde kinetic experiments include \textit{Shakin’ The Contemporary Kinetic Aesthetic} (2012), at the Gold Coast City Gallery, Australia; \textit{The

\textsuperscript{21} It is important to note that the engagement with kineticism is particularly influenced by Jack Burnham’s titled, ‘The Unrequited Art’. See: Burnham, \textit{Beyond Modern Sculpture}, ‘The Unrequited Art’, pp. 218-284.


\textsuperscript{24} \textit{Ibid.}, p. 313.

\textsuperscript{25} Riding, ‘Arts Abroad: Retro or Nostalgic, the Work Never Stops Moving’.


Pleasure of Light: György Kepes and Frank Malina at the Intersection of Science and Art (2010), at the Ludwig Museum in Budapest; Zero: Artists of a European Movement (2006), at the Museum der Moderne in Salzburg; Beyond Geometry: Experiments in Form 1940s to 1970s in 2004 at the Los Angeles County Museum of Art (LACMA); as well as Geometry of Motion: 1920s/1970s (2008), at MoMA, New York, and Luce e Movimento (2010) at the Signum Foundation, Venice. These exhibitions were each publicised as an homage to early avant-garde kinetic artists. While Luce e Movimento paid particular attention to the works and artists that exhibited with the Denise René gallery in Paris during the 1950s and 1960s, Geometry of Motion focused on what the curator described as artists of a ‘neue optik’ or ‘new vision’ in the 1920s and situational aesthetic artists of the 1970s.28

Ghosts in the Machine at the New Museum in New York exhibited a variety of contemporary and historical artworks that aimed to investigate artists interested in mechanical, optical, and virtual art. The exhibition was interpreted by some as an historical exhibition that was ‘a little short on living, breathing artworks, and slightly overloaded with rather stale ones and other objects and diagrams that, altogether, function primarily as interesting period pieces or historical artifacts’.29 The exhibition included a strong focus on kinetic artworks to represent ‘a prehistory of the digital age’30 to be considered ‘a cabinet of curiosities’,31 full of ‘neglected objects’.32


32 Smith, ‘Technology Advances, Then Art Inquires: Ghosts in the Machine at the New Museum’.
However the initial impetus for this thesis began with a number of recent exhibitions that have regarded avant-garde kinetic art as a means for reflecting on the changing conceptions and expressions of temporality over time. More specifically this thesis is centred on the use of movement in contemporary art history as an instrument to express and orchestrate new perceptions of temporality with mechanical and digital media.

There has been a recent focus on avant-garde kinetic art history across a number of exhibitions that suggests that kineticism produces a range of effects that affect and relate to contemporary society in a specific way. For instance, *Vibration, Vibração, Vibración: Latin American Kinetic Art of the 1960s and 70s*, at the Power Collection, University of Sydney in 2004, incorporated a number of artworks that have come to affect contemporary interpretations of kineticism. Curated by Susan Best, the exhibition presented a renegotiation of Latin American kinetic art that ran parallel to dominant Western tendencies in contemporary art history. Best’s curatorial selection presents these artists as participating in ‘alter-forms’ and tendencies related to movement.33 Best’s approach contradicts Pierre’s exclamation that there is a current absence of critical and historical studies of kinetic art. The contemporary reflection in *Vibration, Vibração, Vibración* offers a renewed historical perspective of the role and effect of kinetic form. For Best, avant-garde Latin American kinetic art underwent patterns of ‘survival and revival’ that did not refer to the dominant reception of kineticism in Europe and North America.34

Similarly, *Points of Contact* (2010) at the Govett Brewster Gallery in New Plymouth, New Zealand, incorporated works by Hélio Oiticica, Len Lye and Jim Allen to reconsider connections between kinetic and conceptual art in the country.35 As stated in the exhibition’s press release, post-object tendencies ‘unlike its American counterpart derived

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34 Ibid., p. 7.

not from minimalism’ in New Zealand. Points of Contact instead considered conceptual art to have emerged from kinetic sculpture and kinetic environments.  

The exhibition *Moving Parts: Forms of the Kinetic* at the Graz Kunsthaus (2004) attempted to draw stronger connections between kinetic and contemporary sculpture in order to reflect how the experience of mechanical movement has ‘come to appear as everyday normality to us’.  

The exhibition focused on early kinetic artists such as Jean Tinguely, Hans Haacke, George Rickey, and Julio le Parc, alongside contemporary kinetic works by Olafur Eliasson, Rebecca Horn, and Jeppe Hein, to highlight ‘a renewed interest in the possibilities of kinetic forms’. The exhibition also emphasised that a contemporary art historical survey of kinetic art is necessary in order to contribute ‘to a better understanding of current approaches’ to movement, time and the machine aesthetic in contemporary art.  

Additionally, *Under Destruction* (2010), at Museum Tinguely in Basel, was a commemorative exhibition for Tinguely’s auto-destructive work, *Homage to New York* (1960). The exhibition incorporated emerging contemporary artists that resonated and continued Tinguely’s approach to movement and time in contemporary contexts. Finally, several biennales, art fairs, and symposia have emphasised a desire to renegotiate of the contemporary art history of kineticism. This is inclusive of the annual art fair orchestrated by the Kinetica Museum since 2009, and the 2013 International Kinetic Art Exhibit and Symposium at Boynton Beach in Florida.

These exhibitions were constructed to seek new histories of avant-garde kinetic sculpture and connect them to contemporary interpretation because they inform and express aspects

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36 Ibid.
40 Ibid., p. 17.
of contemporaneity today. They are also indicative of what art historian Edward Shanken has recently identified; that the traditional forms of kinesis from the early modern avant-garde have ‘increasingly become incorporated into contemporary art practices’. New methods for interpreting, recalling and historicising kinetic sculpture have begun to incorporate kineticism within the frameworks of contemporary art and art history. The exhibitions that I have addressed are evidence of this incorporation on an institutional level. They also demonstrate that the dearth in critical and historical engagement with kineticism that Pierre has identified is undergoing a process of review and new understandings between avant-garde kinesis and contemporary art are emerging.

Peculiar Time, Contemporaneity and Kinetic Sculpture

While all works of art present or represent to time in some way, kinetic art is an orchestration of movement that unfolds in duration with the viewer. It enables an expression of time in a way that is specific to the medium. To experience a kinetic artwork one must take time and move with it in duration, to (potentially) perceive movement in time in new ways. This association between actual motion in sculpture and time has been a persistent theme in art throughout the twentieth century. From as early as 1919 Russian constructivist Naum Gabo called upon his audiences to break away from traditional modes of producing and consuming art and instead focus on the present temporality. Gabo explicitly expressed this urge through his kinetic sculpture, Kinetic Construction: Standing Wave, and his Realistic Manifesto, which expressed the need for actual, rather than representations of movement as a revolutionary form of art:

The attempts of the Cubists and the Futurists to lift the visual arts from the bogs of the past have led to only new delusions. …We assert that the shouts about the future are for us the same as the tears about the past: a renovated day-dream of the romantics…Today we take the present.

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42 Shanken, ‘Not Just Smoke and Mirrors: A Brief History of Light and Motion in Art in Relation to the Work of random International’.
In the late 1950s and early 1960s Jean Tinguely created auto-destructive mechanical landscapes and urged people to ‘[l]ive in the present, live once more in time and by Time [sic] – for a wonderful and absolute reality…Stop painting “time”…live in time and according to time for a wonderful and absolute reality’. More recently, contemporary artists such as Olafur Eliasson have also used movement in installation art in order to discuss the subjective perception of ‘now’ and the effects that movement gives and enables audiences to ‘perceive yourself perceiving’ in the present temporality.

Attention to the relationship between movement and temporality produces a number of questions around the changing interpretations of modern kinetic art and its relationship to contemporary art, particularly in the areas of conceptual, participatory art, and the machine aesthetic. The central thesis of this dissertation is that a re-evaluation of the relationship between kinetic art and time is valuable for understanding to multiple approaches of contemporaneity in art today. This reconsideration also opens new avenues for understanding the roles and effects of kineticism in art today that intersect with art historical approaches to mechanical, and digital media arts. Therefore, rather than approaching kinetic art as an predecessor to media art today, this thesis is focused on kinetic art as a tool for exploring the nature of contemporaneity over time.

It is apparent, then, that there is a tension between two broad approaches to kinetic sculpture in contemporary art today. While Burnham and Popper’s scholarship have often been influential criticisms of kineticism in relation to media art practices today, there is also a clear contemporary tendency to incorporate kinetic art into discussions that reflect on the nature of art and society today. This tension points to a number of questions around the changing roles and effects of kinesis in art, and suggests that a further analysis of kineticism and its relationship to contemporaneity is needed in order to further understand aspects of contemporary art.

In order to engage with the effects of movement and time in art today, an understanding of the contemporary approaches to art and art history must first be addressed. As expressed

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by Hal Foster in ‘Questionnaire on “The Contemporary”’ recently in *October*, an understanding of contemporary art today is under defined. Foster explains that contemporary art today:

[S]eems to float free of historical determination, conceptual definition, and critical judgment. Such paradigms as ‘the neo-avant-garde’ and ‘postmodernism,’ which once oriented some art and theory, have run into the sand, and, arguable, no models of much explanatory reach or intellectual force have risen in their stead. At the same time, perhaps paradoxically, ‘contemporary art’ has become an institutional object in its own right…most tend to treat it as apart not only from prewar practice but from most postwar practice as well.\(^{47}\)

In light of this open and under formed understanding of the characteristics and processes of contemporary art, many scholars have attempted to clarify the ambiguous, re-forming and complex state of art today.\(^{48}\) For instance, Terry Smith in *What is Contemporary Art?* proposes a method for unraveling some of the key tendencies that have emerged in art since the early 1990s. What is most useful specifically to this thesis is Smith’s interest in the expressions of contemporaneity today. Smith delineates three general and interweaving currents that have formed since the early 1990s.\(^{49}\)

For Smith, one of these tendencies points to artists and institutions that recall and resensationalise modern approaches to art that contributes to a specific characteristic of contemporary art today.\(^{50}\) The extent to which contemporary art sensationalises modern tropes of art also suggests that contemporary society is an extension of modern society rather than a tendency that returns to or refashions an historical modernity. While postmodernity is at times regarded as a chronological and theoretical addition to modernity, it is also considered, as Frederic Jameson explains, to be a distinct framework

\(^{47}\) H Foster (ed.), ‘Questionnaire on “The Contemporary”’, *October*, vol. 130, 1999, p. 3.
\(^{50}\) *Ibid.*, pp. 241-271. This current of artists is one of three interweaving currents within Contemporary Art that Smith delineates.
that destabilised the power structures laden within modernity, leaving contemporary art and theory in a posthistorical state. Contrary to this, Jameson has recently argued that contemporary society expresses a number of modern processes that exist within it. As with Jürgen Habermas who understands modernity as a system that is endless in nature Jameson argues that the themes of universality, progress, colonisation and reproduction continue in the present day, suggesting that contemporary art and society are consequently characterised by modern aims.

According to Smith, a number of artists and institutions today pursue a modern avant-garde tradition of seeking newness by creating art that produces new effects. They experiment with the formal traditional expectations of art and attempt to confront modes of representation. These artists and institutions ‘pursue the key drivers of modernist art: reflexivity and avant-garde experimentality’ and political contexts and depend on modern avant-garde tendencies in order to elaborate on contemporary society. This tendency is what Smith refers to as ‘remodernism’; and, at times, he uses ‘resensationalism’ to refer to artists and institutions that perpetuate and re-form modern approaches to creating and interpreting art. This is inclusive of Richard Serra, Julien Schnabel, the Young British Artists (yBAs), Matthew Barney, Cai Guo-Qiang, Gerhard Richter and Jeff Wall and

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57 Smith, What is Contemporary Art?, p. 265.

58 The Young British Artists (yBAs) predominantly consists of graduates from Goldsmiths College in London 1988 who in the same year showed in the exhibition Frieze. Although the core artists of the ‘yBAs’ initially exhibited in Frieze, the group expanded during the
institutions such as DIA Foundation, Tate Modern and the refurbished Museum of Modern Art in New York. While Smith’s argument is specific to these artists and institutions, his method for approaching contemporary art today raises questions around further aspects of remodernism at play. More specifically for the focus of this thesis, there is potential to discuss the role and effects of avant-garde kinetic art as being remodernised by contemporary artists and institutions in order to discuss, express and orchestrate old and new perceptions of temporality through art in order to further understand the nature of contemporaneity in society today. Smith’s approach to contemporary art forms a critical basis for this thesis because of his emphasis on modern tropes in art at play within the schema of contemporary art and contemporaneity. What is most useful to Smith’s understanding, particularly for the focus of this thesis, is that it can be used as an opening for considering the role and effects of avant-garde kineticism and relationships between kinesis and contemporaneity.

Smith is not alone in identifying modern trends within the milieu of contemporary art. Nicolas Bourriaud argues, for example, that contemporary art is embarking on a phase of ‘altermodernism’ and considers contemporary art as a new form of modernity. In 2009 Bourriaud curated the third Tate Triennial titled Altermodern, and proposed that the artists explore the current globalised world as a form of new universalism. However, unlike Smith’s description of an antonymous, plural, evasive, and contradictory contemporary art, Bourriaud focuses on the themes of global society, migration, multiculturalism, identity and communication to form a new singular modernity expressed through contemporary art.

These observations also indicate that a wider social and political conception of temporality is in a state of transition, and it is this state of transition that has come to characterise

exhibition Brilliant! (1996) and Sensation (1997). Amongst others, the yBAs includes Damien Hirst, Tracey Emin, Angela Bulloch, Gary Hume, Richard Patterson, and Carl Freedman


60 Ibid., pp. 23-24.

61 Ibid., pp. 11-25.
contemporary art.\textsuperscript{62} Considering this, kinetic movement functions more than a machinic art,\textsuperscript{63} but is also used to explore the nature of contemporaneity in current society. This is particularly prevalent when considering Pamela Lee’s argument, in \textit{Chronophobia}, that contemporary society since the 1960s has tended to produce phobic expressions of temporality, as well as Erin Manning’s study of movement that moves from a state of preacceleration.\textsuperscript{64} Lee and Manning not only present studies of motion, actual movement and time-based arts, but they also consider contemporaneity to be a specific engagement with being with time in art today. Lee has argued that artists in the 1960s have enframed contemporary expressions and reactions to self-reflexive engagements with temporality in art and she uses a Bergsonian approach to defining time, one that is absolute and eternal.\textsuperscript{65} While Lee may have used Henri Bergson as a philosophical tool for engaging with time because his concept of duration as a subjective temporality is one of the most versed, her analysis also facilitates a modern approach of time in contemporary art.\textsuperscript{66}

Similarly, Manning’s approach to incipient movement articulates the immanence of movement moving.\textsuperscript{67} She addresses preacceleration through various practices to indicate that there is a strong exploration of movement by artists, for which conceptual language lacks a modality for interpreting. Her attempt to fill part of this void is done so from the perspective that depends on a concept of thought in motion, or writing with the ‘force of movement moving’.\textsuperscript{68} Unlike Lee, Manning has resisted a chronophobic reading of time-based arts that understand time and movement predominantly as tools for displacement by modern and contemporary artists.\textsuperscript{69} Her analysis borrows from Henri Bergson, Gilles


\textsuperscript{63} \textit{Ibid.}, pp. 93-101.


\textsuperscript{65} \textit{Ibid.}, pp. 259-309.

\textsuperscript{66} \textit{Ibid.}, p. 259.

\textsuperscript{67} Manning, \textit{Relationscapes: Movement, Art, Philosophy}, p. 54.

\textsuperscript{68} \textit{Ibid.}, p. 3.

\textsuperscript{69} \textit{Ibid.}, pp. 13-27. In \textit{Chronophobia} Lee argues that since the 1960s there has been a suspicion around the conjunction of time and technology in art and society. See Lee, \textit{Chronophobia}, pp. xiv-xviii.
Deleuze and Félix Guattari to create an opening for building a language that is devoted to
the elastic sense, actuality and perception of movement across multiple media art practice.

Smith, Bourriaud, Lee and Manning each provide commentary on the tendencies within
current society in art, as well as its changing relationship with temporality. Their approach
to temporality in contemporary art and society also informs key critical aspects to my
approach to kinetic art and art history today. Even though there are many differences
among their arguments, they form contributions to a larger discussion of the peculiar
relationship to the present temporality in art today. Manning and Lee have drawn from
modern philosophers like Bergson, as well as Whitehead, to frame contemporary
understandings of temporality. While Bourriaud and Smith have significant differences in
their arguments regarding how modernity persists in contemporary art and identity, they
also recognise that contemporary artists are perpetuating modern themes within their
artworks. Additionally, these approaches provide an opening for engaging with actual
movement in contemporary settings and reflecting on contemporary conceptions of
movement, temporality and contemporaneity.

Modern philosophy often approaches temporality as an absolute form, or what Bergson
regarded as the Whole durée. By contrast, postmodern art and theory can broadly be
understood to have destabilised the power structures laden within modernity through a
system of reterritorialisation of temporal and spatial codes. According to Jameson this
was executed to the degree that ‘time has become a nonperson and people stopped writing
about it’. This conjures the ‘end to temporality’ through cessation of time as a
philosophical tool to understand society, as people no longer visualised the world from a
temporal point of view. Jameson emphasises that since the industrial revolution modern
society has positioned time-space in ‘homer opposition’ to one another, rather than
progressing in relative synthesis. For example, early film and photography produced

70 Jameson, End of Temporality, pp. 696-697.
71 H Bergson, Matter and Memory, trans. N. M. Paul and W. S. Palmer, Macmillan, New
York, 1911.
72 Jameson, Postmodernism, or, The Cultural Logic of Late Capitalism, pp. 181-258.
74 Ibid., p. 708.
75 Ibid., p. 698.
representations of time to be perceived from a spatial point of view. Movement in film and photography rendered time into isolated segments of space, which perpetuated a binary mode of perception that engages with time from a spatial point of view. Although, as Deleuze suggests, early modern cinema produced a movement-image that represented time from a spatial point of view, just as modern cinema in the mid twentieth century began to be created to explore movement from a temporal vantage point.

These changing approaches and conceptualisations of temporality suggest that each society expresses a specific contemporaneity. As Louis Althusser has suggested, each society visualises, interprets, and understands temporality in ways that are specific to its own social context. This is what Althusser describes as each society having its own peculiar time. If each period builds its own specific interpretation of time, the transition from late-modernity to postmodernity is generally described as a process from time’s ‘livid final flame’ towards a de-emphasis or disregard for temporality. In Jameson’s words, the ‘end of temporality’ became a catchphrase for postmodern theory because ‘it was widely rumored that space was supposed to replace time in the general ontological scheme of things. At the very least, time had become a nonperson’. Therefore while the peculiar


82 Jameson, End of Temporality, p. 716.

83 Jameson, Postmodernism, or, The Cultural Logic of Late Capitalism, p. 695.
time of contemporary society is characterised by Jameson as a zone of non-temporality. Smith draws from contemporary artists and institutions to demonstrate that time is no longer necessarily a function of speed, but can also be a mechanism to navigate and assert the peculiar nature of contemporaneity in contemporary society.

If contemporary art and society is in a state of transition, perhaps this very condition has come to be a key defining characteristic of contemporary art and society. Even though the term contemporary art is not a neologism, there have been a substantial number of scholars and curators who have begun to analyze contemporary art as an emerging tendency that is informed by, and yet defers to, modern and postmodern art. This suggests that a new peculiar interpretation of time is emerging in both art and theory, which is specific to contemporary society. For instance, previous descriptions of time, such as speed, acceleration and the instant, still exist within the contemporary, but no longer serve explicitly as descriptions of its peculiar time. For Jameson, the key point of difference that the present day has with modernity and postmodernity, is that contemporary

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86 Foster ‘Questionnaire on ‘The Contemporary’’, pp. 3-124.
89 This is articulated by Virilio: “we suddenly jump from real-space objectivity de visu and in situ, to the real-time tele-objectivity of an acceleration whereby the spaces of perception, the optical space and the haptic space of the tangible, undergo a disturbance – a topological or, more precisely, a toposcopical disaster”. See P Virilio, *Art As Far As the Eye Can See*, p. 21.
globalisation reconciles time and space to no longer be in mutual opposition to one another.\textsuperscript{92} This observation also provides an opening for considering a renewed investment in temporality and movement in art.\textsuperscript{93}

In art today there is a coexistence of distinct but simultaneous temporalities. As Smith describes ‘of different ways of being in relation to time, experienced in the midst of a growing sense that many kinds of time are running out…what is it to be \textit{with} time, to be contemporary’.\textsuperscript{94} When articulating time such that it is expressed in the contemporary, Smith creates an elusive and contrary temporal landscape. He continues:

\begin{quote}
the current situation…is characterised more by the insistent presentness of multiple, often incompatible temporalities accompanied by the failure of all candidates that seek to provide \textit{the} overriding temporal framework – be it modern, historical, spiritual, evolutionary, geological, scientific, globalizing, planetary…Everything about time these days – and therefore about place, subjectivity, and sociality – is at once intensely \textit{here}, is slipping, or has become artifactual.\textsuperscript{95}
\end{quote}

For Smith, time today is addressed as evasive, contradictory and antonymous in nature with a sense of urgency,\textsuperscript{96} in order to understand the ‘deepest sense of the contemporary: what it is to be \textit{with} time, to be contemporary’.\textsuperscript{97} The present does not move forward or backwards but is expressed in a contradictory and unpredictable manner in Smith’s image of contemporary art, if there can be one at all. This uncertainty about how time is mediated not only highlights the contrary, elusive nature of temporality,\textsuperscript{98} but also heightens our awareness of this ambiguity as a defining characteristic of time in contemporary art. Effectively, the present is often presented as elusive, contradictory, and heterogeneous.\textsuperscript{99} Viewers of contemporary art have become attuned to, and affected by, expressions of

\textsuperscript{92} Jameson, End of Temporality, p. 699.
\textsuperscript{93} Ibid., p. 699.
\textsuperscript{95} Ibid., p. 196.
\textsuperscript{96} Ibid., pp. 1-10.
\textsuperscript{97} Ibid., pp. 3-4.
\textsuperscript{98} Ibid., pp. 193-215.
\textsuperscript{99} Ibid., p. 196.
multiple and, at times, conflicting time scales; simultaneously geological, modern, historical, spiritual, global, scientific and cosmological time scales. This signifies not only an expansion of temporal experiences but also an ambiguity as to how they contribute to a defining character of contemporary time.

Temporal uncertainty does not necessarily suspend us in time, or accelerate its speed, but heightens our perceptual sensitivity to it as constituting multiple, incompatible temporal modes. Conflicting approaches to time all understand the present to function differently. From this perspective, the temporality that is expressed and encouraged through remodernism is one of many simultaneous contemporary time codes that exist in art today. Within this, the re-exhibition of kinetic art functions in two ways: to recall modern avant-garde conceptions of temporality and to encourage discussions about how current society has deferred to previous modern temporalities.

The negotiation of temporality in contemporary art is also a key site for understanding the nature of contemporaneity in the present day. For instance, exhibitions such as Where Are We Going? at the Palazzo Grassi in Venice in 2006 returned to modern questions of time and space to investigate the nature of contemporaneity in this social climate. A key work at the exhibition was Damien Hirst’s Where Are We going? Where Do We Come From? Is There a Reason?, which proposes questions around how contemporary society understands and expresses the concepts of time. The work consists of a stainless steel and glass cabinet installed in a T-section that displays a variety of animal skeletons. If the decades after 2000 can be described as being after ‘the end of history’ and after ‘the end of temporality’, Hirst’s work is an invitation to reconsider and relocate the self in time and space and is but one example of contemporary artists grappling with this polemic. This is an articulation of an ongoing curiosity about time by recycling and referencing Paul

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101 Both Hirst’s artwork and the exhibition title is a reference to Paul Gauguin’s Primitivist work, Where Are We Gong? Where to We Come From? (1897-98).


Gauguin’s modern colonial works, thereby reaffirming Smith’s argument that contemporary artists such as Hirst perpetuate modern avant-garde practices.

Additionally there have been a number of contemporary exhibitions that have turned towards temporality as a means to reflect and explore contemporary identity. These include; As Soon as Possible at the Palazzo Strozzi, Florence (2010); The Whitney Biennale (2008) which projected the theme ‘temporal tenuousness – the sense many artists feel of being in translation’; Time Change, at the Whitney Biennial (2008)\textsuperscript{104}, On Time. Disarming Matter at the The Courtauld Institute of Art’s East Wing VIII exhibition; the 2012 Kinetica Artfair themed ‘Time, Transformation and Energy’;\textsuperscript{106} and the symposia series, Time, Space and Energy Symposium at Arti et Amicitiae, Amsterdam (2007), which debated the strong presence of time and temporality as an artistic tool in contemporary art.\textsuperscript{107} These exhibitions show contemporary artists that are interested in expressing temporality in new ways, in order to investigate how time is conceptualised in contemporary society in a manner that is inherent to current social and political settings. These exhibitions indicate that there is a continued desire to discuss and express the role of time in art in order to explore various motifs of temporality specific to contemporary society.\textsuperscript{108}


\textsuperscript{105} Ibid., pp. 51-78.


\textsuperscript{108} There have also been a number of large-scale international exhibitions by artists that have foregrounded temporality through their artworks. This is inclusive of Olafur Eliasson’s Take your Time and the Museum of Contemporary Art, Sydney, that has also travelled to MoMA San Francisco (2007), and MoMA P.S.1, New York (2008); as well as Peter Fischli and David Weiss’ The Way Things Go (1987), Doug Aitken’s Sleepwalkers at MoMA, New York (2009)
Thesis Chapter Outline.

Sydney’s sixteenth Biennale, *Revolutions - Forms that Turn* in 2008 is a significant exhibition in this thesis, as it is used to raise a number of key research questions that underpin my understanding of contemporary approaches to kinetic art history. The thesis opens with an analysis of how kinetic sculpture can be incorporated into an art historical framework that resensationalises modernity within contemporary art. Unlike other biennales that often engage with the emerging local and global currents of contemporary art,109 *Revolutions – Forms that Turn* was contemporary art historical reflection on the presence and effects of the modern avant-garde in art today. Through Terry Smith’s method for approaching and analysing contemporary art I argue that modern avant-garde kinetic sculpture is used in *Revolutions – Forms that Turn* to inform audiences of a peculiar consciousness of temporality. I also argue that contemporary art history incorporates modern avant-garde engagements with time and movement to reflect on the changing expressions of the present temporality, over time.

The avant-garde artists that feature in the Biennale are positioned as seminal expressions of temporality. Combined, they create a critique of a modern machine aesthetic, and provide a self-reflexive approach to destabilising traditional modes of representation.110 Furthermore, the presentation of contemporary kinetic artworks alongside their historical antecedents draws a strong lineage between contemporary kineticism and early European experiments with mechanical movement. In effect, a relationship between early avant-garde and contemporary artists is nurtured to establish continuity between artists, as well as to contemporise modernity, or what Smith describes as a remodernisation at play within contemporary art.

For Carolyn Christo-Bakargiev, the artistic director of the Biennale, the avant-garde artworks that featured in the exhibition were overall considered as being at once historical and contemporary. This is because, according to Christov-Bakargiev, contemporary art history draws from, and coalesces, the recent past in order to understand the nature of

110 Ibid., pp. 3-4.
contemporaneity today. If this is the case, then not only is avant-garde kinetic sculpture considered to be within the broad setting of contemporary art, but also the artists and the artworks of this period can be used to understand the changing conceptions of time in contemporary art history, as well as being a resource for understanding aspects of art and society today.

*Revolutions-Forms that Turn* also focused on the changing conceptions of temporality in society and also used a number of avant-garde kinetic artworks to help facilitate out this discussion. For Christov-Bakargiev, contemporary history is considered a coagulation of temporalities that the contemporary draws from to inform, reflect and express identity in the present day. In Christov Bakargiev’s words: ‘everything that exists in the world is of my time, whether it is an old 1950s Bakelite telephone, or an artwork made two years ago or today, simply because it is *cum-locu* – with place’. That is, what is remembered by the present day is contemporary. In this regard avant-garde kinetic sculpture is not necessarily an obscured forgotten practice, but a resource to consider the role and presence of modern avant-garde art as a feature of contemporary art history. The Biennale has been discussed as an art historical lesson for viewers to posit modern avant-garde artists and their preoccupation and expression of temporality as key aspects of contemporary art history. If this is the case, Christov-Bakargiev attempts to pinpoint how society today expresses a specific consciousness of time. As with many contemporary artists and institutions that have recently explored the conceptualisation of time in contemporary settings, Christov-Bakargiev recognises that there is an art historical tradition of using

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113 Christov-Bakargiev, ‘Revolutions forms that Turn: the Impulse to Revolt’, p. 33.
movement to express time.

In light of this tendency to express, discuss and contribute to understandings of contemporaneity in contemporary art, it is therefore no surprise that exhibitions such as *Revolutions – Forms that Turn* are curated with a renewed interest in avant-garde kinetic art. This is because, as I will argue in this thesis, kinetic art and art history is a key resource for mapping the changing conceptions of contemporaneity. Additionally, because contemporary artists and institutions often recall the recent past to inform characteristics of contemporaneity, the study of avant-garde kinetic art is also valuable for understanding the peculiar time unique to contemporary contexts.

Chapter 2 is focused on the influences of this relationship to time in contemporary art. In a variety of respects, this relationship to temporality in art is borne from a turbulent relationship with temporality in Europe and North America in the 1960s. Michael Fried’s seminal essay, ‘Art and Objecthood’ (1968), the exhibition *Directions in Kinetic Art* curated by Peter Selz, and the auto destructive kinetic sculptures by Jean Tinguely, *Homage to New York* (1960) and *Study for an End of the World* (1963/1964), provide an array of conflicting approaches to duration in art. The approaches to time presented by Fried, Selz, and Tinguely react to the role and effect of duration in art in conflicting and disparate ways, and culminate to signify a larger uncertainty towards how time is conceptualised in a period of technological transition.

Although the turbulent relationship to time was produced through a variety of social, political, and technological changes in art and society, I argue that artists such as Tinguely, in working with kinesis, attempted to expand the ways in which time could be orchestrated through mechanical media in art. As noted before, art historian Pamela Lee has argued that the use of movement in art during the 1960s suggests a phobic relationship to time in art and society.116 My focus is directed towards a number of ways in which Tinguely used the movement of mechanical, televisual, and electronic media to emphasise that these technologies move differently and give rise to new temporal systems. Tinguely’s sensitivity towards the different and at times conflicting rationalisations of time through

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different mechanical media attempted to expand on the conceptualisation of time through movement in art by bringing attention to these differences.

In Chapters 3 and 4 I further draw out a number of tensions in relation to movement, time and art in the 1960s and early 1970s. While the 1960s has been described as the decade of the ‘kinetic kraze’, the technological turbulence during this time was overcome by an attempt to use spatial concepts to address the role of duration in art.\(^{117}\) One key example of this that greatly affected the creation and interpretation of kinetic art is Jack Burnham’s argument in ‘Systems Esthetics’ (1968). Chapter 3 addresses Burnham’s appropriation of Ludwig von Bertalanffy’s General Systems Theory as a method for engaging with emerging artistic practices at the time. Burnham’s argument focuses on the arrangement of art objects where ‘[t]he specific function of modern didactic in art has been to show that art does not reside in material entities but in relations between people and the components of their environment’.\(^{118}\) For Burnham, systems theory nurtures an approach to art that de-emphasises the ontological form of art and instead focuses on art as a component within the larger system of society.

Burnham’s approach to systems theory in art developed with, and alongside, German-born artist Hans Haacke’s. The artist’s interest in incorporating environmental systems in his art is one of Burnham’s earlier examples of systems aesthetics at play. According to Burnham, Hans Haacke’s work highlights a significant shift in art that moves from technological art towards the orchestration of cybernetic systems.\(^{119}\) However, Burnham’s argument is dependent on the misdirection of Hans Haacke’s early systems art in order to affirm that kinetic artists remained unrequited by their aims, and failed to remain relevant to discussing art from a systematic point of view. In deference to Burnham’s premise, actual movement is also useful for elaborating on perception as a systematic process. The arrangement of actual movement in Haacke’s works is also a central aspect of Haacke’s expression of systems aesthetics in art in order to connect with the material and immaterial implications of systems theory. As Haacke explains,


\(^{118}\) Burnham, ‘Systems Esthetics’, p. 16.

A ‘sculpture’ that physically reacts to its environment is no longer to be regarded as an object. The range of outside factors affecting it, as well as its own radius of action, reach beyond the space it materially occupies. It thus merges with the environment in a relationship that is better understood as a ‘system’ of interdependent processes.\textsuperscript{120}

While Burnham reconsidered the definition of art through an appropriation of systems theory, in the early 1970s Frank Popper explored the effects of the emerging post-object aesthetic in relation to kinetic art. Chapter 4 addresses Frank Popper’s argument in \textit{Art, Action and Participation} that kinetic art in the 1960s and early 1970s became increasingly dematerialised to the point of entire invisibility. This dematerialised work of art refers to a de-emphasis of form, and the prioritisation of the conceptual properties of an artwork led to what can be described as a post-object, or post-formalist aesthetic.\textsuperscript{121} For Popper, demateriality is the catalyst for entirely disregarding form, and from which artists became engaged with relational and communicative movements, rather than exploring the effect and affects of the form of movement in art.\textsuperscript{122} This perspective emphasises a distinction between the attention to movement of mechanical media in kineticism from conceptual art. Popper’s argument in \textit{Art, Action and Participation} and, later, \textit{From Technological to Virtual Art}, also delivers a digitally determinist view of kinetic art as a material, mechanical and formal practice by comparison to the dematerialised, ephemeral and immaterial conceptual, interactive, and digital artworks.

Popper’s argument is problematic when considering that kinetic artists have often focused on both the material and immaterial effects of movement in their work. Popper’s emphasis on the effects of demateriality to kinetic art also suggests that artists interested in movement since this time have concentrated on the immediate and immaterial movements through participation, interaction, and simulation. This also encourages a regard for kinetic sculpture as a modern antiquated practice. In addition to this, Popper’s premise also draws a distinction between technological media where digital media is associated with immateriality and conceptual art, while the term kinetic is restricted to mechanical motion.


\textsuperscript{121} Burnham, ‘Systems Esthetics’, p. 17.

\textsuperscript{122} F Popper, \textit{Art, Action and Participation}, London, Studio Vista, 1975, pp. 7-12.
In my view, and, more importantly, the artists’ views, it is important to consider the role of movement and time in sculpture where artists attempt to explore both the material and immaterial effects of movement. In order to destabilise Popper’s binary distinction in this chapter I consider the role of emergent movement and preacceleration as a means for considering the material effects of movement. Through Anthony McCall’s *Line Describing a Cone* (1973) and Anish Kapoor’s *Shooting into the Corner* (2008) I emphasise the role of movement as a process that arrives from a virtual incipience. This considers the use of movement in real-time as a productive, emergent, and material process.

The Biennale *Revolutions- Forms that Turn* is used as a key example in this thesis for articulating the way contemporary art history draws from avant-garde kinetic artists to inform audiences of the origins and developments of art since the industrial revolution. However, it is also important to consider works of this artistic generation outside of the exhibition setting. In Chapter 5 I address the early European avant-garde artworks by Moholy-Nagy and Gabo and, importantly, the philosophical approaches to movement and time by Bergson, as three key prominent influences of kineticism in art. Additionally, the works by Gabo and Moholy-Nagy are interpreted in ways that problematise Bergson’s concept of duration and his resistance to mechanical representations of movement. For Bergson, the representation of movement in art not only provides a distortion of the subjective experience of duration, it also encourages these representations to be mistaken for actual time itself. These artists use kinesis as a tool for bringing attention of the present temporality through machine art. The use of movement, mediation, and distortion across a variety of media are used by Moholy-Nagy and Gabo to create new perceptions of temporality in real-time.

This is particularly prevalent through their use of what they describe as ‘virtual volumes’. These volumes are images of movement that are produced when an object moves rapidly enough to create a blurred formation of present and past movements.

Bergson, Moholy-Nagy, and Gabo’s approaches to movement in art are also influential for contemporary artists interested in the phenomenological experience of movement and time.


in art. The emphasis on temporality in the virtual that I establish in Chapter 5 is also useful for my analysis of Olafur Eliasson’s installation titled *Your Negotiable Panorama* in Chapter 6. Here, I draw a connection between Eliasson’s approach to the virtual with Gabo and Moholy-Nagy’s, to explore the material and immaterial effects of movement that emphasises time as a continual transformation in the present that also consists of folds of the past within it.

In this chapter I use *Your Negotiable Panorama* to consider movement in the present as a productive creation of actualisation from the virtual. This approach to time also resonates with a Bergsonian understanding of time, which, I argue, is remodernised by Eliasson. This is because they both privilege an experience of temporality that is experienced as a unified present that emerges from immanence. This also suggests that rather than using virtuality in art to move away from a materialised state, as Popper argues, there can also be alternative historical forms that continue to use movement as a tool for bringing a consciousness of time to the foreground. In regards to Eliasson, the virtual stems from Moholy-Nagy and Gabo, while he also uses movement to create slippages of indiscernibility between what is actual and virtual in the present.

In order to understand the roles, functions and affects of kinetic sculpture that contribute to this consciousness of time, it is important to consider several features within the history of kinetic sculpture that work to marginalise the practice from contemporary interpretation. In this thesis I aim to reassess various ways in which contemporary and historical avant-garde kinetic sculpture not only features in the wider milieu of contemporary art, but is also a resource for audiences today to reflect on the conceptualisation of contemporaneity in art history. As Pierre has recently described, there has been a clear critical absence of discussion around kinetic art and its interpretation in art history. This thesis therefore identifies a number of catalysts that have contributed to this absence and restricted kinetic art from contemporary art history and theory. Each of the chapters in this thesis focuses on a polemic that conflict with an understanding of kinesis as an expression of time in order to shed light on various roles and functions of kinetic art history within the wider milieu of contemporary art and its relationship to contemporaneity.

Understanding the role and effects of contemporary and historical kinetic art in this way is significant for assessing the wider implications of contemporaneity today. Kinetic
sculpture is not necessarily the antiquated machinic avant-garde practice that those such as Popper frame it to be, and which is seen to have little relevance to contemporary society but is instead indicative of an ongoing relationship with time in art. The central thesis of this dissertation is that there needs to be a reconsideration of the relationships between kinetic art and time, and how these orchestrations of temporality are present in contemporary art and contribute to the multiple approaches to contemporaneity today. This reassessment of the contemporary and historical interpretations of kinesis in art also provides an opening for considering the multiple intersecting histories in the fields of technological, mechanical, electronic, and digital art. Rather than considering kinetic sculpture and installation as primarily an antecedent to contemporary media arts, my approach to the field points to a continued desire to use actual movement to express and explore the nature of contemporaneity through time.
This chapter draws on Sydney’s sixteenth Biennale titled *Revolutions – Forms that Turn* (2008) as a key example of how centres of contemporary art reflect on the recent past in order to discuss current conceptualisations of contemporaneity. *Revolutions – Forms that Turn* is one of many recent large-scale exhibitions that have turned to avant-garde kinetic sculpture in order to discuss and unpack the facets of contemporaneity in contemporary society. As I addressed earlier, in the introduction of this thesis, there has been a recent tendency to return to and re-evaluate avant-garde kineticism in relation to contemporary contexts. The following interpretation of *Revolutions – Forms that Turn* is therefore one
example of the multiple ways contemporary art historical exhibitions engage with and reflect on avant-garde kinetic sculpture.

The overall curatorial arrangement of *Revolutions – Forms that Turn* gives attention to the use of formal and political movement to express and produce specific perceptions of temporality, and contributes to a consciousness of time that reflects contemporary society. Christov-Bakargiev encourages new perceptions of contemporary art historical understandings of kinetic sculpture in relation to other modern artists and aesthetics prominent in dominant art historical narratives, fostering new perceptions and interpretations of kineticism in contemporary art. If, as Carlos Basualdo has suggested, biennales are created ‘with a distinct instrumental purpose: to respond to the interest that brought them about’,¹²⁵ then *Revolutions – Forms that Turn* is an investigation of formal and theoretical expressions of movement and time in order to reflect on contemporary art in society.

Therefore, while *Revolutions – Forms that Turn* itself was criticised for reflecting more on contemporary art history rather than contemporary art,¹²⁶ I argue in this chapter that Christov-Bakargiev’s incorporation of avant-garde kinesis within the wider scope of the Biennale is an indication that kinetic art is useful for articulating the peculiar time in contemporary art and society. In doing so, *Revolutions – Forms that Turn* is also useful for considering the fluidity of kinetic art history that is continually re-formed by contemporary society. This is because through the Biennale kinetic sculpture is not regarded as an obsolete, mechanical and unrequited practice,¹²⁷ but instead positions it to inform audiences about the nature of our contemporaneity in art.

This is a key mechanism behind Christov-Bakargiev’s decision to orchestrate a unique biennale that brings some of the characteristics of contemporary art history to the forefront. In light of Smith’s approach to contemporary art, it is possible to approach *Revolutions – Forms that Turn* as an exhibition that resensationalises central elements of modern avant-garde art within its contemporary context. In doing so, the Biennale is significant in this thesis because it exemplifies a need for reflecting on how kinetic

¹²⁷ Weibel, ‘It is Forbidden not to Touch’, pp. 21-41, pp. 21-41.
sculpture has been framed by art historical analyses in the past, and how these analyses have changed over time to express a peculiar time unique to society today.

Christov-Bakargiev’s decision to title Biennale, *Revolutions – Forms that Turn* brings the effects and functions of a biennale in the contemporary artworld to the forefront; a site for contemplation and transformation of the present. For Christov-Bakargiev, what then is contemplated and transformed are the associations between modernity and the contemporary and how temporality is conceived in each. Furthermore, Christov-Bakargiev’s understanding of contemporary art history in the Biennale also bears considerable weight now that similar approaches to contemporaneity and contemporary art have been echoed through her curatorial direction in *Documenta 13* in 2012. While *Revolutions-Forms that Turn* exhibited four years prior to *Documenta 13* Christov-Bakargie has been recognised for her tendency to ‘attempt something deeper and philosophically unusual’ about the undercurrents of contemporary art and art history. *Revolutions- Forms that Turn* is therefore not only an art historical exhibition, but also an appropriate site for analysing some of the approaches to contemporary art and art history in contemporary society.

My analysis presents the Biennale as an indicator for the some of the roles, functions and effects of exhibiting modern kinetic art in contemporary exhibitions. That is, rather than an obscure and obsolete avant-garde tendency, *Revolutions – Forms that Turn* is useful for considering contemporary and historical kinetic art as a resource for contemplating the changing conceptualisation of movement, temporality and contemporaneity. The Biennale is also valuable for reconsidering the dominant art historical notions that

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130 A number of exhibitions have exhibited avant-garde kinetic art in order to reflect and reconsider contemporary art history. These include *Vibration, Vibração, Vibración: Latin American Kinetic Art of the 1960s and ’70s* (2012), *Points of Contact* (2010), *Shakin’ The Contemporary Kinetic Aesthetic* (2012), *Luce e Movimento* (2010), *Under Destruction* (2010). However, what is specifically of interest to this thesis is the way *Revolutions – Forms that Turn* was curated to discuss contemporaneity, temporality and contemporary art.
mechanical kinesis in art is a key precursor to contemporary digital art, and the historical canons between modern, postmodern, and contemporary frameworks. Therefore, the Biennale is positioned early in this thesis to also give rise to new questions around the roles and effects of kinetic art in society.

I argue that this exhibition, like others that draw upon modern kinetic sculpture, are key resources for considering alternative ways in which modern kinetic art is reconfigured by contemporary art history. The exhibition is interpreted as an effort to strengthen associations between modernity and contemporary society as well as an attempt to position the historical tendencies of kinetic artists as a part of a plural and continually reforming narrative. Through this I argue that there is a specific relationship between temporality and art in current society. The contemporary desire to express, negotiate, and critique the changing nature of temporality has created an opening for kinetic sculpture to be discussed with an increasing relevance to the contemporary world.

*Revolutions – Forms that Turn* is one of many large-scale international exhibitions that have drawn from avant-garde kinetic art in order to reflect on contemporary art theory and history in relation to perceptions of movement and temporality. Reflecting on the relevance of avant-garde kinetic sculpture in contemporary society, this chapter uses the Biennale as a gateway for considering various facets of kinetic art history from a contemporary perspective that conflict with past interpretations of the practice. If, as I argue in this chapter, kinetic art is a resource for considering the changing conceptions of temporality, *Revolutions – Forms that Turn* is also valuable for opening new questions concerned with the role and effects of historical and contemporary kinetic art, which will be addressed in the following chapters of this thesis.

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132 I have mentioned a number of these exhibitions in the introduction of this thesis.
**Contemporaneity in Contemporary Art: Coalescing Canons**

The title of the Biennale, *Revolutions – Forms that Turn* resonates with what Marshall Berman has described as the natural affinity between modernity and revolution, ‘what is modern is newer than what it succeeds: what is revolutionary is more advanced than what it overthrows – “tradition” in one case, “reaction” in the other’.\(^{133}\) *Revolutions – Forms that Turn* echoed this balance of tradition and reaction in modernity by drawing from historical canons of art in order to engage with the elements of contemporary art and society in a self-reflexive manner. However, this curatorial decision has also meant that the Biennale was also criticised for presenting an art historical lesson for patrons.\(^{134}\) Michael Desmond in *Art Monthly Australia* described this curatorial arrangement of the Biennale as predominantly an educational exhibition that only delivered trajectories into art historical canons rather than ‘confront[ing] topical issues to deliver meanings outside of art’.\(^{135}\) If this is case, then *Revolutions – Forms That Turn* was received as a formal aesthetic inquiry into Western art history, rather than a critique on political avant-gardism in contemporary art. Through this, kinetic sculpture is considered as a key element within this schema.

The artistic director, Christov-Bakargiev, presented both historical and contemporary works as part of a continued social impulse of revolt. As she explains in the exhibition catalogue:

**What is the theme of the Biennale?** The impulse to revolt. Revolving, rotating, mirroring, repeating, reversing, turning upside down or inside out, changing perspectives. Such literal and formal devices are charted for their broader aesthetic, psychological, radical and political perspectives. This project explores the relationship and distance between ‘revolutionary art’ and ‘art for the revolution’, the space between form, on the one hand, and the role of art in society on the other.\(^{136}\)


\(^{134}\) Desmond, p. 5.


\(^{136}\) Christov-Bakargiev, ‘Revolutions forms that Turn’, p. 30.
Christov-Bakargiev’s statement indicates her intention for the Biennale to be a site for reflection, critique and new interpretation of the contemporary world. Her theme and statement nurture reflections and inquisitions into how the meaning and expression of political and formal revolution has changed in art throughout the nineteenth and twentieth centuries.\textsuperscript{137} *Revolutions – Forms that Turn* was therefore assembled to self-reflexively engage with the association of biennales as instruments of modernity.

Even though in *What is Contemporary Art?* Smith broadly associates biennales to work within a tendency of contemporary art that express a globalised local/international image of contemporary art,\textsuperscript{138} in many respects the themes within *Revolutions – Forms that Turn* also resensationalised tropes of modern art such as temporality, newness, mechanical reproduction, revolution and the avant-garde. The Biennale is therefore an attempt to remodernise contemporary art history. The thematic structure of the exhibition, which juxtaposed early avant-garde with contemporary art, resonates precisely with what Smith described as remodernism: a tendency to ‘cleave new art to the old modernist impulses and imperatives, and renovate them’.\textsuperscript{139} In a similar vein to institutions of modern art that Smith refers to in his argument,\textsuperscript{140} *Revolutions – Forms that Turn* was assembled to reflect on the impact of modern avant-garde art on contemporary society, as well as reviving these modern tendencies. However, unlike these aforementioned art institutions, biennales are not traditionally geared towards exhibiting and discussing the presence of modern art in contemporary art history.

This standpoint justifies the curatorial program of the *Revolutions – Forms that Turn*. The number of modern avant-garde artworks that were featured predominated over the presence of contemporary artists. Among the avant-garde works there was a concentration on early modern Constructivist, Dadaist, and Futurist artists, which included key art historical works from the early twentieth century. Within the historical section of artists, kinetic artworks were prominent throughout the Biennale that represented the machine aesthetic within modern art and modern movement. These included the ‘Futurist

\textsuperscript{137} Although *Revolutions – Forms that Turn* was the not the first Biennale that critiqued the symbolic capital of biennales. See: C Basualdo, ‘The Unstable Institution’, *MJ – Manifesta Journal 2: Biennials*, Winter 2003-Spring 2004, pp. 50-61.

\textsuperscript{138} Smith, *What is Contemporary Art?*, pp. 7-8, 151-171.

\textsuperscript{139} Ibid., p. 7.

\textsuperscript{140} Such as the Museum of Modern Art New York and the DIA Art Foundation
Manifesto’ by Filippo Tommaso, Marcel Duchamp’s Bicycle Wheel (1920); his collaboration with Man Ray, Rotary Glass Plates, Precision Optics (1920), mobiles by Russian Constructivist Alexander Rodchenko such as Hanging Spatial Construction Nos. 9-13 (1921-21), and Alexander Calder’s hanging kinetic mobiles Hanging Spider (1940) and Roxbury Flurry (1946). Already recognised as experimenters of social and political change through their art, these artists were projected in the Biennale as reminders of the ancestral lines of avant-garde works that constitute contemporary art history.\textsuperscript{141}

Also within the Biennale were many avant-garde works that were created in the decades shortly after WW2. These earlier artists were joined with central avant-garde figures from the 1960s to the 1980s, and were projected by the Biennale as works through which to consider the historical pathways of revolution, change, repetition and re-enactment in relation to the other artists.\textsuperscript{142} This is inclusive of John Cage’s durational work 4’33’’(1952/2004), Guy Debord’s film Le Société du Spectacle (1973) and documentary material of Chris Burden’s performance work Shoot (1971), Carolee Schneeman’s Meat Joy (1964), Valie Export’s Touch Cinema (1968), and Gordon Matta-Clark’s film, Program Eight: Office Baroque (1977/2005). The works from this period built a landscape of late-modern avant-garde as a period when the role of the avant-garde was discussed in a self-reflexive manner that was conscious of the late-modern avant-garde aesthetic becoming an artistic tradition of its own, while attempting to dissolve traditional representation in art.\textsuperscript{143}

When considering the early modern and contemporary avant-garde artworks exhibited at Revolutions – Forms that Turn, recurring themes of temporality, contemporary, and the historical are prevalent. Within the exhibition historical and contemporary kinetic sculpture played an integral role in implementing discussions about the modes and methods of contemporary art history.\textsuperscript{144} This is perhaps one reason why there was a


\textsuperscript{142} Christov-Bakargiev, pp. 30-31.


\textsuperscript{144} Many articles that reviewed the exhibition paid particular attention to the kinetic sculptures that were featured. Some even produced their entire interpretations of the whole biennale solely through the range of kinetic sculptures. See: Tracey Clement, ‘Mind the Flying Spike’ Sydney Morning Herald, August 2008, url:
The exhibition itself stands as a contemporary reconstruction of art history, within which kinesis is projected as a tool for social and political revolution, as well as the revolution of aesthetic form, and this has continued in art throughout capitalist society.

Kinesis was also widespread throughout Christov-Bakargiev’s arrangement of late modern avant-garde artworks, which breaks from a regard for kineticism as an unrequited and forgotten phase of modern art. Many of the artists in the Biennale were concerned with portraying the futility of industrial labour and the performative possibilities of sculpture.145 These include a remnant from Jean Tinguely’s Homage to New York (1960), as well as Bascule no. 1: Sisyphus (1965) and Metà Malevich (1954); Len Lye’s Storm King (1964) and Ribbon Snake (1965/2008: a reconstruction was created specifically for the Biennale); and David Medalla’s Cloud Canyons (1967/85). These artists have frequently been much commended for their experimental techniques with social and political ideology, and Christov-Bakargiev’s curatorial decision to disperse these contemporary artworks among a predominantly historical exhibition alludes to contemporary art as a continuation of the modern avant-garde. The theme, Revolutions – Forms that Turn further reaffirms that the contemporary artworks signify a cyclical return to artistic experimentation, political antagonism, and dissolving traditional modes of representation. Additionally, this curatorial composition infers that form and aesthetic move in cycles; that postmodernity is historically read as a part of the greater cycles of art and modernisation as an endless project.146

Drawing on modern avant-garde to reflect on contemporary art and society in the Biennale also propelled temporality as a key theme throughout the event. Christov-Bakargiev expressed a specific understanding of the present temporality as a state embedded with cycles of time, where history is considered a reserve of time periods to which the present is privy. From this perspective, to be contemporary is cum-tempore (with-time). As Christov-Bakargiev understands, the contemporary is approached according to what is remembered


145 Engberg, ‘Children of the Revolutions: Sixteenth Biennale of Sydney’.
by contemporary society. The recent past of the modern avant-garde is therefore constantly reformed by contemporary perception and interpretation. In light of Christov-Bakargiev’s approach, the peculiar consciousness of time that is presented in the exhibition is a focus and ambivalence on the nature of contemporaneity. Here, the present unfolds in time, and does so by drawing on the past. This way of loading the present with folds of the past resonates with Michel Serres’ approach to contemporaneity. Serres uses the example of a late-model car as an accumulation of inventions from the past, within the present object, as an analogy for defining ‘contemporary’. The wheel, motor and every other component were all separately invented in different eras, and these have come together with the invention of the car. While the contemporary contains the past, the only true indication that the car has been made in contemporary time is the assemblage of any additional inventions, its design, advertising, consumption and ideology.

Unlike Christov-Bakargiev, Serres does not privilege the contemporary but rather eradicates distinctions between the historical and the contemporary. He projects an absolute ‘indifferen[ce] to temporal distances’, where everything is at once contemporary and historical. While Christov-Bakargiev might not reach as far as Serres’ collapse of temporal distinctions, her regard for the contemporary constitutes as a process of folding the historical within it. This implies that constructions of art history today, according to Christov-Bakargiev, are constituted as contemporary, but not necessarily vice versa.

Among the contemporary artists that featured within the Biennale, kinesis was also a regular element. This includes Olafur Eliasson’s Light Ventilator Mobile (2002) and Rebecca Horn’s Cutting Through the Past, both of which I will address in the following section. Also featured in the Biennale was Michael Snow’s De La (1969-72), a rotating sculpture fitted with surveillance cameras, monitors, and controls that stalk and project on screen the viewers and their movements without delay. Also exhibited was a

147 Christov-Bakargiev, ‘Revolutions Forms that Turn’, p. 33.
149 Ibid., p. 45.
150 Ibid., p. 45.
151 Ibid., p. 45.
reconstruction of Vladimir Tatlin’s *Monument to Third International* (1919) entitled, *White Man Got No Dreaming* (2008), by Michael Rakowitz constructed with scrap material from what was an Aboriginal Housing Community in Redfern, Sydney. The work aptly echoed the Biennale’s theme of revolution, tradition and resistance.

![Image](image.png)

**Figure 5:** Olafur Eliasson, *Your Light Ventilator Mobile* (2002). Installation view at World Class Boxing Gallery.

Exhibited alongside Calder’s black-and-white hanging mobiles was Eliasson’s *Light Ventilator Mobile*, a hanging, rotating mobile that balances the weight of a domestic fan on one end of a rod and hanging down with its electrical chord on the other end is a spotlight shining onto the walls of the space. The motorised mobile rotates rapidly, while the dangling fan swings unpredictably at eye level, and the shine of the circling light attached at the opposite end of the mobile catches and briefly blinds the viewers. Eliasson’s work is dizzying and tests the threshold between chaos and predictable circular action.

Eliasson’s performance was interpreted as signifying the continuation of movement and aesthetic form in contemporary society. Rather than conjuring political engagement like
Snow and Rakowitz’s works. With *Light Ventilator Mobile* there is a sense of displaced movement between the erratic motion of the fan and the comparatively smooth yet unpredictable glide of the light beam because a single horizontal rod connects them. Additionally, the movement of the viewer is restricted by the performance of the mobile. The rotation of the mobile casts a territorial circumference within the exhibition space, which viewers are not usually inclined to enter because of the peril of the swinging fan. The speed of the light beam extends the space occupied by the sculpture, casting outwards, rather than inwards, encouraging viewers to further step further back, and watch the light tracking the walls around it.

Eliasson is well known as a contemporary artist concerned with the phenomenological relations between the viewer and object and the act of perceiving as an uneven and, at times, waning and swelling subjective experience. He describes history as ‘not external and objectified in a situation but… inside the spectator’, as a constant reconstruction that is borne by each viewer and their experience. After the Biennale, Eliasson also produced a number of works that expressed his curiosity with orchestrating temporality through kinetic lumia, sculpture, and installation, and exhibited them in the Museum of Contemporary Art in Sydney, a main venue for the Sydney Biennale. His exhibition *Take Your Time* focused on the subjective perceptions of, and within, the present temporality: ‘The sense of time that I work with is the idea of a “now”….There is only a “now”….our belief in time is just a construct’.

Like many artists who have used actual movement to express time before him, Eliasson expresses sensitivity towards the effect of the temporal present kinetic movement on his audiences. He aims for his works to let viewers ‘see...


153 P Lee elaborates that ‘[s]eeing oneself seeing’ has become a mantra for interpreting Eliasson’s works in the exhibition *Take Your Time* See: P Lee, ‘Your Light and Space’ in M Grynsztein (ed.), *Take Your Time: Olafur Eliasson*, pp. 33-35.

154 J Morgan, interview with Olafur Eliasson, in *Olafur Eliasson: Your Only Real Thing is Time*, Boston, Institute of Contemporary Art, 2011, p. 16.

themselves seeing’ this ‘now’, similarly to early avant-garde artists who used movement to draw attention to perceptions of the present.

Rebecca Horn’s installation in the Biennale was as perilous as Eliasson’s swinging fan. Her work *Cutting Through the Past* (1993-94) is constructed with five doors standing in a circle on a platform with the edges of their frames pointing inwards, towards a horizontal spike that rotates in the centre. At each rotation the spike scratches into the edge of each doorway as it passes, with what has been described as an ‘incisive and cruel gesture, rich with erotic implications’. Horn’s motion produces conflicting effects; each rotation is performed in its predictable manner, and yet as the spike approaches each doorway, a moment of piercing tension is orchestrated. Horn’s piece functions similarly to Eliasson’s *Light Ventilator Mobile* as both artists manipulate intensity and the accumulation of tension and intensity even when mechanical movement is constructed to move in a repetitious manner.

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156 P Lee elaborates that ‘[s]eeing oneself seeing’ has become a mantra for interpreting Eliasson’s works in the exhibition *Take Your Time See*: P Lee, ‘Your Light and Space’, p. 35.


These contemporary gestures play to Christov-Bakargiev’s cyclical approach to time, which is in constant progression, and the effects of the modern machine aesthetic continue to be effective media for expressing time rhythms. Horn and Eliasson perform mechanised activities that range from the carefully measured, to entropic and unpredictable, and explore tensions laden within the present – time moves in obvious circles, and yet moments of tension, energy and suspense can arise within it. The curatorial decision to exhibit these works in the same biennale alongside the avant-garde works by Lye, Alexander Calder, Tinguely, and Medalla presents an assumption that Eliasson and Horn continue this artistic investigation. Although to varying degrees the reliance on the movement of form to build tension, or explore the effects of entropy, by Horn and Eliasson, establishes a continued desire to explore the actual and virtual effects of kinesis. These earlier artists from the 1960s (and in Calder’s case, the 1930s), each explore the capacity for unpredictable movement and unforeseen forms through repetitive mechanical actions.
As an art historical exhibition, Juliana Engberg claims that the biennale constructed political revolution as a recurring and yet weakening element of present society. As she paraphrases, ‘[a]t the beginning of the twentieth century, represented by Rodchenko, art is launching into space, daring us to embrace the dawn of speed and velocity. By the end of the century, represented by Cattelan's forlorn hoisted horse, all the puff has gone out of the revolutionary enterprise’.\(^{159}\) In light of Desmond and Engberg, the biennale drew together an art historical construction that reified the spirit of revolution with the modern avant-garde, and undermined contemporary art as a site for political engagement.\(^{160}\) Therefore, to move forward in time requires a reconstruction of modern art that resensationalises it within contemporary contexts.

This interpretation also positions *Revolutions – Forms that Turn* as a critical inquiry into the dialects between modernity and postmodernity, and as an attempt to collapse the distinctions between these canons. Consequently, kinetic sculpture and installation are significant players in the reconstruction of contemporary art historical interpretation. For instance, Horn and Eliasson’s work are situated as extensions of the modern machine aesthetic presented by early European avant-garde artists. Furthermore, as Christov-Bakargiev has argued, these early modern works of art are contemporary precisely because they are perpetuated by artists, institutions, and exhibitions as forerunners of the present sense of contemporaneity.

In this respect *Revolutions – Forms that Turn* is a contemporary exhibition that returns to and perpetuates avant-garde tropes. The modern aesthetic is for this reason part of the contemporary because Christov-Bakargiev’s decision to use movement as a tool for reevaluating contemporary art history is what Smith would describe as a ‘remodernist’ action.\(^{161}\) However, more importantly for the focus of this thesis, an effect of this remodernist perspective is that a reevaluation of the roles and effects of kinetic art in relation to understandings of movement and time are encouraged. *Revolutions – Forms that Turn* is indicative of a renewed art historical evaluation of kineticism in practice. The Biennale aligned modern avant-garde mechanical kinetic works alongside contemporary mechanical installation, thereby strengthening the association between kinesis as a

\(^{159}\) Engberg, 'Children of the Revolutions [The Sixteenth Biennale of Sydney]'.

\(^{160}\) Desmond, p. 5.

\(^{161}\) Smith, *What is Contemporary Art?*, pp. 5-7.
continued tool for contemporary artists. Rather than bringing together contemporary artworks that represented a digital contemporary avant-garde, Christov-Bakargiev made a conscious decision to present to the international artistic community a disregard for digital determinism, and presented modern industrial kinesis as an informant to contemporary art historical canons and characteristics of contemporaneity today. This encourages new relationships between avant-garde kineticism and the contemporary to be formed. Considering Christov-Bakargiev’s approach to contemporaneity, *Revolutions – Forms that Turn* is presented as a contemporary art historical view that does not necessarily frame technological art as a move from mechanical towards virtual art, but builds as a coagulation of the machine aesthetics within it.

This perspective provides a gateway for interpreting kinetic art history that resists the assumption that mechanical kinetic sculpture is a rudimentary form of digital art in motion. Another consequence of the arrangement of *Revolutions – Forms that Turn* is for the dichotomy between the mechanical and the digital to be destabilised. Considering Christov-Bakargiev’s approach to contemporary art history, the artists in the exhibition were arranged as pioneers of contemporary art and were themselves to be interpreted as contemporary. Kinesis is therefore used in the Biennale as a tool for demonstrating that the modern avant-garde is at once considered historical and contemporary in contemporary art. This challenges the idea of digital art as the ‘more refined’ technological art to modern mechanical media. This is because, as I have highlighted, the Biennale indicates a construction of art history today that collapses temporal distinctions between the historical and the contemporary and continually reconstructs by drawing from the recent past.

While Horn and Eliasson’s works are engineered with motors that are normal by present-day standards, technological media is used as a means of achieving their formal and conceptual intentions. This is unlike the kinetic artists from the 1920s or 1960s in the Biennale who were concerned with building or critiquing a machine aesthetic in their artworks. Christov-Bakargiev’s perspective of contemporary art, one that is *with-time*, indicates, as I will argue throughout this thesis, that there is still a strong desire to express and consume modern and contemporary kinetic presentations of time. The contemporary works such as those by Eliasson and Horn use movement and time as tools for asserting identity through a process of entropy that attempts to locate and dislocate viewers through
the use of motion. Both artists depend on entropy, control, movement and duration as ways to draw attention, and affect their audiences in spectacles of movement similar to the early European avant-garde kinetic works they were presented alongside with at the exhibition. They are playful of the limits of human perception through experimentation of form, and depend on shocking their audiences with suddenness to create new sensations.

Christov-Bakargiev’s direction is also useful for unpacking the peculiar expressions of temporality in modern art to contemporary audiences. Revolutions – Forms that Turn returns to the space-time conceptions that were popular at the time of early avant-garde, while also encouraging discussions about the use of movement and expression of time through contemporary kinesis. Unlike Bourriaud’s proposition of a new modernity (altermodernism), she is concerned with the contemporary artists that signify one of many returns to modern avant-garde tendencies such mechanical aesthetics, and the use of shock, chaos, and repetition. This return is also considered as a greater condition of the cycles of form and aesthetic in art history, and is demonstrated by kineticism, specifically through works such as those by Eliasson and Horn next to Tinguely, Medalla, Lye, and Duchamp. This presents actual movement in art as a key concern for modern art history, and as a significant site for understanding of contemporary art. Christov-Bakargiev’s approach compliments Smith’s emphasis of art institutions that contemporise modern art, as well as contemporary artists perpetuating modern aesthetics.

Smith’s description of contemporary art today is useful for understanding some of the mechanisms behind the return to modern kinetic art in these three exhibitions. Smith’s claim that a remodernist tendency is one of many emerging trends within contemporary art today serves as one explanation behind the desire to reassess contemporary art history. In

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163 Such as Duchamp’s Bicycle Wheel, Duchamp and Man Ray’s Rotary Glass Plates, Precision Optics, and Alexander Calder’s Hanging Spider. Each of these artists use these works to discuss the unpredictable nature of movement in real-time with the viewer.
165 Smith, What is Contemporary Art?, p. 7.
light of this, the artists and institutions that reignite modern avant-garde tropes are particularly interested in the contemporary conceptions of temporality. The Biennale can therefore be considered as an engagement with contemporary audiences by resensationalising modern tropes of art such as revolution, shock, temporality and the machine aesthetic.

The relationship between time and mechanical kinesis in *Revolutions - Forms that Turn* in contemporary art history is valuable for discussing further the changing interpretations of modern avant-garde kinesis, specifically because their perspectives conflict with the art historical frameworks that determine early modern kinesis as a precursor to digital art. Christov-Bakargiev’s direction does not necessarily challenge this argument but provides room for considering alternative historical narratives that run parallel to digital art history. *Revolutions – Forms that Turn* is a unique example of a contemporary art institution forming and reconstructing art historical lineages, not only because of the scale and breadth of the exhibition, but also because, as I have argued, it stands as an explicit divergence from traditional curatorial plans of biennales. Rather than focusing on emerging and ever-changing contemporary artistic tendencies, as most biennales do,166 the sixteenth Biennale of Sydney was used to encourage reflections on contemporising modernity, as well as drawing divergences and references between contemporary art and art history.

**Conclusion: Contemporary Exhibition of Modern Kinesis**

Christov-Bakargiev’s curatorial direction at *Revolutions – Forms that Turn* has projected a nature of contemporaneity and contemporary art history that collapses temporal distinctions among modern, postmodern, and contemporary art. The Biennale is an articulation of the present as a process that unfolds in time, while also accumulating and preserving the past within it.167 This arrangement encourages considerations about formal and political movement, and a reflection on the cyclical, linear, or heterogeneous ways art

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167 Serres, p. 45.
history has explored the tropes of revolution, form, movement, and time. By exhibiting a higher concentration of modern avant-garde than contemporary art, construction of contemporary art history that depends on the above-mentioned modern tropes is emphasised. These approaches to temporality and contemporary art history also open new ways to think about the artists and their works that feature in the Biennale. An effect of this spectacle of modern kinetic art in contemporary art history is that it re-situates kineticism as a key driver of modern and contemporaneity today. This suggests that actual movement in art can be used as a resource for unpacking aspects of contemporary art and society today, particularly in regards to a number of approaches, expressions, and conceptualisations of time today. The Biennale enframes an historical lineage between modern kinetic sculpture and contemporary installation that breaks away from associations of kinetic as a purely modern machinic tendency in art, but is also valuable to unraveling aspects of contemporaneity today. Therefore, a reconsideration of how artists have used movement to express and engage with time in the past is valuable for understanding contemporaneity in contemporary art.

*Revolutions – Forms that Turn* is therefore a significant exhibition for bringing to the fore discussions about the roles and effects of kinetic art for contemporary audiences. This is particularly in relation to sculptural movement as a way to engage audiences and influence their understanding of what it is to be with time in art. The next chapter addresses this connection in more detail. It presents the 1960s as a significant period because kinetic artists in the decade of the ‘kinetic kraze’\(^\text{168}\) were devoted to expanding the understanding and use of temporality in art. The technological expansion after WW2, and the domestication of communications and computing technologies, gave rise to new polemics and perceptions of movement and time, and this is significant for understanding how and why the term ‘kinetic’ has been framed by contemporary art history as a modern machinic practice.

Closely related to the space problem in sculpture is the problem of Time…the latter
still remains unsolved, being complex and obstructed by many obstacles.\textsuperscript{169}

The moderns were obsessed with the secrets of time.\textsuperscript{170}

The 1960s is marked as a key decade in the twentieth century that grappled with
technological, social, and political transition within the ‘turbulent era’ of modernity,\textsuperscript{171}
which experienced a ‘peculiar form of acceleration’.\textsuperscript{172} This time of transition has also
formed the foundations of contemporary art, theory, and history. As Lee has identified,
‘what might seem a sixties problem is embedded in the web of our own present … its
implications get played back – like a tape-loop – between our contemporary moment and
that of the recent past’.\textsuperscript{173} For Lee, contemporary art history draws from this recent past as
a means for understanding the foundations of contemporary art and theory. The
contemporary is therefore marked, in part, by the return and reflection of art, theory, and
exhibition in the decade of the 1960s.

Additionally, contemporary art historians have at times considered kinetic art in the 1960s
as a popular but brief tendency that experimented with the movement of mechanical
media.\textsuperscript{174} As Yves Alain-Bois has recently stated, kinetic sculpture was a phase during this
time that, despite its popularity in Europe and North America, came and dissipated

\textsuperscript{169} N Gabo, ‘Sculpture: Carving and Construction in Space, \textit{Gabo on Gabo: Texts and
Interviews}, p. 112.

\textsuperscript{170} Jameson, ‘End of Temporality’, p. 697.

\textsuperscript{171} Selz, \textit{Art in a Turbulent Era}, pp. x-xvi.

\textsuperscript{172} R Kocelleck attributed modernity with a ‘peculiar form of acceleration’ – cited in Lee,
2007, p. xii.

\textsuperscript{173} Lee, \textit{Chronophobia}, p. xvi.

\textsuperscript{174} Popper, \textit{Origins and Developments of Kinetic Art}. See also: G Brett, \textit{Kinetic Art},
quickly\textsuperscript{175} due to the growing antiquity of modern industrial media in a new technological age. However, as I emphasised in the previous chapter, avant-garde kinetic sculpture continues to be a site for exploring the ‘peculiar acceleration’ of modernity and its influence over the conceptualisations of movement, time, speed, and acceleration in the present day.\textsuperscript{176} In light of Lee’s approach to art in the 1960s, perhaps kinetic art during this decade can also contribute to a specific consciousness of time in contemporary art history.\textsuperscript{177}

This chapter focuses on the 1960s as a period that expresses a turbulent relationship to time in art that reflects a wider social and technological transition in society. The chapter considers this period as a decade of temporal turbulence in contemporary art history, where artists used kinesis to reflect on this technological transition and expanded the role, effects, and changing concepts of time in art. While art historian Charlie Gere has argued that the artistic responses to the increasingly accelerated society throughout the nineteenth century is a significant element of modern art,\textsuperscript{178} I argue that the 1960s is an especially important decade of debate on the role of time in art as it is the nexus between two technological societies. I also argue that kinetic artists in the 1960s created kinetic sculpture to express and critique technological rationalisations of time while also attempting to build new perceptions of temporality.

Firstly in the chapter I will address the 1960s as a decade that is marked by a temporal turbulence, where the role and function of time in art was debated and experimented with utopianism, uncertainty, and resistance. The increasing use of new technological media in art was often used as a gateway to discuss the changing conceptions of temporality in society, which brought new perceptions of the role of time and technology for an increasingly ontologically unstable definition of a work of art.\textsuperscript{179} Secondly, Michael Fried’s seminal essay, ‘Art and Objecthood’ is a quintessential example of the turbulent relationship to time in art that was expressed during this period. Fried’s perspective

\begin{flushleft}
\textsuperscript{175} Bois, ‘Force Fields’, p. 145.
\textsuperscript{176} Althusser & Balibar, \textit{Reading Capital}, pp. 99.
\textsuperscript{178} C Gere, \textit{Art, Time and Technology}, p. 2.
\end{flushleft}
presents the hesitancy towards open durational artworks, because he considers time in art as a threat to modern formalist understandings of a work of art. 180

Following this, I address Directions in Kinetic Art (1965) held at the Berkeley Museum of Art as a key exhibition that discussed kinetic art as a practice that had potential to create new perceptions of time in art. 181 Although the exhibition was not the earliest to feature moving sculpture, it was one of the first to discuss and debate kinesis as an aesthetic within the 1960s avant-garde. 182 For instance, the curator Peter Selz, and the artists in the exhibition, discussed kinetic movement as an artistic tool to explore the differences between the sensations of mechanised time and the subjective experience of time. What is significant about the discussions that emerged through the exhibition and its corresponding symposium is the frequent return to the relationship between temporality and kinesis. 183 From the literature that documented this exhibition, it is clear that the term ‘kinesis’ was used by Peter Selz, with the intention of cultivating sensitivity towards movement as an expression of time in an era of social and technological turbulence. 184 Therefore, rather than a chronophobic approach to time in art, 185 this chapter presents Directions in Kinetic Art as an attempt to bring attention to, and expand the role and affect of, time in art.

Finally, while Jean Tinguely’s early kinetic performances Homage to New York (1960) and A Study for an End of the World (1961/1962) are often addressed as critiques of capitalist production and consumption, 186 in this chapter I will highlight these auto-destructive works as performances that orchestrate specific experiences of temporality. In both works Tinguely brings an awareness of the passing present to the fore, and problematises Fried’s argument against durational works of art. These destructive mechanical performances also

182 Other exhibitions during the late 1950s and early 1960s include: Le Mouvement (1955) Denise René Gallery, Paris; The Responsive Eye (1965) MoMA New York
184 Ibid., pp. 275-285.
185 Lee, Chronophobia, pp. 8, 38, 81.
present the potentiality for open time systems to operate across various modern industrial
and telecommunication technologies. Tinguely’s use of duration in his art indicates a
desire to explore the changing conceptions of time-space that emerged through the
experimentation of the new technological media that emerged after WW2. In this respect
Tinguely’s work contributes to a practice of kineticism in the 1960s as an exploration of
the technological rationalisations of temporality in art, as well as a means of bringing
awareness to, expanding, and complicating the perceptions of duration.

The Polemics of Time and Technology in Art in the 1960s.
Avant-garde sculptural artists in Europe and North America in the 1960s began to
experiment with the ways in which time could be explored through art. This was evident in
areas both inside and outside of kinetic sculpture. For instance, in his essay titled, ‘Entropy
and the New Monuments in 1969’, Robert Smithson reflected on the emerging minimalist
and conceptual tendencies that, he argued, came to characterise sculpture in the 1960s.187
Within these new trends, the shifting perceptions of temporality became central
components, not only of sculpture, but also within the wider milieu of art in the 1960s. He
wrote:

Instead of causing us to remember the past like the old monuments, the new
monuments seem to cause us to forget the future [sic]. Instead of being made of
natural materials, such as marble, granite, plastic, chrome and electric light. They
are not built for the ages, but against the ages. They are involved in a systematic
reduction of time down to fractions of seconds, rather than in representing the long
spaces of centuries. Both past and future are placed into an objective present.188

For Smithson, artists like Donald Judd, Dan Flavin, Robert Morris, and Sol Le Witt were
creating works that reassessed traditional time-space relations between the viewer and the
work of art. They conflicted with modern notions of a work of art by creating works that
moved with time, rather than representing it.189 By making sculptural works that were

188 Ibid., p. 11.
ontologically unstable, they also emphasised polemics between form and content in conceptual art. In this sense, according to Smithson, the use and discussion of duration in sculpture was a means for artists to dematerialise their works and discuss their art from a post-object vantage point.\(^{190}\)

Smithson’s essay echoes a regard for time that Tinguely had presented a decade earlier. In 1959, at the Institute of Contemporary Arts in London, Tinguely argued against the traditional representations of time in art, and for his audience to become aware of the experience of the present as it unfolds. Tinguely stated:

> The constant of movement, of disintegration, of change and of construction is static. Be constant! Get used to seeing things, ideas and works in their state of ceaseless change. You will live longer. Be permanent by being static! Be part of movement! Only in movement do we find the true essence of things. Today we can no longer believe in permanent laws, defined religions, durable architecture or eternal kingdoms …. We are still very much annoyed by out-of-date notions of time. Please, would you throw away your watches! At least, toss aside the minutes and hours.\(^{191}\)

Both artists recognised that addressing time in art was an effective means for engaging with the structural codes of high-modernism.\(^{192}\) Both Tinguely and Smithson emphasise time as a state of constant change within an objective present.\(^{193}\) Their approach to time is used to harness the attention of their audiences in order to engage with their works as experiences rather than representations of time. While Smithson was more concerned with conceptual and minimalist art, Tinguely brought attention to time through his neo-dadaist manifesto and kinetic sculpture.


\(^{193}\) This approach to time resonates with Henri Bergson’s notion of duration. See: Bergson, *Time and Free Will*, pp. 75-139.
The ‘kinetic kraze’ of the 1960s in Europe and North America has been described as a celebration of the motion of machinic technologies.¹⁹⁴ For instance, the Pepsi Pavilion at the Osaka World Fair (1970) presented kinetic artists featured in the exhibition, as forerunners of American art who had represented an aesthetic for technological art to international audiences. Organised by Billy Klüver’s *Experiments in Art and Technology* (E.A.T), the pavilion involved a collaboration of artists and engineers who created a range of participatory works, responsive environments, large-scale kinetic installations, virtual reality interfaces and manufactured ecological environments.¹⁹⁵

Robert Breer’s motorised minimalist fibreglass dome shaped ‘floats’¹⁹⁶ slowly glazed around the outskirts of the pavilion. The artist jokingly likened them to emblems of American technological progress¹⁹⁷, as he recalls: ‘I thought, how typically American it

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would be to actually motorize a Zen garden!’.

Amongst the high-speed light shows and immersive environments at the pavilion even the most seemingly static works were motorised, with Breer’s kinetic sculptures moving at a rate so slow, their movements were barely perceptible (less than two feet per minute). The works exhibited by the artists were publicised not only as an experimentation of technological art but, also as a display for international audiences of an advanced technological American society. Similarly to the Kitchen Debate between vice President Richard Nixon and Soviet Premier Nikita Krushchev in 1959, the Pepsi Pavilion was projected to international audiences to reveal an array of technological achievements mastered by American artists. Among which kinetic artists like Breer, David Tudor, and Robert Rauschenberg were key representatives.

Considering the use and presence of kinetic sculpture at the Pepsi Pavilion, the association between kinetic sculpture and the modern machine aesthetic was a strong one in 1970. This has also been indicated by Alvin Toffler, who argued that the ‘kinetic image’ in art at this time was a celebration of the materiality of industrial machinery. Toffler describes:

[k]inetic sculpture or constructions crawl, whistle, whine, swing, twitch, rock or pulsate, their light blinking, their magnetic tapes whirling, their plastic, steel, glass

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and copper components arranging and rearranging themselves into evanescent patterns within a given, though sometimes concealed, framework.203

The technological utopianism of this time also deemed kinetic artists as pioneers of artistic progress. For instance, art historian Jonathan Benthall has reflected that kineticism was ‘an attempt to develop a theory from which a new art might grow’,204 rather than lamenting early European avant-garde kinetic experiments in art. Therefore, leading up to 1970, kinetic sculpture was considered as a popular emerging technological practice that pioneered the experiments between art, science, and technology.205 Similarly art critic Katherine Kuh once commented, that ‘[k]ineticians are space-age artists’ who responded to the social and technological turbulence of the time.206 A strong cohort of artists and exhibitions that discussed new technological artistic practices in the future indicates this.207

Many have associated kinetic sculpture with material and mechanical abundance including, Jack Burnham,208 Jonathan Benthall,209 Alvin Toffler,210 and Stephen Peterson.211 The popularity and dominance of kinetic art at this time also suggests that it had the potential to foreground anxieties, visualisations, and critiques of changing technological time codes. For John McHale, the technological expansion after WW2 needed to be expressed and critiqued by artists utilising the same newly domesticated innovations.212

208 Burnham, pp. 218-224.
210 Toffler, pp. 156-158.
This provides one explanation of the popularity of kinetic sculpture at this time. As he states, ‘[a]ccelerated changes in the human condition require an array of symbolic images of man [sic] which will match up to the requirements of constant change, fleeting impression and a high rate of obsolescence’.\textsuperscript{213} Therefore, kinesis was not only used to celebrate a machine aesthetic, but also to explore and discuss the sense of accelerated change in modern society.

Additionally, the post-modern aesthetics that were emerging at the end of the 1960s destabilised the notion of time as a central mechanism for regulating society.\textsuperscript{214} To follow Jean-Francois Lyotard, post-modernity predominantly works through a framework of reterritorialising the modern power structures.\textsuperscript{215} This is achieved by using space as a mechanism for destabilising this hierarchy.\textsuperscript{216} For Jameson, this is further evidenced by the technological shift that has moved from the speed of the mechanical machine towards the instant nature of the digital age.\textsuperscript{217} This new transition also prioritised spatial, rather than temporal codes,\textsuperscript{218} thereby marking the 1960s as a decade of temporal turbulence.

If, as Jameson has argued, modernity is in part characterised with an ‘obsess[ion] with the secretes of time’, postmodernity is as enamored with space.\textsuperscript{219} The 1960s marks a specific nexus in time when the transition between modernity and postmodernity was most evident.

\textsuperscript{213} Ibid., p.156.
\textsuperscript{214} F Jameson, ‘Periodizing the 60s’, \textit{The Sixties Without Apology}, Minneapolis, University of Minnesota Press, 1984, pp. 178-209.
\textsuperscript{219} Jameson, ‘End of Temporality’, p. 697.
Jameson’s argument can be mirrored through the antonymous reactions to kinetic art in the 1960s. While some regarded kinesis as the newly emerging dominant form of art that celebrated the movement and interaction with technology in art, by the end of the decade the practice was considered to be an antiquated modern form of art. The shift from the temporal towards the spatial, as Jameson has identified, explains both the celebration of, and criticism against, kineticism, precisely because artists used kinesis to express and explore machinic rationalisations of temporality.

The computer age that emerged during the aftermath of WW2 is, amongst others, a key contributor to this acceleration that produced what Reinhard Koselleck has described as a ‘peculiar’ temporality that differs from the expression of movement earlier in modernity. For Koselleck, what is different about the acceleration of the everyday within the computer age is the substitution of movement with the speed of information systems. The speed at which actions, information, and feedback can be projected, redistributed, accessed, and processed in the computer age contributes to an increasingly isolated and stationary individual. This is in contrast to the tropes of segregation, repetition, and alienation associated with the spectacle of the modern industrial revolution, that postmodern machines accelerate.

Art historian Pamela Lee has argued that artists in this decade of technological transition created art that was sensitive to the ‘bleak prognosis for the condition of time in late modernity’, where the spatialisation of time became an indication of a transition from

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221 For instance, Clement Greenberg described machinic art as an ineffective means of ‘non-art’, ‘The look of machinery is shunned now because it does not go far enough towards the look of non-art, which is presumable an ‘inert’ look that offers the eye minimum of ‘interesting’. See: C Greenberg, *Modernism with a Vengeance*, Chicago, University of Chicago, 1986, p. 252.
222 R Kocelleck attributed modernity with a ‘peculiar form of acceleration’ – cited in Lee, 2007, p.xii
modernity to postmodernity. Through this, Lee argues that even though temporality was at one point a site of power, it became ‘understood as at once desperate and fatal’. This bleak prognosis, as Lee has described, is a consequence of newly emerging time-space relationships formed by the domestication of technological expansion and increasing presence of the emerging post-modern society.

Lee considers that temporality in this period was under threat. A combination of social and political turbulence, fears of international nuclear warfare, cold war tensions, and America’s military engagement in Vietnam provided implications that ‘the time’ as people saw it then, was at risk of great change. Combined with the domestication of computing technologies in the public and private spheres in the 1960s, discussions around the changing rationalisations of time through art surfaced. Lee approached a broad range of artists such as Andy Warhol, Pol Bury, Jean Tinguely, and On Kawara and suggested that they were amongst those who explored the phobic relationship to temporality in society.

For Lee, the contemporary art historical emphasis on these artists suggests that not only were the 1960s a time that developed a fear of time described as chronophobia, but that this condition has also continued through to contemporary art, theory, and history.

Additionally, despite the strong technological enthusiasm in the 1960s, there was also trepidation towards the consequences of a newly emerging technological society.

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Technological militarism was a particularly strong incentive for being skeptical of the expansion, domestication, and appropriation of an emerging technological society, particularly considering the domestication of war atrocities, international nuclear and cold war tensions. The culmination of these trepidations and celebrations of technological innovation pinpoints exactly to why Peter Selz described later modernity as a ‘turbulent’ era, full of disorientation that artists struggled and attempted to engage with.

Daniel Rosenberg suggests in *Cartographies of Time* that the desire to chart time, and create visual representations of its flows in an attempt to understand it, are more often created during periods of social and technological change. That is, even though to write or represent time is an attempt to territorialise what can never truly be represented, mapping time indicates an uncertainty around the changing perceptions of time and space in society. Considering this, the tendency for artists to create time-based arts in this decade presented movement and time as unstable elements in a work of art. Or as Smithson has suggested, artists in the 1960s created works that stood against time as an indication, of social and technological transition.

And yet, in contrast to Lee’s bleak prognosis, of a desperate and fatal temporality in the 1960s, it was also a unique decade where artists also attempted to expand the modern conceptions of time in a chronomanic, rather than a chronophobic manner. Prior to the domestication of computing technologies, kinetic artists worked at unlocking the ‘secrets

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236 Jamison and Eyerman, p. 6.
240 Debord, pp. 100-117.
242 Ibid., p. xi.
of time’ with electro-mechanical media. The expansion of technological artistic media, and new discussions and understandings around the representation and visualisation of movement and time, also presented an opportunity to orchestrate new perceptions of temporality. In short, what is specific to kinetic artists of the 1960s is an expanded range and vocabulary for discussing the perception of time in art, rather than simply exploring the form of actual movement.

This is indicated through the use of real-time in art across a variety of practices. For instance, the popularity of Fluxus art, Allan Kaprow’s Happenings, and John Cage’s 4’33” have each been interpreted as widening the role of time in art. Through this, they use temporality as a tool for widening the perceptions of the everyday, and breaking down high-modernist conceptions of a work of art as being autonomous, material, and fixed in time and space. The popular collaborations between artists and engineers orchestrated by E.A.T, founded by Robert Rauschenberg, Billy Klüver, Fred Waldhauer, and Robert Whitman, also concentrated on the incorporation of interactive computer based systems art, participatory theatre, interactive systems, and the innovative power of art in scientific thought. These works generally distribute time by making their works respond and interact with their audiences. Through this, the artists present the new relationships with time that a viewer can have with technological art. Each of these examples demonstrate a wider desire by artists to activate and register the nature of perception and to also query

243 Jameson, ‘End of Temporality’, p. 697. Although it is also important to note that a number of kinetic artists were also working with the movement of natural forces such as wind and water without mechanical engines. For example, Alexander Calder’s mobiles, Lygia Clark, Julio le Parc, ZERO and Yaacov Agam’s interactive sculptures.


247 C Gere, Digital Culture, pp. 81-87.


250 Popper, Origins and Developments in Kinetic Art, pp. 202-212.
new perceptions and definitions of a work of art. Hence, using movement to express and orchestrate perceptions of time became appropriate tools for critiquing the nature of temporality in this period. This is particularly so because the technological rationalisations of temporality were also under transition from mechanical to cybernetic media.

The technological expansion of the 1960s also brought new possibilities for the implementation and discussion of artworks that moved in real time to their viewers. Umberto Eco claimed that kinetic sculpture was an appropriate tool for presenting his theory of the ‘open work’ within the visual arts because they are not works that are fixed in space and time, but unfold with the viewer and their perceptions. For Eco, art that unfolds in real-time enables a specific constellation of perception to be made. The entire work of art cannot be grasped entirely at one time, but demands a perception that builds with duration, a form of perception that is a form of becoming with the object itself.

Additionally, Willoughby Sharp, the curator of art exhibitions such as Air Art (1968), described kinetic art as the prime medium for elaborating on the effect of time when considering art as an ‘open work’. In Sharp’s words the artists of Air Art, such as Graham Stevens, Hans Haacke, Pol Bury, Andy Warhol, Les Levine, and Robert Morris

251 It is also important to note the works by Fluxus, who focused on process arts. An example of E.A.T’s time-based theatre includes Robert Rauschenberg’s Open Score, which involved the performance of two people playing tennis, with microphones attached to their racquets. Each time one of the racquets made contact with the ball, a spotlight illuminating the court went out until the entire space was in total darkness. See: 9 Evenings Reconsidered: Art Theatre and Engineering, Cambridge, Massachusetts, The MIT Press, 2006. Richard Kostelanetz has suggested that what separates kinetic ‘environments’ from Happenings is that they are more ‘closely planned, their space is more specifically defined and constricted, and the behaviour of the participants (or components) is more precisely programmed. However, they are, like happenings, structurally open in time and, as forms, capable of encouraging participatioonal attention’. See: R Kostelantz, A Theatre of Mixed Means: An Introduction to Happenings, Kinetic Environments and Other Mixed-Means Performances, Great Britain, Pitman Publishing, 1970, p. 6.


254 Ibid., pp. 86-87.

255 Ibid., pp. 86-87.

form works that ‘create time’. For Sharp, the durational works in the exhibition expand the perceptions of temporality by unfolding in the same time and space as the viewer, inviting them to be a part of a spectacle in real-time. Sharp continues, ‘[k]inetic works are more accurately designated as systems….Their major function is providing information about how to adapt our extended faculties to technology’. For this reason incorporating time and movement into art provided the potential for further creation and new perspectives of time.

The polemics between art, time, and kinesis during the 1960s can, then, be reflected on as a period of uncertainty around the emerging machine aesthetics. While the technological and social changes of this period have warranted descriptions of new conceptions of temporality, peculiar acceleration, and even phobic conditions to time-based arts, these arguments form part of a wider debate that expanded the awareness of the role and affect of real-time in art. They have contributed a heterogeneity of understandings that renegotiated time-based arts as real-time systems, and open works that responded to the changing perceptions of time in society.

**Against Duration: Art and Objecthood**

One of the most widely discussed critiques against the incorporation of time in art is Michael Fried’s essay, ‘Art and Objecthood’. Published in *Artforum* in 1967, Fried’s

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262 Lee, *Chronophobia*, pp. xi-xxv.
264 Eco, *The Open Work* pp. 85-87.
essay is indicative of an anxiety towards real-time in art, because it positions duration as a
catalyst for destabilising modern conceptions of a work of art.266 In ‘Art and Objecthood’,
Fried argues that duration reduces sculpture to theatricality and prevents the practice from
expressing the complexities of high modernism. Fried’s premise is largely formed against
Minimalist artists (including of ABC Art, Primary Structures and Specific Objects), and
more specifically the works and texts by American artists such as Donald Judd, Robert
Morris, and Tony Smith. However, even though his essay is most explicitly directed
towards these artists, it also stands as a critique against artists orchestrating a sense of
duration in their art across a variety of disciplines.267

Fried argues that the works by these artists are produced with a specific ‘objecthood’,268
which is entirely dependent on their reception, interpretation and presence of the viewer.
For Fried, these works are made so that their experience and meaning is entirely reliant on
the viewer, rather than the artist.269 This dependency on the viewer to interpret and project
meaning onto these pieces, for Fried, reduces the artwork to a mere object, rather than a
crafted work of art that has been codified with meaning by the artist. Because of this Fried
argues there is an induced theatricality at play between the artist and the viewer where ‘the
literalist espousal of objecthood amounts to nothing other than a plea for a new genre of
theatre, and theatre is now the negation of art’.270 For instance, the experience with a
minimalist work of art is entirely dependent on this relationship between viewer and
object, to which the works offer very little in return because perception is projected onto
the object rather than being drawn from it by the viewer. This is creates a slippage between

242. For contemporary analyses of Fried’s argument, see Lee, Chonophobia, pp. 34-37;
Stephen W. Melville’s Notes on the Reemergence of Allegory. See also: Henry M. Sayre,
The Object of Performance: The American Avant-Garde Since 1970, Chicago, Chicago
Essays on the Writings of Michael Fried pp. 61-96; G Kester, Conversation Pieces:
Community and Communication in Modern Art, Berkeley, University of California Press,

266 Fried, ‘Art and Objecthood’, pp. 166-167

267 Ibid., pp. 166-167. See also: S Gaggi, ‘Sculpture, Theatre and Art Performance: Notes


270 Ibid., p. 153.
objects of art and non-art, or objecthood, which Fried argued devalued the integrity of sculpture.\textsuperscript{271}

This is stated explicitly in ‘Art and Objecthood’ where Fried posits that ‘theatre and theatricality are at war today, not simply with modernist painting (or modernist painting and sculpture), but with art as such’, because duration has the potential to collapse the plastic arts into theatrical events.\textsuperscript{272} Fried is adamant that artists who execute similar presence or performativity, are eroding the quality and status of modern sculpture and therefore must be ‘defeated’.\textsuperscript{273} Fried makes it clear that in order for sculpture to reach what he considers a modern high-art aesthetic complexity as rich as painting,\textsuperscript{274} its primary concern should be to abandon any tendency that draws sculpture closer to the temporal, rather than the plastic arts.\textsuperscript{275}

Fried argues that a key reason why theatricality in sculpture must be abandoned is because of the way durational works are ontologically unstable and unfold in real-time with the viewer. In these instances, time is not embedded in the form of the work, but is projected as a seemingly endless present that resides between the viewer and the work of art.\textsuperscript{276} Time of course exists in the plastic arts: time-space relations are codified in the representation of works, and also too, works of art exist in time, as they are subject to decay and destruction. However, time-based arts such as participatory art, as well as minimalist and kinetic sculpture, are developed with a duration, in which meaning unfolds in time. Fried is critical of the ‘sense of temporality, of time both passing and to come, simultaneously approaching and receding, as if apprehended in an infinite perspective’,\textsuperscript{277} which forms a key concept for his argument against theatricality in sculpture.\textsuperscript{278} In Fried’s words, duration ‘persists in time and the presentment of endlessness that, I have been claiming, is

\textsuperscript{271} Ibid., p. 152.
\textsuperscript{272} Ibid., p. 160.
\textsuperscript{273} Ibid., pp. 167-168.
\textsuperscript{274} Ibid., pp. 163-166.
\textsuperscript{275} Eco, pp. 84-104.
\textsuperscript{277} Ibid., p. 167.
\textsuperscript{278} To quote Fried: ‘Endlessness, being able to go on and on, even having to go on and on, is central both to the concept of interest and that of objecthood’. See: Fried ‘Art and Objecthood’, p. 167.
central to literality art and theory is essentially a presentment of endless or indefinite duration. Therefore, for Fried, a work of art that expresses duration reveals an incompleteness or weakness and suggests that the sculpture develops with and in the time of its viewers. Fried argues that modern painting and sculpture should be ‘wholly manifest’, have ‘no duration’ and be created with a specific representation of time that is embedded in the ontological form of the work.

Such an attack affects the interpretation of kineticism in art, particularly artists who were engaging with kinesis as a tool for critiquing society as a spectacle. Instead of experimenting with this, Fried is determined that the formal structures of sculpture should enframe time and bind it to the object. This critique against artists who attempt to restructure and restructure the aesthetic of sculpture by exploring expressions of temporality also make an attack on the wider practices of technological art, robotics, media art, participatory art, and happenings at the same time. Rather than having the potential for creating new emerging artistic practices and emphasising new differences between them, Fried argues that duration in art conflates and reduces the plastic, to the temporal arts.

Fried’s argument serves as a strong indication of the confusion and debate that circulated around the incorporation of real-time in art. Susan Sontag has also identified the uncertainty around temporality and stated that artists in the 1960s either created work that perpetuated an ‘intensification of what each art distinctively is’, or that consisted of a ‘vast behavioural magma or synthesis’, two strains which for Sontag are irreconcilably opposed to one another. Sontag argues that time-based plastic art risks being interpreted as a hybrid of practices, rather than an exploration and strengthening of the effects and capabilities of sculpture and theatre in a time of technological flux.

Also contrary to Fried’s argument, Rosalind Krauss has drawn attention to the fact that the exchange between kinetic dynamism, sculpture, architecture, and theatre has had a strong tradition in both Europe and the United States, a tradition that she identified as continuing...
throughout the 1960s. To dismiss the productive slippages between theatre and sculpture is therefore also to dismiss the dominant art history of kinetic sculpture. To argue that temporality erodes the aesthetic structures of sculpture misinterprets, at least in regards to kineticism, the efforts made by modern kinetic artists. Krauss argues this exact point when she writes,

Fried had asserted that theatricality must work to the detriment of sculpture – muddying the sense of what sculpture uniquely was, depriving it thereby of meaning that was sculptural, and depriving it at the time of seriousness. But the sculpture I have just been talking about is predicated on the feeling that what sculpture was is insufficient because founded on an idealist myth [sic]. And in trying to find out what sculpture is, or what it can be, it has used theatre and its relation to the context of the viewer as a tool to destroy, to investigate, and to reconstruct.285

Krauss points out that the experimentations of interdisciplinary practices, genres, and temporalities arise as methods of reconstruction, rather than a weakened conflation.286 An important aspect of Krauss’ argument lies in her view that kineticism is a tendency that runs parallel to the post-object minimalist art by Donald Judd and Robert Morris, achieving a similar effect in expanding the formal and conceptual relationships between sculpture, time, theatricality, and spectacle.287 In this regard, kineticism was used to move sculpture beyond the materiality of the object, and extend its conceptual and durational boundaries.

Gene Youngblood’s Expanded Cinema applies a similar approach to Krauss, with respect to the experimentation of time-based arts. Youngblood emphasises the differences between film, theatre, installation, and sculpture that have emerged from the creation of

284 Krauss, Passages in Modern Sculpture, p. 207. Krauss uses Laszlo Moholy-Nagy’s Light Space Modulator [or, as she terms Light Prop] as one example of this connection between sculpture and theatre. She also draws a link between Moholy-Nagy and his European contemporaries with the works by Nicolas Schöffer, Otto Piene, Len Lye, Jean Tinguely, Claes Oldenberg, and Hans Haacke.


287 Ibid., pp. 201-202.
Youngblood, like Krauss, demonstrates that it is only through the dissolution of traditional distinctions that new artistic genres emerge and investigate the limits of what constitutes form. For instance, the incorporation of duration raises questions around intermedia theatre, projected environments, and expanded cinema as distinctive aesthetic forms. To quote Youngblood:

Although intermedia theatre draws individually from theatre and cinema, in the final analysis it is neither. Whatever divisions may exist between the two media are not necessarily ‘bridged’, but rather are orchestrated as harmonic opposites in an overall synaesthetic experience. Intermedia theatre is not a ‘play’ or a ‘movie’; and although it contains elements of both, even those elements are not representative of the respective traditional genres.

Youngblood pinpoints kinetic environments as a way for considering the consequences of artists working within and through kinetic sculpture, theatre, and public works. Sontag, Youngblood, and Krauss understand that time-based arts can collapse the distinctions between aesthetic practices and also reconstruct traditional modes of representation. Therefore, through duration, an exploration of the differences between sculpture, theatre, cinema and performance is facilitated.

As noted earlier in this chapter, the debate that has surrounded ‘Art and Objecthood’ since its publication indicates that Fried’s disregard for the use and expression of duration is symptomatic of the temporal turbulence in the 1960s. Fried’s argument in ‘Art and Objecthood’ presents a polemic for artists experimenting with kineticism as an expression of time because, so Fried argues, duration reduces sculpture to a spectacle of theatricality, which resists a modern definition of a work of art. The shift towards expressing temporality through kinetic dynamism is another indication of the technological change and new means for conceiving and experiencing time in the everyday, in a manner that differs from modern industrial conceptions and practices of time.

289 Ibid., p. 365.
The popularity of kineticism in Europe and North America indicates the desire to understand the role and effects of time in art during the 1960s. While some exhibitions of kinetic sculpture focused on kineticism as an exploration of a modern industrial machine aesthetic, others such as *Le Mouvement* (1955/1967), *Slow Motion* (1967), *Kineticism: Systems Sculpture in Environmental Situations* (1968), *Place and Process* (1968), *Kinetic Environments I and II* (1967), and *Air Art* (1968) presented artists who were engaged with using movement as an expression of temporality. For instance Yaacov Agam, an artist who had already participated in exhibitions such as *Le Mouvement*, uses mechanical movement to emphasise time as a state of transience. For Agam, his works highlight a sense of time as a constant transformation to highlight that: ‘We are different from what we were three months ago, and in three minutes more, we will again be different.[…]The image appears and disappears, but nothing is retained’. Rather than using mechanical media to articulate movement, speed and acceleration, Agam’s kineticism is focused on modern industrial media as a tool for exploring the perception of time as a constant duration.

Like Yaacov Agam’s approach to time, *Directions in Kinetic Sculpture* at the Berkeley Museum of Art (1966) exhibited a generation of emerging kinetic artists who were interested in the role and effects of movement as an expression of time. One year prior to

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294 *Slow Motion*, Rutgers University, New Jersey (1967) curated by Willoughby Sharp.


Fried’s Art and Objecthood, the exhibition *Directions in Kinetic Sculpture* was certainly not the first exhibition to feature a generation of young artists working with mechanical movement, however, it was one of the first to openly discuss kineticism in a self-reflexive manner. The public reception of the exhibition was extremely positive with over 80,000 attendees, which indicated that kinetic sculpture had a future as an accessible and democratic modern art form.

In the exhibition catalogue, documentary material and transcripts from the exhibition and symposium of *Directions of Kinetic Art*, the artists and curator Peter Selz discussed the roles and effects of movement in sculpture. Rather than showing an historical survey of kinetic sculpture, Selz curated the exhibition to feature 15 artists, who he saw was representing the post-war generation of artists experimenting with the affects of actual movement in art. The artists featured were predominantly from Europe and North America and included, amongst others, Fletcher Benton, Robert Breer, Pol Bury, Jean Tinguely, and Len Lye. The exhibition presented kinetic sculpture and installation through four dominant themes: theatrical spectacle, carrier of natural energy (particularly wind and water), of making the invisible visible, and discovering the formal capacity of

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299 For a more extensive view of the kinetic exhibitions at the time, see: Brett, *Force Fields Phases of the Kinetic*, pp. 226-311. See Also: Popper, *Origins and Developments of Kinetic Art*, pp. 190-212.


301 Selz, *Directions in Kinetic Sculpture*, p. 13.


mechanical movement and media. Within these themes, kineticism was presented as a practice that intersected with the physical sciences, neo-dada aesthetics, conceptual and technological art.

Selz made an explicit effort to discuss the varying approaches and definitions of kineticism with the artists at the exhibition and symposium. The shifting conceptions and perceptions of temporality were persistent subjects throughout the symposium, particularly because many of the artists expressed an interest in using kinesis to explore durational rhythms. For instance, in the exhibition catalogue, Selz emphasised the relationship between the kinetic dynamism and Henri Bergson’s duration as a continual process of change, in order to focus on the entropic, unpredictable and productive nature of the present as it unfolds. Selz makes his audience aware of this by emphasising Bergson’s concept of duration in *Time and Free Will*, where the movements of pure duration are ‘internal and heterogenous to one another, and in pure duration a cause cannot repeat its effect since it will never repeat itself’. This description of duration, quoted from Bergson’s *Time and Free Will*, suggests that there are two kinds of multiplicities in time that relate to one another. Firstly, there is ontological quantity (space), and secondly a multiplicity of states of consciousness as a process of qualitative transformation that cannot be quantified (pure duration). For Bergson, this pure duration is the time that we

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304 Ibid., p. 288.
305 Selz points out in the symposium that Kramer describes, ‘[t]he hope of the Utopians to find here finally the art of space-time is absurd. Kinetic art is more closely related to show business than to physics’. While Takis disagreed and offered his aesthetic ancestry ‘to Tale of Miletus, also to Newton, to Maxwell, because those people discovered motors’. See, Selz, *Art in a Turbulent Era*, pp. 291.
306 Exhibitions such as *The Machine as seen at the End of the Mechanical Age*, *The Responsive Eye*, and *Le Mouvement*, celebrated both actual and optical kinetic artworks, without a concern for distinguishing the differences between the two. While, *Directions in Kinetic Art* was directed at three-dimensional actual movement.
309 Selz, *Directions in Kinetic Art*, p. 2.
312 Ibid., p. 233.
experience subjectively. Like our awareness of time when we experience it, time also moves in rhythms – waning and intensifying as it passes – an experience that can never be truly represented by media.\(^{313}\)

Selz claimed that the exhibition explored Bergson’s understanding of duration because the artists produce a variety of ontological and phenomenological effects of movement in their art.\(^{314}\). The exhibition was also considered as a celebration for mechanical, natural, and communicative movements to expand the ways in which movement can be used in exhibition spaces.\(^{315}\) New technological media in movement therefore had the potential to create new sensations and perceptions of duration.\(^{316}\) Selz’s reference to Bergson is both a dedication and complication of Bergson’s relationship to time and technological representation. This is because for Selz and the artists at the exhibition mechanical movement was used to present, rather than represent or abstract, the sensation of pure duration. Because of this, kineticism was considered as a panacea to Bergson’s frustration with modern attempts to signify time.\(^{317}\) This is because for Bergson duration can never be exactly reproduced or represented by mechanical media.\(^{318}\)

The different approaches to movement and time were also openly discussed between exhibiting artists such as Len Lye and George Rickey:

\textit{Lye}: George, do you think of time when you’re composing a figure of motion? Do you consider, well, now I’ve got a thing I want to be about a minute long?

\textit{Rickey}: Well, I certainly consider the velocity, which is an expression of time.

\textit{Lye}: Yeah, but not in terms of ‘tick-tick’.

\(^{316}\) Selz, \textit{Art in a Turbulent Era}, p. 288.
\(^{317}\) \textit{Ibid.}, p. 288.
\(^{318}\) Bergson emphasises that the only real movement in film is the movement of the projecting apparatus. See: Bergson, \textit{Creative Evolution}, pp. 322-323.
Rickey: A little slower than that. But I certainly think of it – I think of it all the time...I think rather of time as being a material that can be ordered in an exactly equivalent way that space is a material that can be ordered.319

While Rickey is more concerned with the orchestration of speed and velocity,320 Lye, like Bergson, brings attention to the mechanical rationalisations of time as a constraint for creating works that perform movement and express duration with mechanical media. Similarly, Jean Tinguely used movement to create, rather than to capture time, and present a sense of endlessness through his idiosyncratic non-machines. This is made explicit when he explains, ‘I began using movement simply as a method of re-creation. It was a way of changing the image to make it infinite’.321

Discussing kinetic art as an aesthetic enabled the symposium to explore the ontological implications of kinesis and attempt to separate it from other aesthetics that incorporate movement.322 The symposium and exhibition therefore emphasised kineticism as a catalyst for expanding the role of time in art, and creating new compositions and experiences of time. Selz addressed the panel as follows:

The question that arises is: is this kinetic sculpture a new movement? Is it a specific movement, such as, let’s say, movements which are perfectly clear in one’s mind, like Cubism or Surrealism, which had their beginning, their climax, their decline?...Are we dealing here with a specific kind of movement in art, or is it an art form, which has nothing to do with a specific movement?323

322 It is important to note that there is a considerable amount of cross over between theatre, sculpture, happenings and performances. See: G Youngblood, Expanded Cinema, New York, Dutton, 1970, Jonathan Benthall Science in Art and Technology Today, New York, Praeger, 1972. Although Jack Burnham’s Beyond Modern Sculpture attempts to draw more formal distinctions between practices, he also acknowledges that in many cases these distinctions are porous: Burnham, Beyond Modern Sculpture, pp. 1-16.
This question may have been designed to encourage debate and discussion between artists at the symposium. It also indicates that there was a distinct attempt to insert kinetic sculpture into the schema of modern art, rather than discussing how kinesis might be used to help redefine the parameters of modernism. Therefore, unlike Fried’s resistance to time-based art in Art and Objecthood, the artists and curator at Directions in Kinetic Art used movement and temporality as mechanisms to strengthen and explore kineticism as a sculptural aesthetic, rather than as elements that reduce sculpture to theatricality. Directions in Kinetic Art was also a significant exhibition during this time because it openly discussed and debated the role of mechanical media in movement as a vehicle for exploring the functions of temporality in art.

Orchestrating Time: Jean Tinguely’s Auto-Destructive Machines.

Selz’s decision to include Jean Tinguely in Directions in Kinetic Sculpture was informed by the unique calibre, breadth, and humour that Tinguely had already been commended for using in his kinetic sculpture. Tinguely is most recognised in contemporary art history for his neo-realist, neo-dada antagonism and auto self-destructive performances in both Europe and the United States, and has since been referred to as the ‘father of kinetic art’. By 1965, Tinguely had already collaborated with Yves Klein, Nikki de Saint-Phalle, John Cage, and Robert Rauschenberg and the Nouveaux Réalistes (New Realists). Tinguely had also already exhibited his kinetic works with a variety of artists

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325 Carrick, pp. 67-102.

326 Pakesch, ‘Commentary on the Works from 1959 until Today’, p.64.

327 Tinguely’s work was a central feature in both of these exhibitions. Le Mouvement, like Directions in Kinetic Art focused on the upcoming younger generation of artists working with actual and optical movement. Bewogen Beweging was an exhibition of 222 works by 72 artists, while Tinguely was represented by 28 individual pieces, one of which was a three story white machine that was positioned at the entrance of the exhibition. Other exhibitors included: Breer, Bury Kramer, Lye, Mack, Munari, Takis and Tinguely (as well as Josef Albers, Alexander Calder, Marcel Duchamp, Naum Gabo, Alberto Giacometti, Jasper Johns, Kaprow, Laszlo Moholy-Nagy, Victor Pasmore, Robert Rauschenberg, Man Ray, Nicolas Schöffer, Richard Stankiewicz, Tatlin, Vasarely and others. In 1961,
from Europe and the United States. This is inclusive of Le Mouvement (1955), at the Denise Rene Gallery in Paris, and Bewogen Beweging (translated as Art in Movement), curated by Pontus Hultén at the Stedelijk Museum in Amsterdam in 1961.\textsuperscript{328}

In a similar vein to the film Modern Times, which starred Charlie Chaplin,\textsuperscript{329} Tinguely presents a rationale for modern machinery dominating and regulating the times of labour and leisure.\textsuperscript{330} However, to only consider the artist’s oeuvre as a critique of the modern machine aesthetic suggests that the contemporary exhibition of Tinguely’s works to fetishise modern antiquity and neo-dadaist sensibilities common to the Nouveaux Réalistes.\textsuperscript{331} Another pervasive element of many of Tinguely’s works relates to the social engagement with the present temporality as a mode for inciting action, harnessing attention, and manipulating perceptions of duration passing through it.

The four works of Tinguely’s that featured in Directions of Kinetic Sculpture were, Radio Sculpture with Feather (1962), Radio Sculpture Number 5 (1962), Suzuki (1963) and M.K. III (1964). These encapsulate Tinguely’s critique on industrial technology.\textsuperscript{332} Radio Sculpture with Feather (1962) and Radio Sculpture Number 5 are both assemblages of recycled machine parts and transmit live radio sounds out into the gallery space. Rather than as a seamless delivery or depiction of the world in time, the radio transmission is fragmented. It fades in and out of range delivering ‘dismembered’ soundscapes that are juxtaposed against the repetitive motions of the mechanical components of the work.\textsuperscript{333} Radio Sculpture with Feather is a standing metal box comprised of mechanical parts from Tinguely collaborated with Nikki de Saint-Phalle, Robert Rauschenberg and Jasper Johns in Variation II, a concert by David Tudor held at the American Embassy theatre in Paris. See: Hultén, A Magic Stronger than Death, p. 352.

\textsuperscript{328} Sandberg, ‘For Movement’s Sake’, Newsweek, p. 9.


\textsuperscript{333} Carrick, pp. 69-77.

\textsuperscript{332} Selz, Directions in Kinetic Sculpture, pp. 10-11.

different machines and is constructed with an aerial protruding from its head and a feather attached at its end. At repetitive intervals, the sculpture kicks into motion to make the aerial wag wildly in the air above it. Like *Radio Sculpture with Feather*, *Radio Sculpture Number 5* also moves in constant repetitive steps that propel the machine into motion without causing an effect: a machinic performance that is void of producing something other than its movements.

*Suzuki* (1963) and *M.K. III* (1964) are also quintessential examples of Tinguely’s machines fitted with a patchwork of belts and motor parts. Unlike Tinguely’s *méta matics* and self-destructive works, their movement and production is limited to bursts of repetitive actions and rest. *Suzuki* is assembled in a contorted arrangement that balances in a top-heavy pose on its mount, while *M.K. III* is composed with belts that run in continuous loops like empty conveyor belts. By comparison to his auto-destructive performances and antagonist works, these pieces move in a calmer and more regular fashion with their belts looping around and through the sculpture.

These four pieces do little to display the breadth of the artist’s work. If the exhibition aimed to showcase the emerging artists at the time, and the directions in which they were leading kinetic art, Selz curated a conservative image of Tinguely’s kineticism. *Directions of Kinetic Art* did not proclaim to produce a comprehensive range of kinetic works at the time, but rather paid homage to the artists who were attempting to build, produce, and explore the relationship between kinesis and late modernity. In order to gauge the breadth of the artist’s use of movement to orchestrate a specific experience of temporality, it is therefore important to expand this analysis out to other works by Tinguely.

In addition to a critique of modern labour and consumption, Tinguely also uses spectacles of auto-destructive performances to concentrate on the uneasy relationships his audiences form with the temporal present. His mechanical non-machine machines such as *Homage to New York* and *A Study for an End of the World I and II*, propose an inquiry of the present temporality that is conveyed as entropic and unpredictable in contrast to the rationalised and repetitive movements of modern industrial machinery.

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From an early age Tinguely had a fraught relationship with the modern rationalization and regulation of time. For example, before he became an artist he was fired from a department store for ripping the store clock off the wall before storming out in an act of defiance against the social expectation that time equals money.\textsuperscript{336} Later as an artist Tinguely also resisted the regulation of time in a similar vein. For instance, for the \textit{Concert of Seven Pictures} in Düsseldorf (1959) Tinguely distributed 15000 copies of his manifesto titled, \textit{Für Statik} (For Statics) throughout the town via helicopter.\textsuperscript{337} The manifesto called for the honour of actual dynamism and encouraged the production of gestures, motion, and time, in real time, and to abandon forms of static representation in art. The manifesto reads:

Forget hours, seconds, and minutes. Accept instability. Live in Time. Be static – with movement. For a static of the present movement….Live in the present, live once more in time and by Time – for a wonderful and absolute reality….Stop painting ‘time’…live in time and according to time for a wonderful and absolute reality.\textsuperscript{338}


\textsuperscript{336} Hultén, \textit{A Magic Stronger than Death}, p. 13.

\textsuperscript{337} The work was created for the exhibition, \textit{Concert of Seven Pictures} orchestrated by the Schmela Gallery in Dusseldorf.

This manifesto highlights the central principles behind Tinguely’s work and follows the avant-garde precedent of destabilising the traditional modes of representation in art. The manifesto echoes early European avant-garde manifestos such as Naum Gabo’s *Realistic Manifesto*, by calling an attention to and privileging of the present above other temporal modes. Tinguely, however, adopts a more critical tone against society for not living in the present, and instead being distracted by mechanised rationalisations of time.

Rather than emphasising what Pamela Lee describes as a ‘marked fear of the temporal’ in art in the 1960s, Tinguely confronts the uneasiness with the temporal in *Für Statik*. In this manifesto the artist asks the beholders of his art to confront the regulation of time as a mechanically induced regime. This is because for Tinguely, to be aware of the passing present is to also resist mechanical rationalisations of time. As Willem Sandberd, the director of the Stedeljik Museum in Amsterdam stated after *Bewogen Beweging*, kinetic art was then ‘the art of our time’. For Tinguely, if this was the case, it is because kinetic sculpture has the potential to be used to renegotiate the regulation of time in society. Therefore, rather than a chronophobic relationship, Tinguely nurtures a chronomantic attitude towards time, and through his kinesis explores and critiques perceptions of time in a period of technological change.

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341 N Gabo, ‘Realistic Manifesto’, in Danchev, 100 Artist’ Manifestos, pp. 189-197.


Prior to curating *Directions in Kinetic Art*, Peter Selz was the curator for painting and sculpture at the Museum of Modern Art (MoMA) in New York. In February 1960 Selz commissioned Tinguely to create his auto-destructive machine *Homage to New York*, to be performed in the MoMA sculpture garden.\(^{344}\) Compiled from found scrap metal and junk machinery, pieces of the work were collected from rubbish dumps and mechanical dealers in Newark, Summit, and New York.\(^{345}\) From this accumulation, the final work included eight bicycle wheels, a bassinet, washing machine parts, a weather balloon, piano, radio, American flag and a child’s toilet.\(^{346}\) It was also constructed with multiple sections, or *matics*, each painted in white and programmed to start in motion at its own allocated time.


\(^{345}\) Lee, *Chronophobia*, p. 134

This enabled the entire sculpture to ideally slowly turn in separate sections and build into a crescendo of mechanical motion, which would lead to its self-destruction.

On March 17 1960, the first and only performance of *Homage to New York* was set into motion, spurring a cacophony of sounds, smells, and mechanical movements. At one stage a piano played while glass bottles were cast from the top, smashed on the ground and spread nauseating smells while a child’s go-cart paced back and forth in front of the work.\(^{347}\) The performance was one of industrial excess. As the artist described, ‘[t]he machines which we build today produce much more than we can possible consume. I solve this problem of abundance in my own way!’\(^{348}\) Tinguely emphasised this by making a work that did not produce anything other than motion; a re-staged spectacle of abundance, from abundance.

In light of Tinguely’s description, it is no surprise that *Homage to New York* is remembered as a critique of the physical abundance of consumer materials in capitalist society.\(^{349}\) However, Tinguely’s kinetic performance is also an orchestration of duration, anticipation, and suspense to confront his audience with a new awareness of time. For the experience of the performance itself one can only draw from the documents, photographs, and film recorded by Robert Breer, as well as first hand accounts from the audience at MoMA that night that witnessed the sole performance.\(^{350}\) Billy Klüver, an engineer from

\(^{347}\) Bill Klüver detailed that the finale of the performance was dulled when a fireman was called to extinguish a *matic*, consequently hastening the destruction of the work. See: B. Klüver, ‘The Garden Party’, *A Magic Stronger than Death*, pp.74-77.


\(^{350}\) *Study for an End of the World No. 1* was performed in the Lousiana Museum in Humlebaek, Copenhagen September 22, 1961. *Study for an End of the World No.2* was performed in the Nevada desert, Las Vegas on March 21, 1962. Both works were programmed auto-destructive works that each performed with a varying degree of success. No. 1 played out closer to its timed mechanics than *Homage to New York*, and yet the dove that was supposed to fly out of the machine as a symbol of peace, before the machine self destructed, was trapped and killed during the performance and found in the rubble of the work.
Bell Laboratories who assisted Tinguely in the compilation and construction of *Homage to New York* reflects on the performance as an experience riddled with interruption, unplanned accidents, and suspense for both the unknowable and yet programmed mechanical self-destruction.\(^{351}\) In various sections of Klüver’s account, he emphasises the anxiety that was felt while waiting for the work to unfold, and then destroy itself:

> Not once did we go over everything and check it…the arm he had worked on with perfection did not work…Something was wrong with it, it was winding too slowly…In the eighteenth minute, the fire extinguisher in the piano was supposed to go off. It didn’t….The whole machine was somewhat sick after the bad handling in transport, and it fell over after only a few minutes….After three minutes, the longest in my life, they finally began to put out the fire….At this point Jean and I were almost desperate.\(^{352}\)

Klüver’s reaction to the unpredictable performance is described as a moment of excruciating suspense. The time that the sculpture took to inevitably self-destruct painfully stretched out and tested the threshold between expectation and actualisation.\(^{353}\) In this moment, time waned and slowed because Tinguely brought attention to the uncertainty of time as it unfolded. Klüver’s reaction to the movement of the work emphasises Tinguely’s intention to manipulate a sense of time – one that draws out, prolongs, and becomes excruciating as a result of anticipation.

Klüver’s experience of waiting was an intensive, rather than extensive sensation.\(^{354}\) Throughout the performance Klüver was not only sensitive to his perception of time, but became arrested in suspense as he waited.\(^{355}\) This is because for Klüver to wait during

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\(^{353}\) E Manning, ‘From Biopolitics to Biogram’, *Relationscapes*, p. 126-127. Manning uses the term ‘threshold of appearance’ to situate appearance as a force from the virtual, to the actual. For Manning the threshold of appearance is ‘a transmutation of process-becoming form. In this intensive passage, the biogram constitutes active points of creation and potentiality through which body-worlds emerge’.


\(^{355}\) Bergson and Deleuze’s writings on suspense, waiting and the perception of time have greatly influenced my analysis of this artwork. These perspectives are also crucial to my
Homage to New York, was to be seized by it, and drew attention to its uncontrollable and unpredictable nature.\textsuperscript{356} To wait during the final three minutes before the fire was finally extinguished, Klüver’s perception of the passing of time slowed to what felt like, an endless state.\textsuperscript{357} In a similar vein to the reactions to Tinguely’s works at Directions in Kinetic Art, Klüver and fellow audience members were void of agency other than being made aware of their impatience, uneasiness, and uselessness. Through Klüver, Tinguely’s work is characterised by unease with the present temporality as it is framed as something that is unpredictable, uncertain, and endless. The uneasiness that Tinguely creates not only exists because the performance heightens an awareness of duration by audience members but, also because Tinguely’s kinesis brings forward and makes visible movement as a material and excessive element.

This is also emphasised by Selz, who stated that a key effect of Tinguely’s kineticism is his ability to create a specific relationship between mechanical movement and time that is specific to kinetic sculptural media. In Selz’s words: ‘Jean Tinguely’s experiments are works of art in which time, movement, and gesture are demonstrated – not merely evoked’, which resonates with Tinguely’s earlier claims in Für Statik.\textsuperscript{358} Kinesis is therefore used by Tinguely to present and persuade sensations of time, rather than representing them. This is achieved in Homage to New York by bringing attention to the tensions between rationalised time and time as a state of transformation. Some of the sections or matics within the work delayed, while some began earlier than they were supposed to. For instance, a radio piece played, but the audience could not hear it above the noise of the machine, while some objects rolled in the wrong direction and made paintings out of beer rather than paint, and the overall performance went on for three times longer than Tinguely had anticipated.\textsuperscript{359}


\textsuperscript{358} Lee Chronophobia, p. 137.

\textsuperscript{359} Hultén, A Magic Stronger than Death, p. 77
In addition to this, *Homage to New York* acted as an allegorical performance that celebrated the gradual emerging antiquity of modern rationalisations of time. While some have understood the exploding self-destructive machine as a commemoration for the end of modern industrial machinery, Tinguely also demonstrates that in the wake of technological transition, the conceptions of time-space relationships are also changing within this greater technological and social shift. To create a mechanical landscape out of an abundance of recycled and rejected machinery is not only a warning for the increasing antiquity of modernity, but also acts as a signpost for the new ways time is spent, divided, expressed, and perceived.

This time is primarily characterised by waiting for change that does not happen when you expect it (and also happens when you do not expect it). Although Klüver lived through the performance, his perception of time was paced by his own hesitancy and passive inaction. Bergson too, has described that the hesitancy that is felt during the present, in the process of actualising from the virtual, as a felt hesitancy that is associated with the unpredictable and productive nature of the present. Klüver’s hesitancy is evidently a reaction that is indicative of the anticipation and anxiety about change that occurs later than expected, and outside of any control.

Tinguely’s performance at MoMA directly resonates with Fernarnd Léger’s description of modern spectacles. Léger wrote in his essay titled ‘The Spectacle’, which was published soon after his film *Ballet Mécanique* in 1924, that ‘[t]here is in the origin of the modern spectacle…the shock of the surprise effect’. In light of this description of modernity, Tinguely uses movement to create a spectacle of movement that arrests its audience with shock and attention through kinesis. Although the work inevitably destructed, Klüver’s shock originates with the way the mechanical machine moved in unpredictable ways. Tinguely’s cacophony of simultaneous motions in *Homage to New York* also contributes to an open and distributed experience of time. Rather than coming together to form a total work of art, Tinguely uses mechanical movement to distribute the work across time.

Tinguely understands that perceptions can be heightened when attention to the temporal present is harnessed in the moment. Rather than considering that perception is an act of the subject drawing percepts away from the object, perception is distributed and accumulated over time. The perception of the spectacle within the present has an unavoidable intensity; as Tinguely suggests: ‘only in movement do we find the true essence of things’. Tinguely emphasises that modern industrial mechanical movement has the productive potential to pull in an awareness of duration, rather than being a technological tool for abstraction and reproduction. While *Homage to New York* may have achieved its desired effect, as evidenced by Klüver’s reaction, Tinguely’s subsequent works highlighted the incompatible time codes that exist between technologies, rather than tossing aside minutes and hours, and bringing awareness back to the passing of real time.

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363 It is important to note that Tinguely’s spectacle differs from Guy Debord’s use of the term. Debord’s writings on the Situationist International were also in opposition to the Nouveaux réalisme (as termed by art critic, Pierre Restany in 1960, translates to ‘New realism’) of Paris, which Tinguely was associated with. According to Debord the Nouveaux Realists, and particularly Restany’s support for the artists depended on ‘overwhelming technical power at the disposal of ruling mental impotence’. See: ‘Editorial Notes: Once Again, on Decomposition’, *October*, vol. 79, Winter 1997, pp. 120-122. See also Jill Carrick’s strong account for New Realism restages a commodity spectacle. See: Carrick, pp. 67-102.

Figure 9 & 10: Jean Tinguely, *Study for an End of the World no. II*, (1962).
Following *Homage to New York* in 1960 Tinguely created two more self-destructive works titled, *A Study for an End of the World* (numbered I (1961) and II (1962)). The first was installed at the Louisiana Museum of Modern art in Humlebaeck, north of Copenhagen in Denmark, in the exhibition titled *Movement in Art*. The second was commissioned by NBC’s television series *David Brinkley’s Journal*, and was performed in the Nevada desert of Las Vegas in 1962. While *Study for an End of the World I* performed similarly to *Homage to New York*, the second *Study for an End of the World* is significant for proposing a critique against modern industrial spectacles of time and production, as well as the domestication of television and telecommunications that became emblems of the middle class modern American lifestyle.\(^{365}\)

Like *Homage to New York* the parts that formed *A Study for an End of the World II* were sourced from nearby rubbish tips in Las Vegas and controlled by Tinguely from afar.\(^{366}\) It also comprised several *matics* that were programmed to set into motion at a specific time before exploding entirely. Even though *A Study for an End of the World II* was created with more sophisticated control mechanisms than *Homage to New York*, the performance was disrupted by more technical glitches. Much to the artist’s delight, the timed *matics* delayed their performances, and the entire destruction took an hour longer than it had been programmed to. He responded to these glitches by commenting humorously that, ‘[i]t’s not to be expected that the end of the world will be exactly as it’s been imagined’.\(^{367}\) The spectacle of *A Study for an End of the World* differs greatly to *Homage to New York*, precisely because of the conflicting time schedules that the later performance was subject to. Even though *Homage to New York* was recorded with media photographers and captured on film by animator/kinetic sculptor, Robert Breer, all documentary media was used to capture the movement and time rhythms of the sculpture itself. In contrast, *A Study for an End of the World* brought to the foreground the incompatible schedules between modern industrial machinery and the newly domesticated telecommunications technology that ran at different time schedules.

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\(^{365}\) For a close analysis of NBC’s televised account of Tinguely’s work see: Lee, *Chronophobia*, pp. 133-153.


Tinguely highlighted the pressure and failure of modern industrial machinery and rudimentary robotics to keep in time and pace with telecommunication in *A Study for an End of the World II*. The televised documentation of the later performance prevented the viewers from witnessing the actual pace and rhythm of the work’s destruction. The spectacle was edited, spliced, and re-presented according to NBC’s own image of time that prevented a confrontation with the unfolding present.\(^368\) While the telecommunications technologies in this performance distorted the experience and duration of the performance, *A Study of the End of the World II* highlights the intersections and incompatibilities between various technological regulations of time, and therefore develops an appropriation of the modern spectacle to *Homage to New York*.

As Charlie Gere has argued, modern art has throughout its history, continually formed critiques and reactions to the increasing speed and acceleration of technology in the modern era.\(^369\) The changing conceptions of temporality are central to the critique and representation of modern acceleration. Lewis Mumford argued this precisely when he stated that rather than the steam engine or any other modern invention the clock was the most pervasive invention of modernity.\(^370\) This is because regulation of time mobilised and synchronised the private and public spheres more so than any other modern industrial technology. The regulation of time that commanded the division of labour and leisure implemented a regime of time that influenced the greatest social change of modernity. As Jacques Ellul identified, all life including the facets of work and leisure, and indeed the perception of change and motion continues to be approached and governed by the clock.\(^371\) With Mumford and Ellul in mind, it becomes evident that Tinguely’s performances highlight that temporality undergoes a conceptual shift within the emergence of each technological age. In his case, the time codes between industrial machinery, which are fixed in time and space, and the edited rhythms of telecommunications, dislodge and reset the rhythms of the work’s destruction.

\(^368\) For more on how films alter a perception of time see: Deleuze, *Cinema 2*, pp. 1-24, 44-67.


The spectacle that Tinguely orchestrates in *A Study for an End of the World II* differs greatly from *Homage to New York*, precisely because of the conflicting time schedules that the later performance was subject to. Even though *Homage to New York* was recorded by media photographers and captured on film by animator/kinetic sculptor, Robert Breer, all documentary media was used with the aim of capturing the movement and time rhythms of the sculpture itself. *A Study for an End of the World II*, highlights the incompatible schedules between modern industrial machinery and the newly domesticated telecommunications technology. This is emphasised by the pressure and failure of the performance to keep in time with the pace of the time codes that pace telecommunication. *A Study for an End of the World II* was marked with an expectation around the pace and synchronicity of various technologies coming together, that was not prevalent in *Homage to New York*. Broadcast out to viewers, the televised documentation of the performance prevented its audience from witnessing the actual pace and rhythm of the work’s destruction.

**Conclusion: Technological Expansion and New Durations**

This chapter addressed the temporal turbulence of the 1960s through Michael Fried’s essay ‘Art and Objecthood’, the exhibition *Directions in Kinetic Sculpture*, and the auto-destructive kinetic works by Jean Tinguely. These three examples each address temporality as a polemic in art during this period. While Fried has argued that the incorporation of duration in the plastic arts reduces sculpture to theatricality, Selz and the artists in *Directions in Kinetic Sculpture* and Tinguely’s works demonstrate that a key defining affect of kineticism in art is the ability to express and explore conceptions of temporality. Additionally, I argued that Tinguely produced works that confronted his audiences with temporal systems that highlight the tensions and conflicts that emerge between the movement of modern machinery and the transmission of telecommunication technologies.

It is through *Homage to New York* specifically that, when attention is brought towards the present temporality in these works, the uneasy and unpredictable nature of time is emphasised. Tinguely articulates the transition from an industrial age towards a new mechanical age by confronting his audiences with their awareness of duration, as well as

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the manipulation of time by mechanical and communication technologies. His kinetic performances therefore build new perceptions of time, and provide openings for how temporality can be discussed in new ways.

When considering the durational effects of Tinguely’s auto-destructive performances in relation to the discussions and anxieties about temporality in art in the 1960s, it is evident that Tinguely and the artists in *Directions in Kinetic Sculpture* were interested in expanding the sensations and perceptions of time in relation to technology and sculpture. This experimentation and exploration of time-based sculpture was also an attempt to strengthen the relationship between media in art with conceptual art practices. The uneasiness with time in each of Tinguely’s performances also mirrors the polemics around time in art in the 1960s. While Fried’s essay, ‘Art and Objecthood’, from 1967, stands as a key document in contemporary art history that argued against the experimentation with time in art, in an attempt to preserve the ideals of high-modernism, his argument fails to acknowledge the social and technological contexts in which time-based arts were made. In contrast to Fried, the arguments presented by Youngblood, Krauss, and Sharp build sensitivity to kineticism as practise that explores art as something that became ontologically unstable during a time of technological turbulence.

The polemics addressed in this chapter also give rise to new questions concerning the contemporary art history of avant-garde kineticism. Considering that the kinetic art in the 1960s is marked by both popularity and criticism as a popular form of technological art, the following chapter addresses Jack Burnham’s argument in ‘Systems Esthetics’ as a key contributor to the assumption that kineticism refers solely to the movement of a machine aesthetic. The domestication of computing technologies, as well as the popularity of Ludwig von Bertalanffy’s *General Systems Theory*, was used to emphasise movement as a systematic process, rather than a movement of mechanical or non-mechanical form. The popularity of Burnham’s appropriation of general systems theory in contemporary media art history and theory is problematic because, as I will argue, his argument in ‘Systems

373 Bois, ‘Force Fields’.
Esthetics’ is dependent on a disregard for kinetic movement as a means for expressing and exploring systems theory.
CHAPTER 3
SYSTEMS AESTHETICS: A KEY POLEMIC IN CONTEMPORARY KINETIC ART HISTORY.

This is a shift from being to becoming. Kinetic works reflect this shift since kinetic works refute static space. They destroy lineal time. Kinetic works do not occupy space, they create space. Kinetic works do not contain time, they create time. Kinetic works so not interpret reality, they are reality.376

Carolyn Christov-Bakargiev in Revolutions – Forms that Turn framed avant-garde kinetic sculpture to reify the notion that the modern machine aesthetic is also a contemporary issue. Similarly, Force Fields: Phases of the Kinetic was publicised as Guy Brett’s attempt to ‘excavate’ a forgotten experimentation with mechanical movement and present it to contemporary audiences to suggest that approaches to movement and time in art have changed since the late 1960s.377 While both Brett and Christov-Bakargiev draw on avant-garde kinetic sculpture to reflect on contemporaneity in contemporary society, they do so because art history, theory, and criticism have previously concentrated on separating mechanical media and modern art from postmodern and contemporary aesthetics.378 One key example of this that has affected the history of kinetic sculpture is Jack Burnham’s seminal essay, ‘Systems Esthetics’ (1968). Here, Burnham argues that artists creating kinetic sculpture in the 1960s failed to be relevant to the emerging postmodern aesthetics. Consequently the popularity of Burnham’s critique contributed to the assumption that kineticism is a purely modern concern,379 which has since only acted as a precursor to media art practices that have emerged since the 1970s.

During the final years of America’s ‘kinetic kraze’,380 Jack Burnham published two seminal essays in Artforum, ‘Systems Esthetics’ (1968) and ‘Real Time Systems’ (1969),

376 W Sharp, Air Art, p.4.
378 Christov-Bakargiev, ‘Revolutions Forms that Turn’, p. 33.
and his book *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of this Century* (1968) in which he presented his criticisms of modern sculpture. Across these three publications, Burnham considered sculpture in the 1960s as ‘a unique child in a unique age’ due to the popularity of modern ‘pseudo machines’ like kinetic sculpture, which, he considered, failed to reconstruct or mimetically perform life successfully. Through each of these texts Burnham argues for the understandings of Ludwig von Bertalanffy’s *General Systems Theory* as a potential model for approaching the intersections between art and science in the emerging technological age. Within this argument, Burnham’s anti-modernist perspective regards kineticism as an unfulfilled practice, in which its artists had failed to assert their art within the frameworks of emerging systems theory and postmodern aesthetics.

This chapter argues that the popularity of Burnham’s ‘Systems Esthetics’ has nurtured a contemporary art historical understanding of kineticism as an antiquated modernist machinic practice that predominantly serves as a precursor to contemporary media arts. While Burnham’s argument uses systems theory to exclude the effect of movement from critical discourse, this chapter argues that artists such as Hans Haacke - whose work Burnham depended on to demonstrate the operation of systems aesthetics in art - also emphasised the form, function, and movement of his early sculptural systems. Contrary to Burnham’s perspective, which defines kinetic sculpture solely according to the movement of mechanical form, Haacke approaches kinesis as an orchestration of movement that is used to heighten the awareness of viewers who are positioned to seek the perceptual edge between actual and virtual movement in real time as an accumulation and release of intensity.

Burnham’s argument serves as a key influence on the contemporary art historical associations between kinetic sculpture and avant-gardism, and this presents a polemic for artists and institutions producing and exhibiting kinesis. As I discussed in Chapter 1 of this thesis, exhibitions such as *Revolutions – Forms that Turn*, at the 2008 Sydney Biennale,

approached avant-garde kineticism predominantly as an historical, machinic tendency that signified the modern aesthetic. While contemporary media art historians such as Edward Shanken, Charlie Gere, and Peter Weibel have acknowledged the works and discussions of avant-garde artists working with kinesis, this acknowledgement is primarily to strengthen the historical genealogy of digital art.\textsuperscript{386}

This argument will begin by first unpacking the key understanding of Burnham’s ‘Systems Esthetics’ as an attempt to predict the future intersections between art, science, and technology as becoming increasingly based on systems and cybernetic theory. Secondly, the chapter will highlight Burnham’s exclusion of kineticism from ‘Systems Esthetics’, ‘Real Time Systems’, and Beyond Modern Sculpture, and argue that his position is also dependent on works that use movement to explore conceptual and post-formalist objectives. Burnham’s emphasis on automata, light art, robotics, and cybernetic art performs a reterritorialisation that moves from kinetic movement towards the movement of system processes.\textsuperscript{387} This is most prominently addressed through Hans Haacke’s early systems art that was made during the 1960s and 1970s, and whose works I address as dependent on actual movement to signify, perform, and process biological, political, and natural weather systems. Burnham’s emphasis on the movement of systems art, rather than the movement of kinesis, is more than a syntactical argument. As I will argue, Burnham attempts to sequester the theory and practice of movement in art away from the post-modern aesthetics that were emerging at the time. The effects of Burnham’s argument and the popularity of his scholarship in contemporary media arts has reified a regard for kinetic sculpture and installation as a modern mechanical and antiquated practice in art, and is therefore a central influence on contemporary kinetic art history.

**Key Understandings of Jack Burnham’s ‘Systems Esthetics’**

During the 1960s, the term ‘systems’ was utilised for a wide range of disciplines that called for an open theory of organisation and communication within scientific, biological and cultural analysis. Many of the systems discourses, analysis, and aesthetics were largely influenced by Ludwig von Bertalanffy’s *General Systems Theory*, which regarded

\textsuperscript{386} Weibel, ‘It is Forbidden Not to Touch’, pp. 19-41.  
\textsuperscript{387} Burnham, *Beyond Modern Sculpture*, pp. 185-378.
biological processes of evolution and adaptation as a number of intersecting systems.\footnote{L von Bertalanffy, \textit{General Systems Theory: Foundations, Developments, Applications}, New York, G. Braziller 1968/1969.} Outside the sciences, systems theory was appropriated to negotiate the flow of information within technological media in communications,\footnote{A key influence for considering information theory as a system in communications theory is, Claude Shannon in 1948 at Bell Laboratory. See a later expanded version: C Shannon and X Weaver, \textit{The Mathematical Theory of Communication}, Chicago, University of Illinois Press, 1963[1998]. Another key contributor who has influenced the theoretical discussion of systems is: N Wiener \textit{Cybernetics or Control and Communication in the Animal or Machine}, Cambridge, Massachusetts, The MIT Press, 1948.} and it was useful as a model for understanding patterns and processes within economics, chemistry, biology, engineering, sociology, physics, and art.\footnote{For an example of a systems approach to scientific theory, see: G Bateson, \textit{Steps to an Ecology of Mind}, New York, Ballantine, 1972.} Even though there were many interpretations and divergences from Bertalanffy’s original theory, systems in general quickly became a rubric for understanding how modern society was organized.\footnote{F Halsall, \textit{Systems of Art: Art, History and Systems Theory}, Oxford Peter Lang, 2008, pp. 21-66.} For Sanford Kwinter this entailed a ‘shift in twentieth-century thought toward a biological model’,\footnote{S Kwinter, \textit{Architectures of Time: Toward a Theory of the Event in Modernist Culture}, Cambridge, Massachusetts, The MIT Press, 2001, p. ix.} which, Burnham argued, had been increasingly expressed by artists after WWI through to the late 1960s.\footnote{This is particularly addressed through Moholy-Nagy’s sculptural works. See: Burnham ‘On Moholy Sculpture’, pp. 110-113.}

Fundamentally, a system can be thought of as a number of variables that have the capacity to relate to one another, and which form a larger, rationalised whole.\footnote{Halsall, pp. 22-34.} What is unique about a system is not so much its actual components but the way they are organised. Unlike chaos, systems are defined by the relationships between variables, each of which contributes to the unique form of the entire system. Systems can be quite open – for instance, the entire world can be considered as a total system\footnote{\textit{Ibid.}, p. 9. Brian Massumi also argues that there is a difference between ‘system’ and ‘process’ where process ‘refers to this life cycle of potential…The coherence of a process is that of tendency, feeding back on itself in such a way as to generate always another difference’. While systems are of ‘an emergent, provisional stability arising at the crossroads of processual tendencies whose formative for it siphons into it own self-organizing’.} - but there is a key set of
criteria that defines them. Systems must have one or more key identifiable functions, and each individual variable within the system must also genuinely contribute to that system’s function. If one component is removed from the system, its function is consequently altered from its previous state. From this basic criteria, systems can be organised to take in a wide variety of structures, including patterns, rhythms, or networks.

Burnham’s approach to systems theory hinged on the interdisciplinary nature and applicability of Bertalanffy’s general systems theory. If a system was defined as ‘a complex of components in interaction’, Burnham considered art as a system that intersected with all areas of life, from which new subsystems would emerge. As he explained:

A systems viewpoint is focused on the creation of stable, on-going relationships between organic and non-organic systems, be these neighbourhoods, industrial complexes, farms, transportation systems, information centers, recreation centers, or any other matrixes of human activity. All living situations must be treated in the context of a systems hierarchy of values.

Therefore, Burnham’s approach was constructed as an open, porous and intersecting system that encompasses the behaviours, actions and tendencies within all artistic practices that relate to and affect society.

Influenced by Lucy Lippard’s reflection on the dematerialised object in the 1960s, and Norbert Wiener’s cybernetic theory, Burnham’s argument depended on an anti-

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397 K Boulding, *The World as a Total System*, Beverly Hills, California, Sage, 1985, p. 9. Although there are entropic systems, these systems depend on the regular rate or probability of chaos as a constant. Entropy for instance, is a state of a regular rate of chaos.


400 Burnham, ‘Systems Esthetics’, p. 16.

ontological focus on systems theory in art. As he explained, ‘[t]he object denoted sculpture in its traditional physical form, whereas the system (an interacting assembly of varying complexity) is the means by which sculpture gradually departs from its object state and assumes some measure of lifelike activity’.\footnote{Burnham, \textit{Beyond Modern Sculpture}, p. 10.} By diminishing the distinction between art and life through systems theory, Burnham’s perspective was a directed response and resistance to Michael Fried’s criticism of the theatricality of conceptual and minimalist art.\footnote{Burnham, ‘Systems Esthetics’, p. 17.}

In line with Eco’s notion of the ‘open work’, Burnham brought attention to the prospect of artists such as Hans Haacke, to consider movement as an open system of time. For instance, Burnham’s ‘Real Time Systems’ discussed the power of actual movement as a means for destabilising the distinctions between art and life.\footnote{Burnham, ‘Real Time Systems’, pp. 27-38.} The orchestration of actual movement in art became a central tool for achieving this, particularly in a decade of accelerated technological transformation. For Burnham, the real-time systems of actual movement prevent art from being centred on specific objects, and are created to foreground perception as a systematic process of relations between variables.\footnote{Ibid., p. 27.} Real-time systems in art destabilise the ‘ideal time’ of modern classical forms of art and reflect how information is being processed in the technological age of the computer.\footnote{Ibid., p. 30.}

In ‘Systems Esthetics’ Burnham considers a work of art as its own organised system that resides as a component within the wider system of the art world. Like Popper’s focus on demateriality as a relational and communicative tool for artists, Burnham’s approach to systems in art is centred on the felt but unseen entities of art objects: ‘[t]he specific function of modern didactic art has been to show that art does not reside in material entities but in relations between people and the components of their environment’.\footnote{Burnham, ‘Systems Esthetics’, p. 16.} Burnham, after von Bertalanffy, suggests an approach to art that moves away from a focus

\footnotesize{\begin{itemize}
\item \footnote{N Wiener, \textit{Cybernetics: Or Control and Communication in the Animal and the Machine}, Cambridge, Massachusetts, MIT Press, 1961.}
\item \footnote{Burnham, \textit{Beyond Modern Sculpture}, p. 10.}
\item \footnote{Burnham, ‘Systems Esthetics’, p. 17.}
\item \footnote{Burnham, ‘Real Time Systems’, pp. 27-38.}
\item \footnote{Ibid., p. 27.}
\item \footnote{Ibid., p. 30.}
\item \footnote{Burnham, ‘Systems Esthetics’, p. 16.}
\end{itemize}}
on the object and towards art as a component within the larger system of society. In doing so, he abandons an inclination towards media specificity because his systems are defined by a ‘conceptual focus rather than material limits’. \(^{409}\) Burnham also privileges ‘Systems Esthetics’ over the term ‘conceptual art’, because ‘Systems Esthetics’ encompasses the technological expansion and emerging interdisciplinary nature of art in the 1960s – which, for Burnham, Fried had undermined.\(^{410}\)

As with Popper’s appropriation of demateriality in participatory art, which I will address in the following chapter, Burnham’s systems theory is an articulation of the relationships among viewers, and between viewers and the art. Some of these relationships are engaged through real-time interactions; however, Burnham also specifies that his take on systems theory can be applied to more than the time-based, ephemeral staged environments and happenings. He argued that systems theory, ‘deals in a revolutionary fashion with the larger problem of boundary concepts. From a systems perspective there are no contrived confines such as the theater proscenium or picture frame. Conceptual focus rather than material limits define the systems’.\(^{411}\) Because of this post-formalist approach, systems aesthetics is an expansive and non-representational approach to art that has the potential to be applied to interpretations of art across a variety of practices.

Burnham was working within an array of discussions that were focused on the relationships among art, technology, and their future progressions taking place in the 1960s. As David Mellor reflects:

> A dream of technical control and of instant information conveyed at unthought-of velocities haunted Sixties culture. The wired, electronic outlines of a cybernetic society became apparent to the visual imagination. […] It was a technologically utopian structure of feeling, positivistic and “scientistic”.\(^{412}\)

Hence Burnham’s book, *Beyond Modern Sculpture*, predicted that artists would come to explore new means of visualisation through technological expansion.\(^{413}\)

\(^{413}\) Burnham, *Beyond Modern Sculpture*, pp. 185-378.
As a key quintessential exploration of systems theory in art, Burnham’s argument drew upon German artist Hans Haacke, and his recent physiological and biological installations that involved studies of ecological and biological movement, such as *Sky Line* (1967), where hundreds of helium-filled balloons were connected together and cast out into the sky from Central Park. Another work, *Photo-Electric Viewer Programmed Coordinate System* (1968), involved a series of photoelectric sensors installed in the gallery walls with infrared beams fitted at eye level. When viewers enter the space, the light bulbs become active, but light up selectively and in response to the viewer’s movement. It is a work that acts as a responsive environment by corresponding to the viewer’s movement, while also performing random patterns of action, and confusing the viewer and their interaction with the work. If there is more than one viewer in the space, the system will mimetically light up when two or more viewers move as one body through improvised choreography. As Haacke explains:

> A ‘sculpture’ that physically reacts to its environment is no longer to be regarded as an object. The range of outside factors affecting it, as well as its own radius of action, reach beyond the space it materially occupies. It thus merges with the environment in a relationship that is better understood as a ‘system’ of interdependent processes. […] A system is not imagined, it is real.414

Like Moholy-Nagy’s *Light Space Modulator*, a work that I address in Chapter 5 of this thesis, Haacke explicitly informs his audiences that the *Photo-Electric Viewer Programmed Coordinate System* forms an environment rather than an autonomous object. Both Moholy-Nagy and Haacke develop kinetic motion to cast attention outwards into the space of the gallery. While Moholy-Nagy was more interested in the modulation of movement, Haacke’s responsive system is an experimentation of the translation, process, and mimesis of human movement. Despite these differences, there is a continued regard for kinesis as a process that is carried rather than created by material form.415 From this perspective, Moholy-Nagy and Haacke orchestrate kinesis in their artworks for its material, immaterial, and immanent qualities rather than as a study of purely ontological motion.

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However, for Burnham, Haacke’s work signifies a shift in technological art that moves away from modern industrial kinesis and towards increasingly intelligent systems - a tendency that Burnham predicted to be an inevitable outcome for sculpture after modernity.\footnote{Burnham, \textit{Beyond Modern Sculpture}, pp. 1-16.} Systems aesthetics is used by Burnham as a key catalyst to regard kinetic art as an antiquated technological art that falls short of the emerging tendencies of conceptual, cybernetic, and robotic art critiques, and responds to the emerging technological age.\footnote{Ibid., pp. 218-220.}

To make this explicit, Burnham also drew on a range of artists working alongside Haacke to demonstrate that there was an emerging systems aesthetic in conceptual art in the 1960s. This group includes Dan Flavin’s fluorescent installations, the minimalist sculptural works by Robert Morris, Les Levine, and Donald Judd. In many cases Burnham draws from systems and cybernetic theory to deconstruct the works. In ‘Systems Esthetics’ Judd is compared to a computer programmer,\footnote{Burnham, ‘Systems Esthetics’, p. 18.} while Carl Andre is described as having created assemblages of ‘modular forms’\footnote{Ibid., p. 20.}. Within the discourse of ‘Systems Esthetics’ Judd and Andre, along with the above-mentioned artists, reveal an ongoing ‘technological endeavor’\footnote{Ibid., p. 24.} in an attempt to intersect the relationships between conceptual and technological experimentations in art.\footnote{Ibid., p. 17.}

Despite mention of Flavin, Morris, Levine, and Judd, Haacke’s artwork was central to Burnham’s understanding of systems-based art. This was openly admitted by Burnham, who stated, ‘[a]s a close friend of Hans Haacke since 1962, I observed how the idea of allowing his “systems” to take root in the real world began to fascinate him, more and more, almost to a point of obsession’.\footnote{J Siegel, ‘An Interview with Hans Haacke’, \textit{Arts Magazine}, vol. 46, no. 7, 1971, p. 18.} Haacke reciprocated with equal appreciation by saying that Burnham had introduced him to systems analysis and was among the first to apply general systems theory to visual art.\footnote{H Haacke, ‘Untitled Statement’, in J Bird, W Grasskemp, M Nesbit (eds.), \textit{Hans Haacke}, London, Phaidon, 2004, p. 102.}
Although Burnham’s approach to systems theory is distinctly unique, his argument also draws from concurrent communication theory, which was popularising Norbert Wiener’s cybernetics, and which also focused on communication among variables.\textsuperscript{424} Through Wiener, cybernetic theory became a way for negotiating the dematerialised work of art in computer, electronic, and media art practices, by offering metaphors of software and hardware to describe the relationship between the concept and object in a work of art. Take, for example, Roy Ascott’s description of cybernetic art: ‘[w]hen art is a form of behaviour, software predominates over hardware in the creative sphere. Process replaces product in importance, just as system supersedes structure’.\textsuperscript{425} For Ascott, cybernetics and systems theory were useful not only for describing the conceptual (software) codes that are signified by the art object (hardware) but also for engaging with the conceptual grounds within art.

The popularity of systems theory occurred concurrently with a number of complementary emerging theories in art theory and criticism. For instance, the dematerialised post-object aesthetics that were popularised by conceptual artists in the 1960s, such as systems theory, concentrated on the construction and organisation of concepts, which in the case of art are signified by their material form. For George Dickie, this regard for the ontological nature of art emphasised the way in which objects were organised and classified, rather than the form of their physical properties.\textsuperscript{426} Therefore, art was no longer considered an emotive expression of the artist. Instead, artists increasingly worked within a system of observation and differentiation from other artworks and contexts.\textsuperscript{427}

Like Dickie, Arthur Danto has likened the art world of the 1960s to an entire regulated system.\textsuperscript{428} Within this artists referred to art historical tendencies to inform their practice,


\textsuperscript{427} \textit{Ibid.}, pp. 50-52.

and their emphasis on the conceptual properties of a work of art contributed to Danto’s description of the art world as a ‘style matrix’ that is built and organised by artists and institutions.\footnote{Ibid., pp. 571-584.} Danto’s perspective was largely informed by his reaction to the Minimalist and Pop Art tendencies that were emerging in art at the time, both of which played conceptual games with the institutional expectations and definitions of art that determined how art appeared and was constructed in exhibition environments. Danto’s systematic approach to art theory, history, and criticism reified a definition that was determined not by form or expression but, a classification and differentiation of ontological and conceptual objects.

Niklas Luhmann has since reflected that, for many, art has become a social sub-system for society.\footnote{N Luhmann, \textit{Art as a Social System}, Stanford California, Stanford University Press, 2000.} Likewise, rather than approaching a work of art as an autonomous object from which meaning can be drawn, Burnham used systems theory to consider art as something that is built from a matrix of components that were organised by artists and institutions. This point of view focuses on the communicative relations that exist between the work, its viewers, and the historical context.\footnote{Lee, \textit{Chronophobia}, p. 69.}

Norbert Wiener’s theory of cybernetics similarly emphasised the connections among variables in technological information networks. For Wiener, the ‘second industrial revolution’, which was propelled by the domestication of computing technologies, placed an emphasis on the input and feedback of information systems. Like systems and post-object aesthetics, Wiener viewed the information systems of computing technology as being guided by processes, rather than objects - or as Ross Ashby has said, cybernetic theory emphasises ‘not things, but ways of behaving’.\footnote{R Ashby, \textit{An Introduction to Cybernetics}, London, Chapman Hall, 1957, p. 1.} And, as art historian Charlie Gere, has stated, Wiener’s cybernetic theory was a rubric for approaching ‘biological, machinic and social processes’ across a number of disciplines outside the sciences, including art’.\footnote{C Gere, \textit{Digital Culture}, London, Reaktion Books, 2002, p. 52.} Although Wiener and Ashby were reflecting on information systems prior to the 1960s, cybernetic and systems theory intersected with one another most prominently during this
time. A key example was Burnham’s ‘Sculpture as System’, in Beyond Modern Sculpture, which will be addressed later in this chapter. But first Burnham’s critique of kineticism in art must be addressed.

**Burnham’s Turbulent Relationship with Kineticism**

As Lee has warned in Chronophobia, the problem with constructing a system, even one that is thought of as being open, is that there always outliers to the system. This can be problematic when using systems theory as a potential dominant mode of thought in art history, theory, and criticism, as Burnham has. Just as Lee has warned, the exclusion of the study and orchestration of actual movement in art from contemporary criticism in some ways locks kinetic artists into a zone of anachronism, and it does not enable them to be considered contemporary. However, despite Burnham’s de-emphasis of kinesis in art in ‘System Esthetics’ and Beyond Modern Sculpture, systems play an important role for many kinetic artists in contemporary art history. For Haacke, for example, actual movement in art has been used as an effective tool for rendering visible the unseen relationships among variables. This means that movement is not necessarily used in a formalist sense by exploring the rhythms of movement on a purely visual basis but can be a means for presenting how relations between components move in systems.

Burnham’s view on the emerging experiments with art and technology was also inconsistent. A few short years prior to the publication of ‘System Esthetics’, Burnham wrote damning reviews on the collaboration between artists and engineers in a series of exhibitions such at the Los Angeles County Museum of Art’s (LACMA) exhibition *Art and Technology* (1971). In a review for the exhibition in *Artforum* Burnham wrote:

> If presented five years ago, A&T would have been difficult to refute as an important event, posing some hard questions about the future of art. Given the

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434 Definition of open system most notably referred to through Umberto Eco’s the *Open Work*. See: U Eco, *The Open Work*, Cambridge, Massachusetts, Harvard University Press, 1989. Eco also argues for kinesis in art as a metaphor for open systems.


effects of a Republican recession…few people are going to be seduced by three months of industry-sponsored art, no matter how laudable the initial motivation.437

Burnham’s frustrations with other exhibitions and collectives such as Experiments in Art and Technology (E.A.T), Cybernetic Serendipity, at the Institute of Contemporary Arts in London (1968), the Center for Advanced Visual Studies, as department at the Massachusetts Institute of Technology, and his own exhibition, Software, at the Jewish Museum in New York (1969), are detailed in his essay ‘Art and Technology: The Panacea that Failed’.438 The above exhibitions are considered by Burnham as run by elitist organisations with compromised funding from corporate sponsors and inadequate financial support from artistic and educational institutions.439 Burnham also criticised these institutions and the artists in the exhibitions for showing an overall technological incompetence, and for failing to showcase emerging technologies in art.440 These factors stood out for Burnham as reasons why artists were so far unable to create ‘socially acceptable art’ that utilised the latest emerging technologies.441

Additionally, Burnham’s curatorial role for the exhibition Software (1970), experienced a considerable amount of public controversy, and several artists threatened to withdraw from the exhibition. Burnham claimed that artists had been sabotaging their own and other artists’ works442 and said: ‘the results have fared from mediocre to disastrous when artists have tried to use what has euphemistically been referred to as the electronic technology of “postindustrial culture”’.443 Part of his disappointment was directed at an ‘esthetic incompetency’,444 as well as a lack of institutional and corporate support from sponsors.445

440 Ibid., p. 211-215.
441 Ibid., p. 200.
444 Ibid., p. 211.
445 Ibid., p. 212. Burnham goes on to explain that this is a ‘fundamental explanation’ as to why he was disappointed by the efforts to explore technological solutions to visual art.
Burnham’s criticisms of those collaborating with science and technology in their art, at the time, were often directed at artists experimenting with kinesis. The popularity of kinetic art in the 1960s became, for Burnham, a key reason for why technological art was not being interpreted through general systems theory. In his words:

By the fact that most systems move or are in some way dynamic, kinetic art should be one of the more radical alternatives to the prevailing formalist esthetic. Yet this has hardly been the case. The best publicised kinetic sculpture is mainly a modification of static formalist sculpture composition. In most instances these have only the added bonus of motion, as in the case of Tinguely, Calder, Bury, and Rickey….All too often gallery kinetic art has trivialized the more graspable aspect of motion: this is motion internalized and experienced kinesthetically.446

For Burnham, mechanical kinesis was at the time too closely connected with formalist tendencies, and this resulted in a continued desire to create motions purely from physical systems.447

As a former lumia and kinetic artist, Burnham’s critique is largely cast by his disappointment with artists working with kinesis to resist the emerging popular anti-modernist perspectives on art. As he explained, ‘[t]he important thing is that the Kineticist is trying to make himself relevant in a world which is continually being recreated’,448 and from which they were falling behind. Therefore, Burnham’s description of kinetic art as an unrequited practice was made in dissatisfaction with electro-mechanical sculpture, because artists had the unrealised potential to assert kinesis within the emerging postmodern perspectives. As he explains in Beyond Modern Sculpture:

In an art world of ‘cool’ stances and exploding values a dialectical tension continues to build around Kineticism. The very fact that it is unrealized art should remain a sign of encouragement for future artists, even though Philip Leider suggests that Kinetic artists should enlarge upon the stance of Tinguely and create more self-destroying machines. Actually, even with the desire attached to that

446  Burnham, ‘Systems Esthetics’, p. 22.
447  Burnham, Beyond Modern Sculpture, p. 220.
448  Ibid., p. 284.
death wish, it is, at best, only a Luddite solution. The real way to kill an art movement is for it to realize its goals – an objective which Kineticism has yet to achieve’.  

Therefore, Burnham’s criticism of kinesis in art, as a practice that reflected the social and technological issues that were contemporary at the time, was also about the unrealised potential for artists to use kinesis in a way to re-engage with society and once again produce a dominant form of technological media art.

Despite Burnham’s adamant exclusion of kineticism from systems aesthetics, in the same year that Burnham published ‘Systems Esthetics’ in *Artforum* Willoughby Sharp referred to kinetic artists as the forerunners of systems aesthetics. Sharp said that systems ‘are defined by their energy input…. They are a cohesive collection of components relating to a single set of systems equations. These systems deal with facts about our physical reality…. One of the major functions of these sculptural systems is to plug us into the actual forces that configure contemporary reality’. For Sharp, kinetic art not only performs the rhythms of movement and energy that flow through daily life but, also acts as a manifestation of how reality is perceived and framed by society in different ways.

Sharp frames kinetic sculptural systems as a truly avant-garde practice that breaks down the boundaries between art and life: ‘[p]ainting and static sculpture are obsolete. They no longer relate to reality. They are anachronisms because they are irrelevant to our contemporary technological situation. It’s idiotic and immoral to make such objects as art now’. Therefore, for Sharp, whether kinetic art is made from mechanical, biological, pneumatic, or electronic media, it has the capacity to perform visual manifestations of life as a series of systems.

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449 Ibid., p. 284.

450 Burnham ‘Systems Esthetics’, p. 22. There were some exceptions that Burnham noted. This is inclusive of Marcel Duchamp’s *Rotary Glass Plates, Precision Optics* (1920), which Burnham claimed adequately moves beyond kinetic formalism, and engaged with conceptual systems through kinesis. See: Burnham, *Beyond Modern Sculpture*, pp. 212-242.

451 Sharp, p. 10.

452 Ibid., p. 4.
Despite his disappointment in technological experiments in art during the 1960s and 1970s, it cannot be ignored that a number of works by kinetic artists also strongly influenced Burnham’s perspectives on the use of general systems theory in art. This suggests that Burnham’s critical shift away from kinetic movement and towards the movement of systems was in part a syntactical maneuver to disassociate it from a connection to modern art. Consequently, Burnham attempts to remove movement entirely from postmodern interpretation of art. He argued that artists working with new technological media at the time were the forerunners of systems theory in art and were developing new ways for visualising and conceptualising a systems approach to art in real-time. According to Burnham, this tendency was informed by early European avant-garde constructivist and productivist collectives and artists, who drew from the modern industrial machine aesthetic, such as Moholy-Nagy, who was considered to have pioneered a systematic approach to his sculpture, photography, and painting. As Burnham explains:

In his book, The New Vision, Moholy-Nagy described fabricating a set of enamel on metal paintings. These were executed by telephoning precise instructions to a manufacturer. An elaboration of this was projected recently by the director of the Museum of Contemporary Art in Chicago, Jan van der Marck, in a tentative exhibition, ‘Art by Telephone’. In this instance the recorded conversation between artist and manufacturer was to become part of the displayed work of art. For systems, information, in whatever form conveyed, becomes a viable esthetic consideration [author’s italics].

Other kinetic artists were crucial to Burnham’s formulation of an aesthetic of systems in art. Among these are works by Len Lye, Otto Piene, and Robert Breer’s floats, and Group de Recherches d’Art Visue (GRAV) (a kinetic art collective that included Julio le Parc, François Morellet and Yvaral).

It is in Beyond Modern Sculpture that Burnham’s criticism of kineticism is addressed in

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453 This is further affirmed by the title of his book, Beyond Modern Sculpture.
456 Ibid., p. 28.
further detail. He devotes an entire chapter to his argument that artists working with kinesis are inevitably unrequited by their art.\footnote{Burnham, \textit{Beyond Modern Sculpture}, ‘The Unrequited Art’, pp. 218-284.} Burnham’s main intention for systems theory in art was not only to develop a way of understanding the emerging rubric of contemporary art in an increasingly technological society but, also that art as a system would become the dominant framework for creating, experiencing, and distributing art in the future.\footnote{Burnham, ‘Systems Esthetics’, p. 16.} This claim was explicit in his lecture at the Guggenheim museum in 1969, ‘The Aesthetics of Intelligent Systems’ when he said:

> Although the art of the future could take any one of a number of directions, it seems to me that, with the steady evolution of information processing techniques in our society, an increasing amount of thought will be given to the aesthetic relationship between ourselves and our computer environments – whether or not this relationship falls into the scope of fine arts’.\footnote{Burnham, 1970, p. 95. Cited in Gere, \textit{Art, Time and Technology}, p. 129.}

Through Haacke, Burnham considered that movement processes were an effective way for communicating systems theory in art, to the point that ‘real-time information processing mode [was] rapidly becoming the routine style of handling information’.\footnote{Burnham ‘Real Time Systems’, p. 30.} Burnham continues: ‘[w]hat a few artists are beginning to give the public is real-time information, information with no hardware value, but with software significance for effecting awareness of events in the present’.\footnote{Ibid., p. 30.} This connection between concept as software and material as hardware compares art to processing systems and excludes an interpretation and discussion of the way these systems \textit{move}. Burnham’s prediction that systems aesthetics would become a dominant approach to art in an increasingly socio-technological context is based on the dismissal of movement as a means to signify, process, and perform systems art.\footnote{Ibid., p. 30.}
Hans Haacke’s Kinetic Systems

Burnham, however, fails to acknowledge that Haacke’s early systems works performed kinetic dynamism to examine systems processes. Rather than discussing Haacke’s use of movement to signify and perform information systems, Burnham instead describes Haacke’s work with a vocabulary that spatialises the temporal movements of kinetic dynamism. Luke Skrebowski has recently argued that these early sculptures emphasised the movement of ‘physiological, physical and biological processes’ and are central to Haacke’s application of general systems theory, which have persisted throughout his artistic career. In his analysis, Skrebowski problematises Benjamin Buchloh’s attempt to create a division between the artist’s biological kinetic works and his more politically engaged art. He argues that to draw such a distinction is a reductive binarism that patronises the complexity of Haacke’s early practice.

Although Skrebowski does not address this, his emphasis on Haacke’s early sculptural works also problematises Burnham’s antipathy towards the intersection between kinetic dynamism and systems art. In his attempt to exempt kinesis from post-modern interpretation, Burnham’s argument overlooks Haacke’s emphasis on ontological function and form as referents for conceptual systems in art. Rather, for Haacke, it was essential that the real-time processes and conceptual systems were signified in his art, performed on a material level. As Haacke said, ‘I was primarily what you might call job-oriented. Even in the ‘60s, I wanted things to function, in a very literal, physical sense’. It is these material kinetic systems that I would like to bring attention to, rather than Haacke’s later socio-political systems art. Not only are Haacke’s early kinetic installations from the 1960s important features of contemporary kinetic and new media art history but, his emphasis

464 Benjamin Buchloh has also previously delineated two distinct phases in Haacke’s artistic career, his early kinetic systems and exploration of political systems. See, Buchloh, B, ‘Hand Haacke: Memory and Instrumental Reason’, Art in America, 1988, vol. 76, no. 2, pp. 203-241.

465 Skrebowski, pp. 59, 77.


468 Ibid., p. 220.

on the movement of form as a referent for material and conceptual systems is complementary to the view of kinetic art throughout this thesis.

For instance, early installations such as Haacke’s, *Blue Sail* (1964-65), *Condensation Cube* (1963-65), and *Sky Line* (1967) have often been dismissed as experiments in ‘positivistic scientivism’, all too preoccupied with technological rather than conceptual experimentation. Haacke’s systems art is usually recalled by contemporary art history through works such as *MOMA Poll News* (1969), *Shapolsky et al. Manhattan Real Estate Holdings, a Real-Time Social System, as of May 1971* (1971), which are works that each collate and display data over the duration of the exhibition. Each work materialises the invisible systems that traverse the everyday, such as a constant influx of political news, the hierarchical structure of real estate in New York, or the demographics of attendees at Haacke’s exhibitions.


Haacke’s use of movement also continues many of the experimentations with movement by early European avant-garde artists that are often recalled in contemporary art history. Like artists before him, such as Moholy-Nagy and Gabo, Haacke was concerned with rendering visible the ordinarily invisible facets of motion and energy. While Moholy-Nagy

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470 Buchloh, p. 212.

471 Grasskamp, ‘Real Time’, p. 36.
and Gabo were concerned with space-time perceptions, or what Moholy-Nagy termed the ‘dynamic construction system of forces’.\textsuperscript{472} Haacke was interested in collapsing the distinction between life and art by performing actual motions in life, including the life cycle, metabolism, and the transfer of energy.

Take, for instance, Haacke’s \textit{Chickens Hatching} (1969), an installation that consists of fertilised chicken eggs, incubators, a lamp, and a thermostat, which is both an exploration of kinetic movement and biological systems in art. For Burnham, \textit{Chickens Hatching} presents a system ‘where information is derived from the normal activities of animals in their environments’\textsuperscript{473}. This is an example of ‘real-time information, information with no hardware value, but with software significance for effecting awareness of events in the present’.\textsuperscript{474} While there is little specific hardware value to the actual installation in that time and place, the actual, emergent, and material movements and behaviours of the chickens are the material processes, which unlock the conceptual systems within the work.

It is important to note that these kinetic systems works were created throughout the 1960s and early 1970s during the same time that Haacke was creating works that processed the information of social and political systems. Haacke’s early artistic career did not move away from kinetic dynamism towards systems art in a clean transition; rather, kineticism was used early on to perform and experiment with the natural, biological, and technological transformation of energy. This understanding renews a connection between kinetic and conceptual art and, as I have suggested, also problematises Burnham’s regard for kineticism as a practice that is inherently connected to the modern industrial revolution.

To quote Haacke, these works ‘make something which experiences, reacts to its environment, changes, is non-stable…something which the “spectator” handles, with which he plays and thus animates…something which lived in time and makes the “spectator” experience time’.\textsuperscript{475} Haacke’s emphasis on the subjective perception of time resonates with Bergson’s study on the perception of duration, as a means of experiencing time, while concentrating on duration as a process of constant change. As time-pieces,

\textsuperscript{472} Moholy-Nagy, \textit{Vision in Motion}, p. 238.


\textsuperscript{474} \textit{Ibid.}, p. 28.

Haacke therefore presents constructions of ‘natural’ time in the sterile environments of artistic institutions to present society in an age of technological expansion that has, in a sense, lost time, despite its fixation on efficiency.

While Haacke has since been connected with systems aesthetics, biological art, and process art when considering the nexus between time and kinesis, the movements that Haacke orchestrates portrays time as a system of durations. Although there were moments when Haacke resisted the term ‘kinetic’ to describe his works, the use of movement within many of his works during the 1960s was a focal aspect to his practice. Kinesis, for Haacke, was more closely related to entertainment, rather than art, and this became a term synonymous with public amusement rather than a means for widening and reflecting on the conception of art. His elaboration on his sculptures as ‘time systems’ in the 1960s resonates with Umberto Eco’s approach to kinesis as an example of ‘open works’. For Haacke, they ‘merge with the environment in a relationship that is better understood as a “system” of interdependent processes’. To isolate the movement of a body of water into a perspex container works exactly to demonstrate that movement, even when it is enclosed, refers to and affects other movements (in this case the movements of Haacke’s spectators interacting with the piece).

477 Eco An Open Work, pp. 84-104.
Haacke’s *Blue Sail* (1964-65) is a simple movement study consisting of a sheet of blue chiffon, approximately 3.4 metres long and 3.2 metres wide, suspended horizontally in the air from the ceiling, and weighed down with fishing weights. Underneath the blue sail stands a small domestic fan pointed up towards the sail and panning across it. The sail is porous enough to form the shape of the wind created by the fan without entirely billowing and rising upward. The movement of the fan is translated by the sail; it creates a wave that hovers in constant equilibrium.

This work is one of Haacke’s closed environmental ‘sculptural’ systems works from the early 1960s. His focus on creating sculptures that produce their own weather systems,  

479 *His Rain Tower* (1962) is a clear acrylic container that is divided into sections. Each section is perforated enough to enable water to pass through each division in trickles. When turned upside down, the water rains down to the bottom, ‘turning the grid from a visual into an operative structure’. See: Grasskamp, ‘Real Time’, p. 36.
like other participatory art at the time, highlighted the tangibility of art and what Fried would call the duration of its objecthood. The *Blue Sail* presents a movement that is perpetual. It moves in front of its viewers, as well as when it is alone in the exhibition space. As Haacke explains:

> A ‘sculpture’ that physically reacts to its environment is no longer to be regarded as an object. The range of outside factors affecting it, as well as its own radius of action, reach beyond the space it materially occupies. It thus merges with the environment in a relationship that is better understood as a ‘system’ of interdependent processes. These processes evolve without the viewer’s empathy. He becomes a witness. A system is not imagined, it is real.\(^{480}\)

Movement and time are important elements of Haacke’s exploration of systems theory in art. Motion is orchestrated to resist a modern definition of art as autonomous, finite, and dependent on its crafted form, by producing work like *Blue Sail*, to alter and work within the interior climate of the gallery space and function in time.\(^{481}\) The components of *Blue Sail* each ‘physically communicate to one another’;\(^{482}\) that is, the movement of one object (a fan) causes an effect of movement on another (the sail), which also interacts with, and is affected by, the space and the viewers within it. The unstable or sensitive relationship that *Blue Sail* has with its environment emphasises movement as an unfolding process that is not contained but open to its environment. It is a work that, like many of Haacke’s early systems, ‘evolve[s] in time and [is] affected by time’;\(^{483}\) it is persuaded by an objective temporality rather than the phenomenological ‘shifting experience of the viewer’.\(^{484}\) *Blue Sail* is a work that Haacke created in order to make something which performs in time and makes the ‘spectator’ bring attention to the experience of time.\(^{485}\) On another level, unlike many participatory and interactive artworks at the time, its movement performs with

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\(^{481}\) Grasskamp, p. 38.


\(^{483}\) Ibid.

\(^{484}\) Ibid.

independence from its viewers; it moves in time and also affects time in Haacke’s attempt to emphasise the transformation and process of energy movement systems.

It is important that works such as Blue Sail and Photoelectric Viewer-Controlled Coordinate System perform Haacke’s approach to systems theory, rather than create a database or visualisation of them, unlike Haacke’s socio-political systems such as those written about in News, MOMA Poll, and Gallery-goers' Birthplace and Residence Profile. Providing a visualisation of these systems would create an abstraction that distorts the unfolding nature of temporality. Kinesis is, therefore, a central tool for illuminating and performing the specific temporal arrangements in Haacke’s systems art.

**Conclusion: Ontologically Unstable Movement Systems**

Burnham’s de-emphasis of movement in Haacke’s early systems art was used to defend his arguments made in ‘Systems Esthetics’, ‘Real Time Systems’ and Beyond Modern Sculpture. In these texts Burnham argues that art in the late 1960s was increasingly moving away from an orientation of objects and towards a systems-based approach to creating and consuming art. The consequence, as Burnham argued, is that it positions kinetic artists as unrequited in their aims to contribute a popular technological arts practice. The popularity and influence of Burnham’s argument in contemporary media art history has contributed to an understanding of kinetic sculpture as a practice solely associated with the industrial machine aesthetic and modern avant-garde movements.

This chapter has also highlighted the works and writings of Hans Haacke, who in the 1960s and 1970s drew from Norbert Wiener’s cybernetic theory and Ludwig von Bertalanffy’s systems theory to create works that perform, signify, and unfold as biological, political, and natural systems to challenge the institutional boundaries between art and life. I argue that Burnham’s interpretation of kineticism misdirects Haacke’s early sculptural systems art as early information-processing systems, rather than experiments of movement systems. Contrary to Burnham, I have argued that a sensitivity for, and discussion of, the actual kinetic movement in Haacke’s works is a central aspect of the artist’s understanding of systems aesthetics in art. Therefore, while Burnham’s antipathy

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486 Burnham *Beyond Modern Sculpture*, pp. 218-284.
towards kineticism separated kinesis from the emerging systems aesthetics in art, artists such as Haacke explicitly emphasised the importance of movement and form to connect media with specific conceptual messages. Haacke created works that were ontologically unstable in order to highlight the unfolding entropic approach to time that is found within systems theory. Rather than deferring to actual movement, Haacke used motion to highlight it as a tool that is material and immaterial, as well as actual and virtual. This approach to kineticism resonates with the use of movement by many of the other artists who are referred to in this thesis: Moholy-Nagy, Gabo, Tinguely, and Kapoor.

Burnham’s ‘Systems Esthetics’ is also significant for considering how kinetic art has since been interpreted as a technological precursor to sculptural and installation media art that emerged in the 1970s. The following chapter approaches the ways in which conceptual, participatory, and communicative time-based arts have been considered as dematerialising the form of kinetic sculpture to the point of invisibility and further associate kineticism with an antiquated modern machine aesthetic.
Frank Popper published *Origins and Developments of Kinetic Art* in 1968, the same year as Jack Burnham’s ‘Systems Esthetics’ and *Beyond Modern Sculpture* and is an art historical analysis of the experimentation of actual movement in art from the late eighteenth through to the mid-twentieth century. Popper’s seminal text is, to date, the most comprehensive analysis of kinetic sculpture as an aesthetic art form in Europe and North America up until the late 1960s, and, through his scholarship since, is recognised as ‘the foremost European historian of art and technology’. Since then Popper’s scholarship has been primarily focused on the progression and future of art in an increasingly technological society. This chapter argues that, as with Burnham’s ‘Systems Esthetics’ and Fried’s ‘Art and Objecthood’, Popper’s scholarship presents a polemic for a contemporary art history of kinetic sculpture. His approach to kinetic art in *Art, Action and Participation* and *From Technological to Virtual Art* regards kinetic sculpture as a modern antiquated experiment with mechanical media that is not relevant to contemporary art and theory. His assertion that digital art is ‘more refined’ than analogue media, regards kinetic sculpture as a ‘forgotten art’ which can only be ‘excavated’ by art history.

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491 Popper, *From Technological to Virtual Art*, p. 1.

Popper's later work is directed towards a digital and immaterial experience of art.\textsuperscript{493} This transition coincides with what he considers a ‘post-kinetic’ tendency in technological art since the 1980s.\textsuperscript{494} Throughout his subsequent publications, \textit{Art, Action and Participation} (1975), \textit{Art and Electronic Media} (1993,) and \textit{From Technological to Virtual Art} (2004), Popper has analysed media art alongside the discourses that surround traditional modes of representation because of its increasing popularity with artists, institutions, and audiences.\textsuperscript{495} In doing so, Popper’s scholarship from 1968-2004 builds an historical analysis that moves from modern mechanical kinetic sculpture, through to digital art practices such as virtual art, multimedia online art, and multi-sensorial installation. In the process, kinetic sculpture becomes increasingly regarded as a modern mechanical formal exploration of actual movement.\textsuperscript{496} Rather than considering the role and effects of kineticism in contemporary media arts, Popper asserts that media artists have progressed towards a digital immateriality.\textsuperscript{497} While this contributes to a contemporary understanding that avant-garde kinetic artists have a tradition with modern mechanical media, as I have addressed earlier in the thesis,\textsuperscript{498} it is also a determinist account that privileges the technological progress of digital media in art.

Popper’s analysis of kinetic and digital art is also significant because his perspective resonates with multiple elements of Smith’s understanding of contemporary art. Popper’s digitally determinist view that contemporary digital media art is the conceptual, immaterial, and ‘more refined’ technological media nurtures a remodernist understanding that contemporary digital art destabilises previous modes of representation. Popper’s association with kinetic sculpture as a modern mechanical and formal experiment with movement also provides an opening for contemporary exhibitions such as \textit{Revolutions} –

\begin{itemize}
\item \textsuperscript{493} Popper, \textit{Art, Action and Participation}, pp. 278-281. See also \textit{From Technological to Virtual Art}, pp. 1-8.
\item \textsuperscript{495} These publications include: \textit{Art, Action and Participation} (1975), \textit{Art of the Electronic Age} (1993) and \textit{From Technological to Virtual Art} (2007).
\item \textsuperscript{496} \textit{Ibid.}, p. 1.
\item \textsuperscript{497} Popper, \textit{Art, Action and Participation}, p. 278.
\item \textsuperscript{498} This association is addressed in detail through my analysis of Sydney’s 16th Biennale, \textit{Revolutions – Forms that Turn}. See Chapter 1 of this thesis.
\end{itemize}
Forms that Turn as attempts to collapse chronological distinctions between modern and contemporary art.

This chapter will unpack Popper’s interpretation and appropriation of the notion of ‘demateriality’, as his explanation for the abandonment of kinetic art, and the popularity of relational and communicative motion in participatory, interactive, and electronic media in the 1970s. Popper’s understanding of demateriality is used to form a problematic binary distinction between mechanical media as purely material and digital media as immaterial and virtual. Secondly, the chapter will address Popper’s interpretation of digital media that is used to reify an association of digital art as inherently virtual, immaterial, and ephemeral.

Thirdly, the writings by Susan Ballard and Erin Manning are presented as key resources for considering the effects of contemporary kineticism that problematise Popper’s perception of kinetic art.499 Rather than considering kinesis as a practice that became increasingly invisible, as Popper has suggested,500 kinesis can be used to articulate movement as an emergent material process that arrives in the present from a state of preacceleration. Doing so also emphasises kinesis as a tool for expressing and articulating perceptions of temporality, space, and dimensionality, and diverging from Popper’s digital determinism that strictly aligns digital media with immateriality and virtuality, and mechanical media with materiality.501

Popper’s Post-Kinetic Analysis

To date Popper’s Origins and Developments of Kinetic Art (1968) is one of the more comprehensive historical analyses of the influences and tendencies of European and North American kinetic art up until the 1960s. Since then, art historians and critics have not

500 Popper, Art, Action and Participation, p. 278.
501 Deleuze, Bergsonism, pp. 42-43.
surveyed kineticism in art to the same degree of detail, breadth, and awareness.\textsuperscript{502} Popper’s formal analysis of modern kinetic sculpture explores the use of movement with technology in art between the late nineteenth and mid-twentieth century. Like Jeremy Benthall who predicted that kinetic art would be a practice from which new art forms would grow,\textsuperscript{503} Popper believed that the technological expansion of the 1960s inevitably broadened the vocabulary of technological visual media, and provided new ways to present movement.\textsuperscript{504} It is because of this, according to Popper, that kinetic art became a prominent form of technological art after WWII.\textsuperscript{505}

However, in his publications subsequent to 1968: \textit{Art, Action and Participation} (1975), \textit{Art of the Electronic Age} (1993), and \textit{From Technological to Virtual Art} (2007) Popper gradually concentrated on other emerging practices such as computer, cybernetic, and digital art.\textsuperscript{506} Through this Popper presents a progression that moves away from mechanical kinetic sculpture and installation towards the ‘more refined’ technological media of virtual art and digital media.\textsuperscript{507} Popper constructs this lineage by considering digital media as instantaneous, immaterial, and virtual and treats kinetic art as an early mechanical precursor to contemporary media art.\textsuperscript{508}

For Popper, this transition occurred during the 1960s and 1970s when conceptual artists increasingly began to consider an artwork as a series of processes and perceptions rather than a discrete object.\textsuperscript{509} For Michael Fried, this nurtures a literalist tendency that reduces an artwork to an object within a spectacle of theatricality.\textsuperscript{510} However, others such as Harold Rosenberg argued that artists during this time approached their art as an, ‘arena in

\textsuperscript{502} Guy Brett’s historical analysis is primarily focused on the phenomenological effects of kinetic and op art. See: G Brett, \textit{Kinetic Art}, London: Studio Vista, 1968.

\textsuperscript{503} Benthall, \textit{Science and Technology in Art Today}, p. 101.

\textsuperscript{504} Popper, \textit{Art, Action and Participation}, pp. 13-51.

\textsuperscript{505} Popper, \textit{Origins and Developments of Kinetic Art}, pp. 121-150.


\textsuperscript{507} \textit{Ibid.}, pp. 301-302. See also: Popper, \textit{From Technological to Virtual Art}, p.1.


\textsuperscript{509} Lippard, \textit{Six Years}, pp. vii-xxi.

\textsuperscript{510} Fried, ‘Art and Objecthood’, pp. 149-172.
which to act rather than as a space in which to reproduce, redesign, analyse or “express: an object, actual or imagined”.\textsuperscript{511} For Rosenberg temporality was increasingly becoming an important tool for exploring and expanding available modes of representation because ‘what was to go on the canvas was not a picture, but an event’.\textsuperscript{512} He emphasises that modern American artists were at the forefront of this way of approaching and defining art, who increasingly considered art as a process rather than a discrete object.\textsuperscript{513} Because of this, engaging with the conceptual aspects of an artwork became the focal point of the experience of art, rather than its material elements.

Consistent with Rosenberg, Lucy Lippard later identified that artists in the 1960s increasingly regarded the materiality of their works as secondary, or carriers for the conceptual ideas that they signified.\textsuperscript{514} Lippard’s argument is also a direct break from Fried’s formalist perspective that meaning should be embedded in the formal elements of the art object.\textsuperscript{515} By privileging the conceptual components of an artwork, Lippard argued that for conceptual artists, material form often became ‘secondary, lightweight, ephemeral, cheap, unpretentious and/or “dematerialized” in relation to the idea that it signified’.\textsuperscript{516} This destabilised the ontological high and low power structures laden within modern art because of the disregard for medium specificity.\textsuperscript{517} Instead of focusing on technicality, craft, or formal capabilities, demateriality was a notion that catalysed a separation between form and concept.\textsuperscript{518}

In \textit{Art, Action and Participation} Popper uses demateriality to explain the emerging post-object tendencies of both conceptual and technological artists that Lippard and Rosenberg previously argued. He identifies that a strong selection of artists in the early 1960s and 1970s began to use technological media as a means of expressing their ideas, rather than

\begin{itemize}
\item \textsuperscript{512} Ibid., p. 23.
\item \textsuperscript{513} Fried, ‘Art and Objecthood’, p. 149-172.
\item \textsuperscript{514} Lippard, pp. 5-9.
\item \textsuperscript{515} Fried, ‘Art and Objecthood’, pp. 161-167.
\item \textsuperscript{516} Lippard, p. vii.
\item \textsuperscript{517} Ibid., pp. 5-11
\item \textsuperscript{518} Ibid., pp. 5-11.
\end{itemize}
exploring anything inherent in the technology that they were using. Following Lippard, Popper argues that media artists who were interested in using interaction with technology and/or the dynamics of viewer participation considered the medium of their art as a secondary element to the communicative, relational, and conceptual aspects of the work. Popper’s interest was therefore focused on the intersections between conceptual and technological art, as well as the way participation was being used during this time to dematerialise the art object. For Popper this was evident in the works by Fluxus artists, E.A.T, Nouvelle Tendance, GRAV, ZERO, Lygia Clark, Milan Dobes, Allan Kaprow, John Cage, and Robert Rauschenberg, who were amongst the early generation of artists who used participation as a primary aspect of their work.

For example, E.A.T, which was formalised as a collective of artists and engineers after the collaborative exhibition 9 Evenings: Theatre and Engineering, organised by Robert Rauschenberg and Billy Klüver, consisted of a series of performances and artworks for viewers to interact with over time. One of the more famous works at the exhibition was Rauschenberg’s Open Score (1966), where a game of tennis was played in the exhibition space. At the moment when a player hit the ball a light that was illuminating the game would be extinguished until the players were playing in complete darkness, while in the meantime a performance with five hundred volunteers was recorded by infra-red cameras and projected onto screens in the space. For Popper, these artists focused on the social interaction with technology to resist traditional modes of producing and experiencing art. Rather than focusing on the movement of form, such as with early kinetic art, artists were exploring the social and perceptual movements that unfolded between viewers and the artwork.

Another crucial example of participatory art that dematerialises the object of art for Popper is Allan Kaprow’s happenings, which began in 1959. Kaprow orchestrated a series

519 Popper, Art, Action and Participation, pp. 7-32.
520 Ibid., pp. 13-32.
521 Ibid., pp. 13-32.
of participatory performances that have been considered as a synthesis of assemblage, environment, action painting, and intervention, and involved vaguely scripted activities for the artist and his audience to perform together simultaneously. For Popper, Kaprow’s happenings enforce an ‘anxiety’ around an object of art and counts ‘on the presence of spectators and sometimes the artist himself- of a situation or event in which elements of everyday life or everyday technology become open to the “strangeness” of the fantastic or the poetic’.

Negotiations between art, time, and technology were also discussed amongst artists and critics interested the formal plastic arts. For instance, at the Venice Biennale (1966) Julio le Parc was awarded the grand prize for painting for his optical and kinetic devices that could be worn and interacted with by viewers. le Parc presented mirrors, sculptures, and wearable objects that altered the viewer’s perception to emphasise the experience of art as a process of sensations. le Parc emphasises the movement of participation, interaction, and duration to encourage viewers to reconsider prior conceptions of a unique, finite, and discrete object. With le Parc, the process of engaging with the concept becomes the primary focus, rather than commending the craft of an autonomous work of art. Because of this, a specific relationship between the form and concept of the work emerges, where the meaning of the work is no longer embedded in its material elements. Here, kinesis is used to rupture and dissolve traditional categorisations between the plastic and temporal arts.

Popper explained that as a consequence of a shift from studying the movement of form, towards the movement of interaction and communication in participatory art, ‘[t]he work loses its materiality, and becomes simply an effect or an event’. He continues that in the process of the event unfolding ‘[t]he emphasis lies not on the object, but on the dramatic

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525 D Palmer, p. 162. See also, Popper, Art, Action and Participation, p. 22.
527 Popper, Art, Action and Participation, p. 22.
confrontation or the perceptual situation in which the spectator finds himself".\footnote{Ibid., p. 11.} For Popper, what was unique to media artists in the 1960s by comparison to early artists, particularly kinetic artists, was that movement and time were no longer used to explore the formal qualities of the artwork.\footnote{Ibid., p. 278.} Instead artists orchestrated movement to heighten the awareness of the relationships that are constantly reconfigured between viewers, each other, and the object during the experience of viewing. The de-emphasis of form was a necessary condition that focused on these new social and relational movements in time-based art.

What is significant to his argument in \textit{Art, Action and Participation}, and his subsequent publications, is that Popper argues that artists who increasingly implicated the spectator/s in the aesthetic process and highlighted their movement affected the role and function of the kinetic object.\footnote{Ibid., p. 7.} For Popper demateriality ‘transfers the accent to the spectator…weakens the separate status of the object or “chef-d’-oeuvre”, which is viewed no longer as an autonomous unit but simply as a stimulus or incitement to a particular type of activity or perception’.\footnote{Popper, \textit{Art, Action and Participation}, p. 13.} This has a significant consequence for Popper’s consideration of the role and function of kinetic art because it is through participation and the dematerialised object that Popper suggests that the study of ontological movement ceased in the 1970s.

Therefore, while Popper considered that kinetic art was an important artistic practice in the 1960s because it had the potential to give rise to new art forms, he suggests that this was accomplished via the abandonment of creating objects of art that move. This is indicated when Popper states that kinetic art was one of the earlier practices that orchestrated ‘the public to participate effectively in transforming the existing environment’.\footnote{Ibid., p. 8.} While also ‘the disappearance of the object, the new role of the artist and the participation of the spectator, have a bearing on the aesthetic situation in general as well on kinetic art and the tendencies deriving from it’.\footnote{Popper, \textit{Art, Action and Participation}, p. 232.} For Popper, this ‘disappearance
of the object’ was encouraged by the new forms of participation that were emerging, which rendered kinetic sculpture invisible, and increasingly relevant to the explorations of new technological, media, and conceptual art.\textsuperscript{537}

For Popper, artists in the 1970s through to the present day who celebrated the materiality of industrial machinery in motion in an emerging digital age were no longer considered to be critiquing the technological society at the time,\textsuperscript{538} but instead tinkering with antiquated media.\textsuperscript{539} This is because, according to Popper, artists concerned with kineticism deferred to the popularity of conceptual art. As a consequence of this, Popper has suggested that conceptual and media artists after the 1960s were embarking on a ‘post-kinetic’ and ‘neo-technological’ state.\textsuperscript{540} Even though in \textit{Art of the Electronic Age} and \textit{From Technological to Virtual Art} Popper explored the intersections between science, art, and new media, rather than old technological practices,\textsuperscript{541} in doing so he gives little room for discussing the developments of kineticism that have continued through to contemporary practices.

\textbf{Conflation and Determinism.}

Popper’s understanding and application of demateriality is distinctly different from Lippard’s use of the term. It is important to note that while Lippard described demateriality as a separation of form and concept, and a de-emphasis on the material aspects of a work of art, materiality is integral for accessing and discussing the conceptual elements of an artwork.\textsuperscript{542} For Lippard, dematerialised conceptual art has inscribed in it a new relationship between form and concept, but this does not necessarily deem materiality as an unnecessary component of art. Popper considers demateriality as a

\textsuperscript{537} \textit{Ibid.}, p. 7-12.

\textsuperscript{538} Alvin Toffler describes late-modern kinetic artists as having celebrated the materiality of their works by comparison to those working with electronic media at the time. See: A Toffler, \textit{Future Shock}.

\textsuperscript{539} Benthall, \textit{Science in Art and Technology Today}, p. 101.

\textsuperscript{540} Although it is important to note that Popper referred to these terms as insufficient, they partly described media art practices in the 1980s. See: Popper, ‘Technoscience Art’, p. 302.

\textsuperscript{541} Popper, \textit{From Technological to Virtual Art}, p. 3. See also, Popper \textit{Art, Action and Participation}, p. 7.

\textsuperscript{542} Lippard, p. vii.
process that encourages art to be temporal, relational, ephemeral, and lacking in form. For Popper, demateriality is not only applied to identify a disjuncture between media and medium in postmodern and contemporary media art practices, it is used to inform an historical intersection between conceptual and digital art. Consequently Popper builds a distinction between kinetic and ‘technological artists’ who focus on the effects of ontological movement to convey their ideas differently from artists using digital art and electronic media, which according to Popper, has been used to create immaterial, ephemeral and interactive art. This is how Popper has come to argue that artists have utilised demateriality to the point of entire material invisibility.

In line with Susan Sontag’s analysis of film, theatre, and participatory art, Popper understands that art that unfolds in real time confronts kinetic art with a dual polemic: while movement in real time is a key defining element of kinetic sculpture, its use can potentially conflate kineticism with other practices that use movement, duration, and technology. Popper uses demateriality as a catalyst to blend participatory, conceptual, and technological art practices, and in doing so justifies his claim that kinetic art became increasingly indistinguishable from other practices. Popper’s study draws from a range of practices to develop and inform his approach to movement in art, such as automata, lumia, as well as robotic, cybernetic, and computer art, and provides an open definition of kinetic sculpture. In Art, Action and Participation Popper conflates the distinction between kinetic and conceptual art and positions kinesis as the nexus between technological, scientific, conceptual, and cybernetic art:

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543 Popper, Art, Action and Participation, p. 278.
545 Popper, Art, Action and Participation, p. 7-32.
547 This has also been addressed by Rosalind Krauss in Passages of Modern Sculpture, pp. 201-242.
549 Popper, Art, Action and Participation, pp. 7-11.
550 Popper, Origins and Developments of Kinetic Art, p. 245.
Kinetic art seems to have assumed the role of symbolically representing scientific and technical progress. It has shown the way towards the acceptance of electronic and cybernetic discoveries and their incorporation in the work of art.\textsuperscript{551}

Participation in kinetic art soon became combined with participatory art, happenings, and even public art.\textsuperscript{552} In Popper’s terms, ‘[t]hanks to new forms of participation [and] the dematerialization of the object through new technological procedures…the work as it was known traditionally is tending to disappear’.\textsuperscript{553} It is from this state of disappearance that Popper suggests that kinetic artists turned towards more temporal and relational art like participatory events, public interventions, happenings, polysensorial environments, and theatre.\textsuperscript{554} This is precisely why Popper’s appropriation of demateriality is used for both the defence and demise of kinetic artworks. While on the one hand demateriality points to the cross over between technological and conceptual art, particularly in the early stages of electronic art, it is on the other hand also used by Popper to suggest how and why artists ceased to practise a study of movement with movement. This is because for Popper a temporal approach to art helped to facilitate a diminishing regard for the kinetic object.\textsuperscript{555}

While a post-kinetic approach was predominantly argued in \textit{Art, Action Participation} in 1968, Popper confirms this thirty-one years later in \textit{From Technological to Virtual Art}. In the latter text kinetic sculpture is framed as an important mechanical precursor to what he describes as ephemeral media such as holographic and multi sensorial digital installation, computer, virtual, and net art.\textsuperscript{556} Compared to mechanical media, virtual art is considered as, ‘a new and refined version of technological art’.\textsuperscript{557} Here virtual art is considered to be a ‘new departure’ from previous media art practices, and is characterised by ‘innovation

\begin{itemize}
\item \textsuperscript{551} Popper, \textit{Art, Action and Participation}, p. 7.
\item \textsuperscript{552} \textit{Ibid.}, pp. 26-32.
\item \textsuperscript{553} \textit{Ibid.}, p. 278.
\item \textsuperscript{554} \textit{Ibid.}, pp.13-32.
\item \textsuperscript{555} Popper, \textit{Art, Action and Participation}, pp. 7-11.
\item \textsuperscript{556} Even though Popper devotes one chapter to a selection of artists creating ‘materialized digital-based work’, these artists are considered to be using the immateriality of virtual and digital art to produce new representations. This position still contributes to a model that oversees the mechanical as material and digital as immaterial. See: Popper, \textit{Art, Action and Participation}, pp. 7-32.
\item \textsuperscript{557} Popper, \textit{From Technological to Virtual Art}, p. xiii.
\end{itemize}
in visual and multisensorial perception, interactivity, and the development of aesthetic communication techniques’. For Popper the components of digital media are more complex than the technology of prior decades, and they also consist of improved versions of earlier technologies. While this assumption aims to enrich the historical influences of contemporary digital arts, it does so by implying that contemporary mechanical media art is the antiquated modern counterpart to contemporary virtual art.

Popper’s trajectory from modern kinetic art as a precursor to digital media positions virtual art as the immaterial heir and, in doing so, creates a distinctive digital determinism. Kinetic art is also discussed as having only rudimentary elements of immateriality, virtuality, and emphemerality. This is because Popper applies the notion of demateriality to cast virtual media as the immaterial contemporary equivalent to modern kinesis art. Popper clearly explains that his method depends on media specificity when he states, ‘[t]echnological art was made up of several technically determined areas’, that mostly described a modern mechanical, electronic art form.

In turn, the term ‘virtual art’ was drawn from a similarly technologically determinist viewpoint. As Popper considers that virtual art is the ‘elements of all art made with the technical media developed in the late 1980s’, this also excludes experiments with virtuality and digital art prior to the 1980s from being described as virtual art. This is affirmed when Popper continues that virtual art ‘comprises not only of enduring digital-based work, multimedia off-line and online productions, and interactive digital installations but also what can be identified as a techno-aesthetic within these categories’. This perspective does not account for the continued desire to create and consume actual movement in artistic experiences, and instead constructs a media art

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558 Ibid., p. 396.
559 Ibid., p. 1.
560 J Slayton, ‘Forward’, From Technological to Virtual Art, p. x.
561 Popper, From Technological to Virtual Art, pp. 1-8. See also Popper, Art, Action and Participation, pp. 278-281.
562 Popper, From Technological to Virtual Art, p. 7.
563 Ibid., p. 7.
564 Ibid., p. 396.
history that nurtures a direct evolution from modern technological art towards digital and virtual practices.

This demateriality contributes to a binary association between kinetic mechanical sculpture as material, and digital and temporal art as immaterial. By describing virtual art as the ‘refined version of technological art’, Popper positions digital and virtual art as the more sophisticated and inevitable successor of kineticism. While of course there is ample cross over between late modern kinetic and digital art, Popper’s model alludes to an inevitable end to the desire to create and consume actual movement in sculpture and installation. If this were to be the case there would not be a continuation of kinesis in contemporary sculpture and installation, nor would there be an inclination to exhibit and connect with the modern kinetic sculpture.

This connection between demateriality and media art has subsequently been echoed by a variety of art historians and critics. Edward Shanken has recently highlighted the use of technology in conceptual art as a direct tool for dematerialising the art object and reconsidering it as a process of information. Similarly Julian Stallbrass has argued that information is ‘offered in dematerialized form on the Web’. Both Shanken and Stallbrass connect the notion of digitality with demateriality while analysing the intersections between conceptual and digital art. Additionally, Vladimir Bonačić has argued that cybernetic art is a specific medium that is used to dematerialise information. These interpretations that blur the distinction between digital processes, conceptual art, and demateriality only consider kineticism as a part of a prehistory of contemporary digital media art and also converge demateriality with digitality in art.

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565 Popper, *From Technological to Virtual Art*, p. xiii.
Breaking Away From Binary Associations Between Analogue and Digital Media

However, this binary distinction is not necessarily always a consequence of demateriality in media art. Several critics and historians have considered the materiality of digital media in order to destabilise the deterministic understanding of digital media as an immaterial and ephemeral tool. For instance, Jack Burnham became interested in the notion of a concept having ‘material energy’ when he curated the exhibition *Software* (1970). In an attempt to consider new metaphors for art in a new technological age Burnham drew together artists in the exhibition that highlighted informal as a material process. For instance, the systems works by Haacke were presented alongside more conceptual pieces like Vito Acconci’s *Room Situation (Proximity)*, which involved the artist invading the personal space of gallery goers by standing closely to them and following them.

Burnham intended for *Software* to express post-formalist art as a culmination of conceptual, performance and interactive art that commonly separates medium from message in a state of demateriality. In the introduction to the exhibition Burnham explained that the curatorial choices of *Software* were intended to shape an idea of software, rather than hardware as a material process that is not necessarily abstract or immaterial. He selected works that ‘deal with underlying structures of communication or energy exchange instead of abstract appearances’, some of which were programmed by computer systems, or like Haacke and Acconci’s works, by environmental and interactive situations. Burnham’s idea of software was used to emphasise the presence of communication, concept, and process in conceptual art.


574 Ibid., pp. 10-14.
Similarly, albeit much later, Florian Cramer’s *Words Made Flesh* offered an alternative critique to the relationship between medium and message in relation to information theory.\(^{575}\) Cramer considers that software ‘is both material and practice’,\(^{576}\) rather than supporting a binary understanding of software as immaterial and hardware as material both are comprised of material and immaterial assemblages.\(^{577}\) For Cramer, ‘[i]f the duality of software and hardware needs to be suspended, it follows that the notion of software as immaterial versus hardware as material must be suspended, too. The difference between materiality and immateriality exists within software itself’.\(^{578}\) Cramer determines that by neglecting to locate the material and immaterial properties that lie simultaneously within digital and analogue media, a rigorous scholarship of media art is prevented.

In a similar vein Mark Hansen has argued against an ephemeral image of digital information, and instead understands the body as a site for enframing information from both digital and analogue media.\(^{579}\) Hansen rearranges the communicative structures in art through an embodied register. For Hansen, the specific relationship between the body and digital media is that ‘digitization requires us to reconceive the correlation between the user’s body and the image in an even more profound manner’.\(^{580}\) In Hansen’s view, the body gives form to information in both digital and analogue media equally, but in specific ways in each.

Shanken has also produced a useful categorisation of media that collapses binary associations between analogue and digital art. Rather than building a chronological account of technological experimentation in art during the twentieth century, early avant-garde artists are considered as players within Shanken’s image of the contemporary art sphere. In his survey of early European avant-garde artists such as Gabo and Moholy-

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\(^{578}\) Cramer, p. 124.


Nagy are considered in relation to contemporary public interactive trans-media works by Lozano-Hemmer, Horn, and Eliasson.\textsuperscript{581} Shanken considers avant-garde and contemporary artists to be a part of the contemporary interpretation of motion, duration, and illumination in art.\textsuperscript{582} This approach to media art history emphasises the continuation of motion, duration, and illumination in digital art and installation as an ongoing modern-contemporary conception, rather than as a set of practices that have only informed ‘new’ media techniques and effects.

This is a key and yet subtle difference in Shanken’s approach to kinetic sculpture from that of scholars such as Popper. The unfolding nature of movement and time under Shanken’s view instead shares an ongoing history that runs parallel to the emergence and practice of digital art. For instance, Rafael Lozano-Hemmer’s Vectorial Elevation (1999-2004), in Mexico City, included eighteen robotic searchlights installed in the inner city that were visible from a sixteen kilometre radius controlled by internet users from 89 countries. Shanken interprets the work as a piece of ‘relational architecture’ that disrupts the distinctions between the material as physical and definable and the digital as instant and virtual.\textsuperscript{583} Light is used not only to signify communication, but it also collapses the zones of communication between the geographical space of Mexico and the digital interactions with it from all over the world. Lozano-Hemmer strives to heighten the awareness of time as an unfolding duration through both analogue and digital systems, because the instantaneous actions by users on the internet have actual, material, and durational effects.

Brian Massumi considers Lozano-Hemmer’s architectural light installations in a slightly difference way to Shanken, and yet also complicates assumptions that surround digital and analogue media.\textsuperscript{584} For Massumi, when decoding and recoding digital messages through light projection, as Lozano-Hemmer does in many of his works, the possibilities of merging and rationalising the invisible elements of analogue participatory art,

\textsuperscript{581} Shanken, \textit{Art and Electronic Media}, pp. 55-77.
\textsuperscript{582} \textit{Ibid.}, pp. 55-77.
\textsuperscript{583} \textit{Ibid.}, p. 75.
\textsuperscript{584} B Massumi, ‘Flash in Japan’, \textit{Artforum}, November 2003, Iss 3, p.37. url: \url{http://proquest-umi.com/pqdlink?-did=489606081-&Fmt=7-&clientID=20923-&RQT=309-&VName=PQD} [accessed 20\textsuperscript{th} April 2012].
communication, relation, and community are highlighted.\footnote{585} This approach to digital media as a catalyst for emergence inverts Popper’s argument by considering the ways digital media can visualise specific actions of communication.

Massumi’s understanding of emergence is informed by Gilles Deleuze’s understanding of the virtual. Deleuze draws from Bergson’s approach to the virtual as something that is not opposed to the material, but what is actual in the present.\footnote{586} Consider for a moment a work like Hans Haacke’s \textit{Blue Sail} that was addressed in the previous chapter of the thesis. The sensorial and conceptual percepts that the viewer draws from the work are actualised in the process of perception. In this moment what the viewer does not perceive remains in a virtual state yet to be actualised in the moment of perception.\footnote{587} Both the form and concept of the work are simultaneously loaded with virtual and actual properties in a process of actualisation that is in a continual state of becoming.

Even though Deleuze arranges the virtual and actual as being opposed to one another, they are also in a mutually exclusive dynamic. Brian Massumi, through Deleuze, has emphasised the process of actualisation from the virtual as a continual mode of becoming where ‘the virtual is the mode of reality implicated in the emergence of new potentials. In other words, its reality is the reality of change: the event’.\footnote{588} This raises the polemic within Popper’s connection between virtuality, demateriality, and digital art because, through Deleuze, there is no ‘increasingly immaterial’ or dematerial. Rather, the virtual is something that enables actuality: ‘[t]he elements, varieties of relations, and singular points coexist in the work or the object, in the virtual part of the work or object, without it being possible to designate a point of view privileged over others, a centre which would unify the other centers’;\footnote{589} the relationship between virtual and actual come together in a process of becoming, or emergence in the actual realm.


\footnote{587} Deleuze, \textit{Bergsonism}, pp. 62-63.

\footnote{588} Massumi, ‘Sensing the Virtual, Building Insensible’, p. 1.

\footnote{589} G Deleuze, \textit{Difference and Repetition}, p. 260.
By comparison, Popper presents an understanding of materiality with a physicality that is concrete, visible, and determined. This signifies a paradox within Popper’s framework because he overlooks kinetic artists who concentrated on the unseen relational and temporal processes that they articulated with electro-mechanical motion in the 1960s. While I go into more detail to critique Popper’s use of demateriality later in this chapter through Anish Kapoor, as well as Anthony McCall, this is also relevant to artists in *Directions of Kinetic Sculpture* such as Lye, Haacke, Bury, Robert Breer, and Tinguely, who were as much interested in the materiality of their works, as their orchestration of temporal and invisible elements of their work. The symposium for *Directions in Kinetic Art* consistently returned to the discussion of kinesis in art as having the potential to build a modality for the perceptual edge between visibility and invisibility, concern for the simultaneous material and immaterial elements, and the effects of movement.

Along with producing one of the most detailed historical analyses of kinetic sculpture to date in *Origins and Developments of Kinetic Art*, Popper’s use of demateriality in *Art, Action and Participation* holds considerable weight for the key understandings of kinesis in art history. However, as argued above, his argument that technological art has transitioned from mechanical and kinetic to ‘more refined’ digital media, such as virtual art, positions kinetic art as a precursor to other media practices, and which ceases as an art form when dematerial post-object aesthetics emerge. Popper only considers ‘kinetic’ according to movement that is mechanical and material, which influences but distinctly falls short of digital art, even when movement, time, and process continue to be primary concerns for modern-contemporary artists. Popper’s consideration of demateriality draws a new specificity between analogue and digital media. It is a problematic distinction that associates the digital with the immaterial and virtuality, while associating mechanical media with materiality and formalism. Not only does this conflict with Lippard and Burnham’s use of demateriality but, also with other contemporary approaches to analogue, digital, and conceptual media.

**Anthony McCall’s *Line Describing a Cone***.

Anthony McCall’s *Line Describing a Cone* was originally exhibited at the Whitney Biennale in 1973, and has since consistently travelled to national and international
exhibitions that have shown the work in relation to a variety of contemporary media discourses. In the past decade in Australia alone, the work was recently brought to the Australian Centre for Moving Image (ACMI) in Melbourne, in 2006 was at the Eyes, Lies and Illusion exhibition, and has also been exhibited in Sydney in 2005 through the Sydney Moving Image Coalition. Because of this the artwork has been interpreted from multiple disciplines including as a piece derived from expanded cinema, an avant-garde kinetic post-object oriented work, as well as a contemporary installation.

Figure 12: Anthony McCall, Line Describing a Cone (1973).

Line Describing a Cone is a durational piece that is primarily constructed with film, projection, and movement of light. It begins in a dark space laced with fog that has been fitted with a screen at one end of the room and a projector facing the screen on the

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592 Ballard, p. 179. Line Describing a Cone has
opposing wall. In the beginning a small white dot appears on the screen and for over the course of thirty minutes slowly forms into an outline of a circle. During this time a beam of light is sent from the projector to meet the formation on the screen. Over time the line transforms into the outline of a circle, which the projected beam follows, and an outline of a horizontal cone between the screen and the projector is produced. When left alone over the course of thirty minutes both projector and screen come together and enact this performance. Notably McCall created this work as an interactive installation and invites viewers to walk around and through the light projection.  

During this time there is opportunity for the viewers to interact with the cone. They can choose to intersect with it by using their bodies to interrupt the light and create new formations, or stand aside to watch the cone grow into its complete formation. McCall uses the light beam to create relational movements between viewers, each other, and the light to recreate the space that they are in. In his words:

"For this film, every viewing position presents a different aspect. The viewer therefore has a participatory role in apprehending the event: he or she can, indeed needs to move around relative to the slowly emerging light form."  

This has more recently been reiterated by McCall when he reflects, “[w]ithin the dark room, the individual audience members have to negotiate the space in relation to one another so that they can all see the light form”. This is a work that is durational in nature: over time viewers gain a heightened sense of awareness of their own actions and the consequences of their movements: whether they are interrupting the light, potentially obscuring the view of other participants, and/or observing the formation of the cone. McCall orchestrates a duration that relies on the actual movement of communication and analogue media, and the two work together to negotiate the growing form of the light beam.

McCall’s use of kineticism is unique because the experience of Line Describing a Cone produces some friction with Bergson’s approach to duration. This is because Bergson  

594 Ibid., p. 53.  
595 McCall, ‘Line Describing a Cone’ and Related Films, October, vol. 103, 2003, p. 44.
argues that film and photography reduce duration to a sequence of equidistant images that privilege a static image rather than an experience of movement. The range of media that McCall uses is not orchestrated to highlight the different rhythms of motion between them. Rather, they coalesce with one another to provide a heterogeneous experience of duration. The projector’s light beam moves in a continuous and unfolding motion, which meets the discontinuous illusion of movement created by the animated line on the screen, which is also altered by the interruptions to the beam made by viewers. McCall therefore draws together movement, projection, film, and installation to form a collaboration of movement that is simultaneously continuous and discontinuous, discrete and unfolding, and presented and represented.

While time and movement in film is inferred between instances, in the experience of *Line Describing a Cone* participation and communication between viewers and the movement of the light beam counteract the representation of duration made by the animated line on the screen. This highlights both the continuous and discrete elements of the work at play together and creates an assemblage of mechanical and relational movement. It is nearly always an inevitable desire for viewers to come into the space and touch the light and break its path while the animation of the line on the screen continues to progress. The continuity between the projected light and the screen is a collaboration of two motions (light and screen) that are pulled apart and rejoined through the course of interaction throughout its duration.

One of the effects of *Line Describing a Cone* is that through each representation of movement, even if it simplifies duration, it is not mistaken for duration because the viewers touch, walk around, and interact with its progression in real time. McCall is adamant that the installation does not create a reduction of time but, conversely, heightens the awareness of time. This is evident when he says, ‘[t]his film exists only in the present: the moment of projection. It refers to nothing beyond this real time. It contains no illusion. It is a primary experience, not secondary: i.e., the space is real, not referential; the time is real, not referential’. This is one of the reasons why McCall created a work...

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that, ‘sits deliberately on a threshold, between being considered a work of movement and being considered a static condition. Formalist art criticism has continued to maintain a stern, emphatic distinction between these two states, a division [he] consider[s] absurd’.

These formalist divisions of medium specificity distinguish the difference between dynamic and static works because they prevent new ways for articulating the experience of motion and time. McCall draws together multiple media to show that their conflicting presentations and representations of movement can build together an experience of duration that is contrary and multiple in order to heighten the awareness of the perception of movement in time.

Considering that Bergson’s theses of movement in his time were largely based on reflections of how movement had so far been visualised in his time, McCall demonstrates that technological expansion and assemblage of multiple media have the potential to produce new perceptions of movement and time. McCall’s arrangement of digital and analogue media come together to present movement and time in new ways that are different in kind. This touches on one of the key functions of kinetic art: to produce new perceptions and affects through the manipulation of time, space and movement.

Like many other kinetic works using light as sculptural medium, *Line Describing a Cone* has been described as an ephemeral work; it is a piece that is centred on the movement of time, and it lacks tactility and physical form (with exception of the screen and projector). Paradoxically, however, the experience of the light in motion has another effect. The light is not used to illuminate an area but is used to cut through the darkened space and create a spatial dimension. Because of this, McCall explains, ‘the more people who are present, the more “solid” the form becomes’. What makes the line of light so solid is the heightened awareness, attention, and interaction with the space that is generated over time. Interaction with the beam is nearly always an inevitable haptic desire, as bodies and limbs thrust through the wall of light drawing new formations with

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599 McCall, ‘Formalist Cinema and Politics’, p. 54.
their shadows. In a crowded exhibition the risk of people interrupting the pathway of the projected light with their bodies becomes increasingly persistent. As the cone progresses, the preservation of the cone becomes a key objective for viewers.

Susan Ballard has suggested that one of the reasons McCall’s installation gains presence and becomes ‘solid’ over time, is not only because of the relationships between the viewers, each other, and the work, but because McCall produces a form of materiality that is emergent.604 Rather than considering light as a weightless and immaterial tool, Ballard argues that McCall ‘suggests an emergent materiality where fixed spatial objects generate unfixed spaces of questionable dimensions’.605 McCall therefore uses light to produce perceptions of dimensionality that grow in duration. Ballard’s observation, like McCall’s description of the cone, interprets the beam as something that becomes increasingly solid over time and through movement. However, Ballard is more concerned with the generation of space, rather than the attention and interaction with the light itself. The emergent materiality that Ballard sees is not a condition unique to McCall but, uses *Line Describing a Cone* as an example to develop an alternative understanding of analogue and digital media that diverts from binary associations that solely consider digital media as immaterial and analogue media as material.606

For Ballard, emergent materiality is one of the unique affects of both digital and analogue media in installation.607 Her interpretation of emergence is influenced by Deleuze’s process of becoming that lies between the virtual and actual, and she uses it to foreground the qualities of becoming and intensity in the moment of actualisation.608 Ballard shifts traditional definitions of material and materiality away from what physically constitutes the artwork,609 towards matter in-formation.610 This resonates with Florian Cramer’s perspective of information as a process,611 as well as Matt Kirschenbaum’s understanding

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that digital information is a ‘function of the material and historical dimensions that obtain for all artefacts’. For Ballard, digital materiality points to the affect of the medium – digital materiality is what digital media does, rather than what it is: ‘[t]he digital does this by mutating its very surfaces and interlacing these with a viewer, so much so that the digital image is no longer tied to an external reality, but to the processes of viewing’. This is a distinct shift away from Popper’s chronological and media specific approach to defining digital and technological art because Ballard concentrates on the material and immaterial affects of media in art.

By collapsing modes of media specificity Ballard draws from Peter Lunenfeld to consider that all information, whether it be digital or mechanical, can be stored, distributed, accessed, and altered (although to varying degree). This variability suggests that information in both analogue and digital media depends on an arrangement of material and immaterial processes folding together, and directly conflicts with Popper’s digital determinism. For Lunenfeld, digital materiality ‘encompasses processes, which intersect with analogue notions of matter information. These arrangements are not composites or sums but assemblages’. The ‘informational field’ therefore looks to material and digital information as a form of processes that come together, both in material and immaterial forms.

Ballard’s approach to digital and analogue materials veers away from technologically determinist media specificity by disregarding the binary association between the digital as immaterial and the analogue as material, as drawn by Popper. The virtual is not equal to the digital but refers to the realm of potential that could emerge in the present. From this

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615 Ballard, p. 53.

position all media have a variety of qualities within them that are binary and open. Ballard’s emergent materiality creates an opening for considering the emerging processes that occur through digital and analogue assemblages that affect viewers in artistic experiences. In this respect Ballard is useful for approaching lumia, screen based, and participatory art, as tools for invoking and/or creating a spatial emergence that is both material and immaterial, rather than increasingly invisible as Popper suggests.

Although Ballard’s analysis is not restricted to kinetic installation I would like to suggest that temporality is key to the emergent materiality that she gauges in *Line Describing a Cone*. As I noted earlier, McCall responded to questions about the formal aspects of the work and said that it ‘sits deliberately on a threshold, between being considered a work of movement and being considered a static condition. Formalist art criticism has continued to maintain a stern, emphatic distinction between these two states, a division I consider absurd’. $^{617}$ McCall explicitly created the work to evade formal categorisations of movement and he does this by balancing liminal differences between the representation and presentation of movement with both digital and analogue media. If, according to Ballard, ‘[t]his film installation is periodic although the experience of it is not necessarily so. The emergence of the film is continuous, although the experience of the installation is distributed, interrupted and distorted. It flickers between analogue and digital’. $^{618}$ The tensions of this flickering are enabled because the installation is orchestrated by multiple and, at times, conflicting time rhythms of various mechanical media and viewer participation. The installation lies in the liminal space between formalist categorisation, and is able to flicker between discrete (digital) and open (analogue) effects partly because it is a time-based work. If McCall constructed the cone as an entirely static form, its affects would be eschewed considerably. By orchestrating time with movement McCall is able to produce formal (material) and conceptual (immaterial) processes. Therefore, through movement, the concept is not dematerialised, but reaffirmed through the durational unfolding of its form. In doing so, in light of Ballard, material and immaterial elements of the work can be emergent rather than immaterial and ephemeral.

$^{617}$ McCall, ‘‘A Line Describing a Cone’ and Related Films’, p. 56.

$^{618}$ Ballard’s use of the term ‘digital’ here, refers to the way film represents motion in a discontinuous and binary manner. Instances of movement are presented in equidistant intervals and when presented sequentially, film produces an illusion of actual continuous movement. See: Ballard, p. 182.
In this sense McCall can be used to destabilise Popper’s digital determinism as well as his regard for the dematerialised kinetic sculpture. Firstly, Popper’s approach to digital media assumes that it is predominantly considered as an ephemeral, invisible, and immaterial medium. However, McCall demonstrates that a kinetic installation can hold material and immaterial processes simultaneously through an orchestration of discrete, continuous presentations and representations of movement. Secondly, the form and concept of the installation is assembled to develop a materiality that is emergent over time. The formation of the cone not only occurs over time but, it is through time that awareness and attention of its materiality is heightened. Rather than considering that kinetic sculpture is becoming increasingly invisible, McCall uses light in movement to generate visible dimensionality and locate space. Rather than considering progression from mechanical to digital media, I have used McCall’s work to demonstrate that the exploration of material and immaterial effects of technological media is one of the ways kinetic artists have overcome Popper’s argument. Rather than an entirely formless system of relational movement and communication, McCall orchestrates form and participation together in order to highlight that kinetic movement is the assemblage of material and immaterial qualities through the orchestration of actual movement.

Movement as Emergent and Incipient.

Another technique for artists to elaborate on the emergent nature of movement in art is by arranging movement for viewers to feel for its rhythms during its incipience. Anish Kapoor’s Shooting into the Corner (2009) is a simple mechanical installation that consists of few elements: a canon that is loaded with pre-fabricated canisters filled with scarlet wax. At twenty-minute intervals an assistant fires the ammunition that shoots through a doorway and against the opposing white wall of the gallery space.

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619 Popper, Art, Action and Participation, p. 278.
During the exhibition viewers of the installation are invited to stand in a partitioned area and view the performance of the canon firing. At a scheduled time an assistant is directed to enter the room and reload the canon with an eleven-kilogram container of new wax and fire it by pulling a mechanical lever. Unlike many of his more minimalist works, Kapoor’s *Shooting into the Corner* is an experience abundant with excess. The canon itself fires with a large bass frequency that echoes throughout the gallery halls, and over time the waste of the fired wax canisters accumulates across the walls and floor of the space. Over the duration of the exhibition a mountain of wax builds directly under the general firing zone, while its surrounding areas become splattered with red remnants.

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Kapoor has created the work to be as much an orchestration of matter as it is of duration. Various videos that document the experience of the work in multiple exhibitions show audiences arrested by silence during the intervals between loading and firing the canon and often jeering, celebrating, and applauding after it fires.622 The moment of time that each attendant takes between loading and firing the canon varied, some waited longer than others and let the uneasy expectation of their audience build, while others pause momentarily before pulling the lever.623 In this moment the perception of time passing is heightened as expectation builds because expectation is manipulated to give in to uncertainty. The moment before the fire is unpredictable, anxious, and intense.624

Indeed, it is when we think of a moment that we create an isolation of time, a discontinuity of rhythm. This discontinuity is not a cut in time but, perception is heightened in a matter of degrees, and the awareness of time is isolated to a similar degree. The moment when audience members are held in complete suspense before the canon fires in an instant that passes too quickly – it is the moment prior to it that excruciatingly extends time, draws it out, and heightens our perception of its passing. These audience members react to a building of suspense in a similar way to the viewers of Jean Tinguely’s Homage to New York (1960), which I addressed in detail in Chapter 2. Reflecting on Tinguely’s performance in the garden of the Museum of Modern Art, Billy Klüver describes feelings of rising intensity and suspense as the work destroyed itself in ways that were unforeseen by the artist.625 The suspense that was felt during Klüver’s experience, however, was due to the accumulation of uncertainty.626 A similar reaction is

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622 For details of this variation see: Shooting Into the Corner is recorded in various exhibitions at, ‘Shooting Into the Corners’, Anish Kapoor, url: http://www.anishkapoor.com/583/Shooting-Into-the-Corners.html [accessed 1st June 2012].


626 Klüver states, ‘[n]ot once did we go over everything and check it…the arm he had worked on with perfection did not work….Something was wrong with it, it was winding too slowly….In the eighteenth minute, the fire extinguisher in the piano was supposed to go off. It didn’t….The whole machine was somewhat sick after the bad handling in transport, and it fell over after only a few minutes….After three minutes, the longest in my life, they finally began to put out the fire….At this point Jean and I were almost desperate…’. See: Klüver, ‘The Garden Party’, A Magic Stronger than Death, pp. 74-77.
orchestrated by Kapoor’s kinetic installation. However, the suspense is accumulated, predicted, and relieved through unpredictable repetition.

Suspense in fictional and non-fictional narratives are often orchestrated when the progress of information is withheld and/or uncertain.\textsuperscript{627} Even the threat of uncertainty in film and literature can be contributors to suspense.\textsuperscript{628} Klüver’s feelings of suspense were symptomatic of the uncertainty of how the auto-destructive work would end. Yet, unlike Klüver, the audience members viewing \textit{Shooting into the Corner} feel a rising intensity and suspense before the canon is fired, even though the installation is predictable and repetitious in nature. When they walk into the exhibition space for the first time they are already confronted with an accumulation of red wax along the walls and floor that serves as evidence for what they will witness. The canon also fires at set intervals, provided that the assistant fulfills his/her requirement (which they inevitably do). Despite the predictability of the canon’s fire, audience members wait in silence and perceive with building tension and, as noted previously, release with cheers after the wax pellet is fired.

These reactions to the kinetic performance are tied to the perception of an uncertainty around when the cannon will be fired rather than how or if it will happen. This partly explains how Klüver’s perception of duration felt as though it became elongated to a point of excruciating length, even over an actual moment in time. I am suggesting that not only is suspense created by narratological ambiguity, but also these feelings of suspense signify the intensity of a moment accumulating before it is actualised in the present, particularly in temporal works such as Kapoor’s.

One way to approach this idea is to consider the perception of movement in time as something that builds. It is emergent, as Ballard suggests, but it may also emerge from a point of immanence before it comes into actualisation.\textsuperscript{629} Erin Manning’s \textit{Relationscapes: Art Movement, Philosophy} builds a modality for what she terms preacceleration: the primary phases of movement in its initial incipiency. Manning gauges the rhythms of

\begin{itemize}
\item\textsuperscript{628} \textit{Ibid.}, pp. 146-158.
\end{itemize}
perceiving movement in order to understand how its intensity builds before it is present.\textsuperscript{630} This preacceleration is a way of seeing the temporal present as a continually productive force that territorialises the here and now.

Rather than thinking about static sculpture as an ideal representation of movement, Manning draws from Deleuze’s movement-image to consider sculpture as a form of mobility-becoming-image,\textsuperscript{631} rather than as a static image of movement. Manning explains:

> Although the sculpture seems to give in to the pose, the pose is in fact given to the sculptural movement. You create the pose by prehending it. You actualize it. But its actualization is only as real as the intensive movement that backgrounds it. Any actualization can produce a pose, but this pose will have been created by a mobile cut that is a becoming intensive of extensive movement. The pose is never the starting point.\textsuperscript{632}

For Manning, via Deleuze, the arrangement of mobility-becoming-image, refers to the movement that is implied between representations of movement in film, or the ‘prehension’ of the static pose in sculpture.\textsuperscript{633} Mobility-becoming-image also articulates movement before it is actualised as a form of preacceleration. If actual form, like the sculptural pose, is not the starting point of movement, then in time-based kinetic works such as \textit{Shooting into the Corner} actual movement of the installation is also not the starting point of mobility.

Manning’s Deleuze-Bergson approach to movement engages with duration as an eternal and material process. Duration is considered as a form of unfolding eternity, which when interpreted and visualized creates new rhythms. This approach to deconstructing motion in contemporary art lends itself to a reinterpretation of modern time by borrowing from

\textsuperscript{630} \textit{Ibid.} Manning achieves this by addressing a variety of motion studies: dance choreography, film, time-based installation, and painting amongst others. She demonstrates that each medium mediates movement and presents a unique perceptual edge of actualisation from the virtual. The perceptual edge of movement coming into being is the search for feeling-for and feeling-with movement in its incipience.

\textsuperscript{631} Manning, \textit{Relationscapes}, p.131.

\textsuperscript{632} \textit{Ibid.}, p.131.

\textsuperscript{633} \textit{Ibid.}, p. 131.
Bergson’s universal (yet multiplicitious) duration. This time is a continual unfolding and is unified in the actual present, and what remains to be actualised resides in the virtual domain. What is unique to Manning’s argument is the way in which time and space are not approached as opposing elements of kinetic sculpture, but rather work together in synthesis within the intricacies of the virtual intensifying and informing the preacceleration of the actual.

The very anxiety of predicted movement is the mechanism that prolongs Kapoor’s moment before motion. While the action may be instantaneous, anticipation intensifies the intuition of preacceleration and perception of actual motion. This is how Kapoor manipulates both time and space: rather than considering them in opposition to one another, instead they are used in synthesis in order to create an entirely predictable moment that is also pregnant with anticipation. In relation to Shooting a Canon into a Corner, he states:

I am interested in sculpture that manipulates the viewer into a specific relation with both space and time. Time, on two levels: one narratively and cinematically as a matter of the passage through the work, and the other as a literal elongation of the moment….Space is as complex. The space contained in an object must be bigger than the object that contains it. My aim is to separate the object from its object-hood.

Kapoor’s kineticism manipulates his audience to feel-with the intensity of movement before it occurs, which is what creates this sense of suspense. The audience feels for, predicts, and searches to catch the moment of actualisation before it comes. This elongation of the moment is also met with an immediate passing of its instant; the audience waits in silence, gathers their perception of duration, to be shocked with the short moment that it takes to fire the pellet and for it to hit the wall. The accumulation of

634 Deleuze, Bergsonism, pp. 37-49.
635 Manning, Relationscapes, p. 131.
636 Bergson, Matter and Memory, p. 176-181, p. 319. Here Bergson described the present temporality as an unfolding in time, as well as a preservation of the past within it, therefore giving it unifying qualities that actualise the two.
637 Ibid., pp. 168-169.
anticipation stretches the moment, slows time to feel the precise moment of present that finally passes with a cathartic explosion of the canon.

Ballard and Manning, then, provide a vocabulary for articulating the perceptions and reactions manipulated by Kapoor in *Shooting into the Corner*. Through them, movement is not only an emergent process, but that very emergence is created from a building state of intensity between the actual and virtual. Preacceleration works to show that this emergence comes from somewhere, and that movement does not begin in its actual form, but the building of intensity in the virtual becomes singular and actualised in the present. Kapoor makes his audience feel exactly this by building the perceptions of suspense, anxiety, and celebration that develop when his wax is fired in the gallery.

Through Ballard and Manning, it also becomes evident that movement cannot only be emergent but, is a process of emergent materiality from incipience. This stresses the simultaneous qualities of movement as something that is virtual and actual. Similarly, duration is both material and eternal. Kapoor is a time-based kinetic work that formally presents a similar understanding of movement. His simple gesture of movement mediates temporality. The moment of action is ‘elongated’ to encompass not only the actual action of the canon firing, but the sense of it occurring before it does. Viewers of the artwork are manipulated to see and feel the explosion and vibration of the capsule of wax firing out of the canon, but also sense the arrival of its actualisation, or what Manning would describe as developing a sense of preacceleration. The manipulation and elongation of this eventual moment that is entirely unpredictable and violent. Kapoor’s canon behaves normally for a canon. It repetitively shoots capsules of wax that eventually build against the walls and floors of the gallery. The repetition of its action, despite being unpredictable, is precisely the mechanism that draws out the perception of an emergent moment of materiality.

**Conclusion: Materiality, Participation and Anticipation**

Frank Popper’s view of kinetic sculpture and installation in relation to conceptual and digital art has formed an influential, and yet polemical construction of kinetic art history. More specifically, Popper’s interpretation of the post-object tendencies in time-based art since the late 1960s has serviced an assumption that considers demateriality as a catalyst
that enabled kinetic art to be absorbed by digital art practices. Popper’s argument justifies this transition by associating kinetic sculpture with the weighty industrial materials of modern art, and conceptual and digital art as communicative, ephemeral, invisible, and relational. I have approached Popper’s argument as a key polemic in contemporary art history because it foregrounds a media specificity that suggests that mechanical media is predominantly an historical precursor to digital media.

Additionally, in this chapter I have highlighted the works by McCall and Kapoor, and the concepts of emergence and preacceleration by Susan Ballard and Erin Manning, to emphasise the polemics in Popper’s perspective. I argue that these artists celebrate materiality through kinetic sculpture on a variety of scales, whilst engaging with temporal relational processes such as participation and anticipation. *Line Describing a Cone* has been highlighted as an installation that consists as a collaboration of time and movement rhythms that creates space as it unfolds. Lumia, projection, and film are used to find a perception of movement that is ephemeral and yet emergent as well as being continuous in time, that unfolds with an array of discrete discontinuities. My analysis has also drawn from Ballard and Manning, and to consider movement (regardless of media specificity) as an incipient and emergent process that produces both virtual and actual affects. Kapoor’s *Shooting Into the Corner* uses kinetic movement because it is a medium that is able to manipulate the perception of duration. Movement is used for its incipient and excessive qualities in Kapoor’s work. It builds in intensity and is excessive in its means, signifying a continued desire to use movement in contemporary art to manipulate perceptions of duration.

The analysis of Frank Popper’s historical understanding of kinetic sculpture and the contemporary works by McCall and Kapoor also contribute to Smith’s understanding of contemporary art and conceptualizations of contemporaneity in multiple ways. First, Popper’s inclination to consider kineticism as a mechanical, machinic technological precursor to virtual art strengthens a notion that kineticism is in many ways a form of modern art that is distinctively different from the practices of postmodern and contemporary technological media. In this, Popper provides an opening for exhibitions such as *Revolutions – Forms that Turn* to be interpreted as returning to and reassessing modern art practices. Popper therefore contributes to a contemporary art historical perspective that facilitates a remodernist view of contemporaneity in contemporary art.
Secondly, even though I have used arguments by Manning and Ballard to destabilise Popper’s digitally determinist understanding of the relationship between kinetic and virtual art, the works by McCall and Kapoor emphasise the material and immaterial effects of motion, while also privileging a universal present that is also heterogeneous in nature. This also resonates with Smith’s claim that contemporary artists are often fixated on the contrariness of how temporality is conceptualised today.\(^{639}\) This is evident in the way McCall orchestrates his work to oscillate between discrete and continuous movement and evades to also produce a unified present. Kapoor also draws together modernist tropes of temporalit: rhythm, repetition and incipient time. My analysis of McCall and Kapoor also raises questions about the material, immaterial, actual, and virtual effects of kineticism in general. The following chapter will address early experiments with kinetic sculpture as an exploration that oscillates between these aspects of perceiving movement through the works of early kinetic artists, namely László Moholy-Nagy and Naum Gabo. Like McCall and Kapoor, I argue that these early European avant-garde artists use movement to encourage the viewer to consider mechanical movement as a material and immaterial process.

\(^{639}\) Smith, ‘To Be With Time is All We Ask’, *Contemporary Art: World Currents*, pp. 309-315.
CHAPTER 5

THREE KEY INFLUENCES OF THE KINETIC AESTHETIC: HENRI BERGSON, LÁSZLÓ MOHOLY-NAGY AND NAUM GABO

I suddenly saw the difference between concept and reality.  

Movement does indeed exist here; it is in the apparatus.

Figure 14: László Moholy-Nagy, Light Space Modulator (1922-1930). Exhibition view of Moholy-Nagy in Motion at The National Museum of Modern Art, Kyoto (2011).

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641 Bergson, Creative Evolution, p. 322.
Moholy-Nagy’s *Light Space Modulator* ((1922-30), also known as *Light Prop for Electric Stage* and *Lichtrequisit Einer Elektrischen Bühne*) and publications have participated in art historical discussions in recent decades in connection with contemporary artists.\(^{642}\) The kinetic sculpture has experienced a renaissance in recent years, since the artist’s daughter, Hattula Moholy-Nagy, in 2000 authorising a reconstruction and donating it to Harvard Art Museum specifically for their Busch-Resinger Museum collection.\(^{643}\) The commission of the full-sized replica stipulated that after the replica was made in 2006 it must be lent to major exhibitions whenever possible, and that the Tate Gallery had the right to display the work one out of every fours years.\(^{644}\)

Even though the Bauhaus Archiv Berlin and Van Abbemuseum in Eindhoven already own earlier replicas of the *Light Space Modulator*,\(^{645}\) the agreement between Busch-Reisinger and Tate Museum has encouraged a renewed analysis of the work in relation to contemporary art and society. Since then the work has appeared in a number of exhibitions such as *Moholy-Nagy and Joseph Albers: From the Bauhaus to the New World* (2006), *Light Display Machines: Two Works by Moholy-Nagy* (2007), at the Busch-Reisinger Museum; *Moholy-Nagy in Motion* (2011), at The National Museum of Modern Art, Kyoto; as well as *Moholy-Nagy: An Education of the Senses* (2010), at the Loyola University Museum of Art; *Museum Modules: Play Van Abb, Part 2: Time Machines* (2010), at the Vanabbemuseum, and an online exhibition titled *Extra Ordinary Every Day: The Bauhaus*.


\(^{644}\) Ibid.

\(^{645}\) Two replicas were organised by Sibyl Moholy-Nagy and Nan Piene in 1970. One was shown at the Howard Wise Gallery that year while the other was exhibited at the Venice Biennale. These replicas are now with the Bauhaus Archiv Berlin and the Van Abbemuseum. See: ‘So Many Light Space Modulators’ url: [http://greg.org/archive/2010/08/09/so_many_light_space_modulators.html](http://greg.org/archive/2010/08/09/so_many_light_space_modulators.html) [accessed 15th November 2012]. See also, ‘Vision in Motion’, *Berlin-Archiv Museum Für Gestaltung* url: [http://bauhaus.de/museum/archiv_02.html](http://bauhaus.de/museum/archiv_02.html) [accessed 15th November 2012].
at the Busch-Reisinger in 2005. The construction of the replica and circulation of a major international exhibition has allowed the work and the artist's work in general to ‘get a new lease on life’. Since 2006 The Light Space Modulator has been regarded as ‘a classic work of Modern art’, ‘a seminal kinetic sculpture’, ‘a work of ‘transformative vision’, ‘a symbol of modernity’, and a pioneer of contemporary understandings of modulation, duration, and movement of light, while Moholy-Nagy has been deemed a ‘mentor to modernism’. The positive critique for the work itself has flourished more so recently than before, when the artist was alive. In Moholy-Nagy’s time the work was criticised as an obscure and ambiguous work, a dated fetishisation of a constructivist machine aesthetic.

In 2011 Naum Gabo’s Kinetic Construction: Standing Wave featured in an exhibition with Moholy-Nagy’s Light Space Modulator titled, Immaterial: Brancusi, Gabo, Moholy-Nagy (2004), and Kettel’s Yard, Cambridge, which was also available online for a limited period


651 ‘Tungsten Games: Lights of the Classical Avant-Garde Aesthetics’ *Kunsthalle Erfurt* url: [http://kunsthalle-erfurt.de/ausstellungen/detail?tx_ttnews%5Bpointer%5D=1&tx_ttnews%5Btt_news%5D=42&tx_ttnews%5BBackPid%5D=12&cHash=78ec93f224](http://kunsthalle-erfurt.de/ausstellungen/detail?tx_ttnews%5Bpointer%5D=1&tx_ttnews%5Btt_news%5D=42&tx_ttnews%5BBackPid%5D=12&cHash=78ec93f224) [accessed 30th November 2012].


of time. While Gabo’s *Kinetic Construction: Standing Wave* has not experienced a recent reception as popular as *Light Space Modulator* the work continues to be considered as a key modern art historical piece within contemporary art historical discussions. The sculpture has been recently considered as a work that is central to the artist’s aesthetic,\(^{656}\) and a pioneering example of using movement as an artistic medium,\(^{657}\) even though it is Gabo’s sole kinetic sculpture. While the history of the work’s reconstruction and construction of replicas has not spurred as much contemporary discussion as Moholy-Nagy’s *Light Space Modulator*, a replica of *Kinetic Construction: Standing Wave* is a part of the permanent collection exhibition of the Berlinische Gallery in Berlin *Art in Berlin 1880-1980*.

While art historians Smith and Lee have considered the 1960s as an influential decade for the contemporary interpretations of time in art,\(^ {658}\) exhibitions such as *Revolutions-Forms that Turn* frame avant-garde artists during the early decades of the twentieth century as key figures for contemporary art history. My earlier interpretation of the curatorial arrangement of *Revolutions-Forms that Turn* in Chapter 1 positions the contemporary contemplation of time and contemporaneity as being influenced by artists of the early European avant-garde. Chapter 1 of this thesis addressed the role and function of avant-garde kinetic sculpture in contemporary exhibitions as a means for remodernising a modern machine aesthetic in art theory, history, and criticism today. It is, therefore, also important to consider the use of movement and time in early avant-garde kinetic experiments as influences of contemporaneity in contemporary thought.

In light of this, the following chapter concentrates on Moholy-Nagy and Gabo who experimented with kineticism in sculpture in the 1920s, as well as the writings on movement and duration by Henri Bergson. I present these figures as three key influences of the role and function of movement and time in contemporary kinetic art history that contribute to kineticism as a practice, and that can be used to expand perceptions of temporality in technological media. More specifically in the following chapter I address Moholy-Nagy and Gabo’s approach to mechanical representation and representation of

\(^{656}\) Hammer & Lodder, *Constructing Modernity*, p. 69.

\(^{657}\) Popper, *From Technological to Virtual Art*, p. 12

movement to complicate Bergson’s attitude towards the relationship between experienced time and technological mediation of movement. Rather than distorting or simplifying the experience of duration, I argue that Moholy-Nagy and Gabo use kinesis in their works as a balanced experimentation of actual movement and expressing the sense of time passing through the present. In this, both artists produce new spectacles of duration through the mechanical production and reproduction of movement.

The technological expansion of the industrial revolution in Western society brought new discussions around how space and time were perceived in modern media such as film and photography, and therefore came to characterise a form of peculiar time in modernity. For many, these elements underwent a process of annihilation. Time, rather than space, was a key consideration for modern art and philosophy. Rather than equating time to space, or validating the distortions of temporality perpetuated by Western culture, Bergson discussed time as an event that cannot be represented and is constantly bifurcating between present and past between its actual and virtual form. Similarly, Moholy-Nagy and Gabo created their kinetic sculptures in order to seek new ways to express time that did not distort or simplify its experience through representation, but explored the limits of perception through actual and illusory forms. Actual movement in real time was for

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660 For arguments on each society building its own ‘peculiar’ character of temporality, see: Althusser & Balibar, Reading Capital, p. 99.


662 For reflections on the spatialisation of time in Modernity, see, Jameson, Postmodernism, or The Cultural Logic of Late Capitalism, pp. 154-160.

Moholy-Nagy and Gabo an effective means to explore the limits of perception of movement. Movement was not only an expression of the present temporality but, also a tool for considering the act of perceiving time as an intuitive and malleable process.

This chapter will begin by focusing on Henri Bergson’s critique of modern Western representations of movement in relation to duration. I will highlight that rather than defining time through space and dissecting it into quantitative units, Bergson’s duration, by contrast, is characterised by continual transformation. The lived experience of time constitutes a process of constant bifurcation from the present (actual) to the past (virtual) while the very awareness of this continual change itself participates as its own rhythm of duration. From Bergson’s perspective the mechanical representation of movement is problematic because, ‘we give a mechanical explanation of a fact, and then substitute the explanation for the fact itself’. For instance, the reductive representation of movement in film is mistaken for a presentation of actual movement in duration. For Bergson mechanical movement depends on discrete, isolated, and repetitive actions that differ from the qualities of the subjective experience of time.

This chapter therefore positions Bergson’s duration as a perception of temporality that focuses on movement as a process that is not subservient to images of time, but contributes to time as an unfolding present.

Secondly, this chapter will approach László Moholy-Nagy’s, Light Space Modulator; Vision in Motion, and The New Vision, as key texts that indicate the artist’s approach to the presentation and representation of movement in modernity. Moholy-Nagy’s approach to movement differs from Bergson’s because the artist uses the presentation and representation of mechanical motion to expand perceptions of time. Moholy-Nagy’s kinesis is therefore a means for exploring the creative productive modes of technological media that defer from notions of mechanical motion as reductive, binary, and repetitious. Many of Moholy-Nagy’s photographic experimentations focus on altering perceptions of

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664 Bergson, Matter and Memory, pp. 267-283.
665 Ibid., p. 239.
666 Bergson, Time and Free Will, p. 181.
667 Ibid., p. 181.
668 Although the Harvard Art Museum, owner of the reconstructed Light Space Modulator (courtesy of Hattula Moholy-Nagy), states that the sculpture was made between 1928-29: http://www.harvardartmuseums.org/exhibitions/past/detail.dot?id=17982 most other sources state that the work took eight years to complete, from 1922-1930.
the present to stretch across the frame, rather than presenting it as an instant. Images of time are produced as continuous durations that are preserved within the frame. Similarly, motion in his sculptural works express the movement of light as a process that is continuous, but also modulating, refracting, and rejoining, all of which are perceived when the viewer moves with and around the work.669 One of the unique aspects of the Light Space Modulator is the way Moholy-Nagy demonstrated the differences between representing movement in film and photographic media, to various settings in which the sculpture itself could be experienced. Because of this, I argue that mediation of motion does not simplify duration, but has the capacity to produce new perceptions of its rhythms.

Thirdly, Naum Gabo’s Standing Wave: Kinetic Construction (1920) is presented as a direct expression of the key claims found within his Realist Manifesto (1920).670 Both the manifesto and sculpture indicate Gabo’s exploration of the limits of human perceptions through kinetic dynamism in real time.671 Gabo’s use of kinesis is an orchestration of real movement in real time that is used to privilege the present as an unfolding and continuous event. Gabo resisted the avant-garde tendency to focus on art as a means for bringing attention to the future,672 and instead used movement to draw attention to the present temporality.

Gabo’s ‘virtual volume’ is an important optical effect of movement in Standing Wave. This volume is an optical illusion that is produced when an object moves in rapid repetitive motions and creates a blur of present and past perceptions. Gabo’s kinesis in sculpture is,

669 Although many of his kinetic sculptures and architectural plans remained unrealised, the artist demonstrated strong intentions for these images of movement and time to be publicly and openly experienced as a part of public spaces, carnivals and festivals as well as being incorporated in architectural spaces of leisure and recreation. See: L Moholy-Nagy, Vision in Motion, 2nd edn., Chicago, P. Theobold, 1965/1947.

670 Co-signed by brother, Antoine Pevsner. See: Danchev 100 Artists’ Manifestos, pp. 189-194.

671 Ibid., pp. 189-194.

672 For example the Italian Futurists called for the eradication of historical artefacts and archives, in order to produce a clean future that is not influenced by the past. See: F. T Marinetti, ‘The Foundation and Manifesto of Futurism’, in Danchev, 100 Artists’ Manifestos From the Futurists to the Stuckists, pp. 1-8. Additionally the term avant-garde translates to ‘advance guard’ and is defined as artists experimenting with traditional modes of representing and experiencing art, and breaking down their boundaries. See: R Poggioli, The Theory of the Avant-Garde, trans. G Fitzgerald, Cambridge, Massachusetts, Belknap Press of Harvard University Press, 1968.
then, an orchestration of the perception of actual and optical (or virtual) movements. The perceptual edge between material and optical volumes enables movement in the present and impressions of past motion to be consolidated while a viewer perceives the work. For Gabo, kinesis is not only used to explore the perceptions of the movement, but also to form a perception of temporality that is plural, folding, and as a constant transformation.

Bergson has been an influential philosophical figure for the artists who orchestrate actual movement in their art. This is because many of these artists explore the use of actual motion, rather than its representation, in order to articulate the nature of how we perceive ourselves perceiving motion and time in artistic experiences. My analysis of Moholy-Nagy and Gabo’s use of kinesis problematises Bergson’s resistance to mechanical representations of movement in a number of areas through the perceptual effects of mediation, modulation, and the virtual volume.

**Bergson: Modern Western Movement, and Duration.**

In *Time and Free Will, Matter and Memory*, and *Creative Evolution*, Henri Bergson unpacks three dominant ways in which Western society rationalized and represented movement and time. Throughout these texts the representation of movement in film, photography, and—to a degree—painting are critiqued for distorting the experience of time. For Bergson, these representations separate time into equidistant static images and spatialise its form. For instance, Eadweard Muybridge’s photographic motion studies of a horse galloping along a racecourse is problematic because it reduces the animal’s

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673 This is in a similar vein to Erin Manning’s *felt-with* sensation of Étienne Jules-Marey’s photographic and fog motion studies. Manning primarily focuses on comparisons between a Bergson-Deleuze perception of duration through Marey’s work, and later a Bergson-Deleuze analysis of David Sprigg’s fog installations. The argument in my chapter focuses on the affects of actual motion in conjunction to photographic and cinematic representations of motion to find that kinetic dynamism has been used to expand on the temporal present. See E Manning, *Relationscapes*, pp. 83-111.


movement into a series of instances, to which movement occurs between points A and B as a subordinate process to the image represented. As Bergson notes, ‘all division of matter into independent bodies with absolutely determined outlines is an artificial division’. For Bergson, this is because movement is a qualitative transformation that is distorted when divided and quantified.

Bergson explains that representations in modern media according to a series of instances (such as film, photography, animation, and zoetrope), or ideal images (representations of growth or movement presented in stages of change over time) are problematic. Bergson’s reasoning for this is that not only are these representations a distortion of duration, but also, and more importantly, ‘we give a mechanical explanation of a fact, and then substitute the explanation for the fact itself’. Modern media is therefore characterised by Bergson as conceptualising and expressing time in a spatialised and quantifiable manner. Within these representations time exists in an interval between images of movement, and is represented in a repetitious, linear, and mechanised fashion.

In this regard representations of movement fail to demonstrate that time is subjectively experienced as constantly changing. In Bergson’s words, ‘what is real is the continual change of form: form is only a snapshot view of a transition’, and to create a snapshot of movement is to represent it exactly as it is not: static and unchanging. Bergson describes this static image of movement as an interruption of actual movement because ‘a passage is a movement and a halt is an immobility. The halt interrupts the movement itself’, hence exposing the contradiction of representation. For Bergson, time becomes spatialized through the mechanisms of static representation that signify transformation. This is

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677 Bergson, Matter and Memory, pp. 153-186.
678 Ibid., p. 259.
679 Bergson describes the deficiency in representing movement through Ancient ideals in See: Creative Evolution, pp. 350-355. These renditions of movement are not objective representations of the transformation of movement, ‘all moments count. None of them has the right to set itself up as a moment that represents or dominates the others’.
680 Bergson, Time and Free Will, p. 181.
681 Henri Bergson, Duration and Simultaneity, Manchester, Clinamen Press, 1999.
682 Bergson, Creative Evolution, 1913, p. 319. See also: Bergson, The Creative Mind, p. 15.
683 Henri Bergson, The Creative Mind, p. 15.
684 Bergson, Matter and Memory, p. 247.
particularly problematic because to render time dependent on space also reduces it to something that is divisible, measurable, and homogenous. In this light, Bergson considers the representation of movement as a mechanism that is inherently incapable of creating a true experience of duration. Through film, representations of movement can be problematic as they can be mistaken for actual movement rather than be recognised as illusionary. The increasing, everyday consumption of these illusions of movement make the risk even more prevalent.

For Bergson, duration is the time that we experience subjectively. It not only entails the perception of the present as it unfolds, but it is also the memory of the past affecting the experience of the present. Therefore, the present preserves images of the past while gathering the potential future, both of which coexist virtually with the present. In this sense, duration is both a continuous unity while also heterogeneous in nature. In *Time and Free Will*, for example, duration is described as: ‘On the one hand, a multiplicity of successive states of consciousness and, on the other hand, a unity which binds them together’. This unity consists of the actual events that form in the present. As Bergson continues, ‘[d]uration will be the synthesis of the unity and multiplicity’. Therefore, duration inherently consists of change, transition, and becoming, and its rhythm in the present—as well as the past preserved within it—is inherently unpredictable, and continuously in a state of becoming.

To explain duration, Bergson describes the act of watching sugar dissolve into a glass of water. The process as a whole involves the weaving of interactions between the glass, water, and sugar, as well as Bergson’s own subjective perception; his senses, mind,

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690 Deleuze, *Bergsonism*, p. 45.
patience, and boredom. In his words, ‘the time I have to wait is not that mathematical
time…it coincides with my impatience, that is to say, with a certain portion of my own
duration, which I cannot protract or contract as I like’. 694 This means that duration is
caracterised by the present as an unfolding continuity, as well as the consciousness and
memory of the present passing that fold together in relation to one another. 695 Duration also
changes according to the subjective awareness of its transformation in its present. In fact, it
is characterised exactly as ‘the immediate awareness of the flow of changes that
simultaneously constitute differences and relationships between particulars’. 696 These
relationships refer and defer from one another in a plural and heterogeneous fashion, and
includes the very awareness of the state in which movement travels through. 697 Bergson
therefore presents a critique against the modern rationalizations of time as a distortion of
the qualitative subjective experience of duration.

Even though the subjective awareness of time is an important element of duration,
subjectivity is not its core element for Bergson. 698 Rather, duration is a combination of
both the awareness of time as a continual unfolding as well as the perpetual bifurcation of
the present passing through into the past. Additionally, for Bergson, there is a difference
between psychological and physiological time 699. While both qualities of time strongly
affect one another, and they come together to form the whole of duration, their differences
also needs to be recognised. 700 In Bergsonism Gilles Deleuze has emphasised Bergson’s
duration as a continual expansion and contraction between the infinite possibilities and
finite actualities within a heterogeneity of rhythms of time. 701 He describes that this

694 Ibid., p. 10.
695 Deleuze explains that duration has 3 main characteristics: consciousness, memory and
freedom. Freedom here is defined as the unpredictable nature of the present as a productive
event that actualises forms from the infinite virtual field. See: Deleuze, Bergsonism, pp.
51-52.
696 Parr, The Deleuze Dictionary, p. 79.
697 For more on the multiplicity of these movements moving through the Whole and also
hypotheses on multiple durations, see: Henri Bergson, Duration and Simultaneity, pp. 30-
85.
698 Bergson, Creative Evolution, p. 10.
699 Bergson, Duration and Simultaneity, pp. 30-85.
700 Cañales, ‘Einstein, Bergson, and the Experiment That Failed: Intellectual Cooperation
701 Deleuze, Bergsonism, pp. 73-89.
potential infinite nature of duration as, ‘psychological duration, our duration, is not only one case among others, among an infinity of others, a certain well-defined tension, whose very definitiveness seems like a choice between an infinity of possible durations.’  

Each rhythm of duration is therefore relative to each other while also varying in intensity and being in a state of constant change. These rhythms are also always continuous with a variety of intensities, pauses, and folds that come together and part from one another.

This lived subjective time has been considered by Deleuze as a contrast to the way Western society has represented and conceptualised time. To quote Deleuze: ‘Bergson’s major theses on time are as follows: the past coexists with the present that it has been; the past is preserved in itself, as past in general (non-chronological); at each moment time splits itself into present and past, present that passes and past which is preserved.’ The overarching whole that encompasses these relationships between past, present, and future involves the continual passage of transformation from one state to another. Duration is therefore not linear in nature, but instead involves a heterogeneity of transformations.

Deleuze’s approach to Bergson’s duration is significant as he emphasises intuition as a philosophical method for duration. Intuition is to perform a conscious self-awareness of the temporal. It is an apprehension of the real that exists before perception or conception in the present. Intuition further positions the act of perception to be another element within and of duration. This highlights the continually folding multiplicity of time that is

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703 Deleuze, Bergsonism, pp. 75-77.
704 Ibid., pp. 75-77.
705 Deleuze, Cinema 2, p. 82. See also: Todd Jermone Satter, ‘James Stirling’s Architecture and the Post War Crisis of Movement’ Deleuze Studies, vol. 6, pp. 55-71.
707 Bergson addresses duration in Time and Free Will, pp. 232-240 as inherently of mental synthesis, while in Matter and Memory and Creative Evolution, pp. 8-17, duration is not only extended out to external objects but is applied to the entire universe.
708 Bergson, Matter and Memory, pp. 13-14.
709 Ibid., pp. 31-32.
710 Deleuze, Bergsonism, p. 39.
subject to various flows, intensities, and rhythms. To understand movement via intuition is to engage with a self-awareness of the temporal moment: the exact present moment of movement is negotiated according to both its actual and virtual forms. Movement is evidence of the actualisation of a multiplicity of virtual forms in time, and the awareness of this is engaged through intuition. This is evident when Deleuze states that ‘our present falls back into the past when we cease to attribute to it an immediate interest’. The self-awareness of time through intuition is a valuable philosophical tool for understanding the nature of perception, as it creates an opening for how perception (and perception of time) varies in intensity. The latter is a significant point to keep in mind during the following analysis of Moholy-Nagy and Gabo, who are also interested in perceiving perception through their kinetic works.

Moholy-Nagy: New Perceptions of Time Through Technological Expansion

In addition to the recent acclaim and exhibition the Light Space Modulator has been subject to, contemporary art historians have interpreted the work as a pioneering work of avant-garde kinetic sculpture, light architecture, early media art, virtual art, mimetic robotics, musical spectacles, as well as a relic from early years at Bauhaus.

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712 Deleuze, *Bergsonism*, p. 33.
713 Bergson, *The Creative Mind*, p. 179. Bergson describes attention of the temporal present as elastic, enabling the perception of the present to extend, stretch and contract. The present in its continual passing, is both a ‘juxtaposition of instants’ as well as being ‘extended indefinitely’ according to the attention to perception.
717 Popper, *From Technological to Virtual Art*, pp. 16-17.
719 ‘The Apparatjik Light Space Modulator’ *Staatliche Museen zu Berlin* [accessed November 2012].
The work has more recently been regarded by Joyce Tsai as an early instrument of the artist’s consideration of a total work of art,\textsuperscript{721} and by Jonathan Crary as a work of art that paints with light rather than a work of kineticism.\textsuperscript{722} Additionally Lloyd C Engelbrecht has published an extensive biography on Moholy-Nagy and positions the artist, noted earlier, as an influential ‘mentor of modernism’ in contemporary art history.\textsuperscript{723}

*Light Space Modulator* has also featured in many art historical frameworks in part because Moholy-Nagy applied himself to a broad range of artistic practices\textsuperscript{724} and debates around the role of art in society.\textsuperscript{725} Additionally, the piece has also been described in multiple ways that intersect technology, science, and art. The artist’s wife, Sibyl Moholy-Nagy reflected that the work has been described as a work of lumia art, demonstration of kinesis, theatrical prop, robot, mobile, and even domestic furniture, before it was finally described as a kinetic sculpture.\textsuperscript{726} These factors enable the *Light Space Modulator* to appear in a multiplicity of interpretations within contemporary art history.

\textsuperscript{721} Tsai, ‘The Sorcerer’s Apprentice’, pp. 227-303.
\textsuperscript{722} Crary, ‘Spinning Histories’, p. 42.
\textsuperscript{724} This is inclusive of painting, drawing, architecture, photography, film. See: Moholy-Nagy, *Vision in Motion*.
\textsuperscript{725} Ibid., pp. 33-62.
\textsuperscript{726} Tsai, pp. 238-244.
As Smith argues, there is a tendency for contemporary art institutions to perpetuate modern conceptions of creating, experiencing and interpreting art that effectively remodernises contemporary interpretation.\textsuperscript{727} The revival of Moholy-Nagy’s artistic career, and in particular \textit{Light Space Modulator}, has produced renewed interest in kineticism as an expression of time. More specifically the exhibition of early avant-garde kinetic sculpture perpetuates a specific consciousness of temporality in art. Moholy-Nagy’s exploration of movement in art across a variety of media, as I will argue, contemplates the possibility of new technological media to be used to produce new images of temporality, and thereby expand the perceptual field in art.

Moholy-Nagy’s early interest in sculptural movement was in many ways concerned with the machine aesthetic as a tool to expand and explore the perception of temporality

\textsuperscript{727} Smith, \textit{What is Contemporary Art?}, pp. 69-113.
through mediation. This perspective has the potential to problematise Bergson’s critique, because actual movement is used as one element within an entire mediated spectacle of motion rhythms. For Moholy-Nagy technological expansion has the ability to open a range of perceptions and produce new expressions of temporality. What is equally important to the accumulated conceptualisations of movement and time between Gabo, Moholy-Nagy, and Bergson, are the differences between these figures as a means for extending the questions and affects of kinetic dynamism in art.

As with Bergson, Moholy-Nagy was primarily concerned with the effects of perceiving continuous movement in his art. Moholy-Nagy emphasises that his kinetic sculptures do not create movement from stasis. Instead they are ‘carriers of movement’ that emerges from an incipient state. The object of movement is therefore subsidiary to the form of movement. For Moholy-Nagy the wider mainstream discussions of the sciences in relation to the arts, ‘designated a new dynamic and kinetic existence freed from the static’, in which his artwork was used to create new perceptions of time, space and movement. It is these explorations of kinetic sculpture in relation to the perception of time and space by Moholy-Nagy that provides openings for kinetic art to later develop as an aesthetic.

This approach to kinesis can be demonstrated through Moholy-Nagy’s *Light Space Modulator*. The sculpture itself consists of three intersecting metal axes, which are fitted

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**728** During this time Moholy-Nagy directed many of his teachings at Bauhaus with strong influences from Russian Constructivism and became concerned with building a modern industrial visual literacy within art and design. His Manifesto was co-authored with Alfred Kemeny, Erno Kallai, László Peri who attributed the Dutch Stijl Constructivism and Russian Constructivism as key influences of their artistic aims. See: Engelbrecht, ‘Moholy, Alfred Kemény and the ‘Dynamic-Constructive Energy-System’, *Moholy-Nagy*, pp. 177-179.


**730** L Moholy-Nagy *Vision in Motion*, p. 266. See also: L C, Engelbrecht, *Moholy-Nagy: Mentor to Modernism*. This details a professional friendship between Einstein and Moholy-Nagy. Bauhaus had commissioned the two to co-author a book on space-time relationships in 1930, although these projects never came to fruition.

**731** For Moholy-Nagy this creative production was key for extending the limits of human perception in modernity, which he feared was too often exposed to consuming and labouring with machinic reproduction, rather than creativity See: James-Chakraborty, p. 49.

**732** *Light Space Modulator* was first shown in Paris, 1930 at an exhibition on Deutscher Werkbund at the Salon des Artistes Décorateurs de Paris organised by Walter Gropius,
with various metal and wood elements comprised of spiralled, perforated, and curved forms hanging from them. The work is clearly modern industrial in its aesthetic; its visible cogs, frames, and a simple mechanical motor—that propels the motion of the axes—the silver steel panels, spirals, and perforated plates that hang off them are notable products of their time. Each of the axes rotate at their individual speed, and also move with the rotation of the entire sculpture. The structure is mounted to stand at 151cm high,\(^7\) and is installed with a simple motor to propel its anti-clockwise gyration that completes a rotation every two minutes. As the sculpture moves light is projected from beneath the work, then reflected and refracted out into the exhibition space by the hanging axes. This produces a variety of textures of light and shadows, which are cast out onto the walls and space that surrounds the work.\(^7\) Its performance of light projection, reflection, and modulation activates and brings attention to the space around it with an illumination of moving light textures.\(^7\)

The work performs two kinds of movements simultaneously: the mechanical rotation of the axes as they turn, swing, and meet with one another, and the motion of the projected light modulations, textures, and shadows cast onto surrounding areas. When in motion light is projected onto the work from lights fitted within it, to be reflected by the axes and the hanging elements, activating the space around it with a variety of light textures that are reflected off the axes and their hanging parts swinging from the motion.\(^7\) Moholy-Nagy manipulated light, movement, and mechanics to create a sculpture that is intended to transform through time from a static mechanical structure to a weightless body of light and

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\(^7\) Moholy-Nagy and Marcel Breuer. See: Joyce Tsai, ‘The Sorcerer’s Apprentice’, pp. 227-303.


\(^7\) At its initial exhibition in 1930 at the Salon des Artistes Décorateurs de Paris in an exhibition on Deutscher Werkbund, the light textures were prevented from projecting across the room because the work was encased inside a box with a single hole cut out on one of its faces for viewing. However, this was the only time that it was exhibited this way and it has since appeared open in the centre of exhibition spaces, and within theatre stages, to cater for panoramic viewing. See: Moholy-Nagy, *Vision in Motion*, p. 238.

\(^7\) Krauss, *Passages in Modern Sculpture*, p. 207.
movement. As he explained, ‘sculpture is both material volume and its transformation into virtual volume; it has tactile existence but may be changed to visual grasp; from static to kinetic; from mass to space-time relationships’. Depending upon the speed of motion, ‘the originally heavy block of material – the solid volume transforms itself into a kind of ethereal extension’. This highlights that kinesis, for Moholy-Nagy, was considered as a tool to produce a balance between actual mechanical and optical sensations, to negotiate the materiality of sculpture and its weightlessness as a carrier of movement.

The Light Space Modulator is an object that presents motion as a constant transformation of rhythms. The sculpture performs genuine motion, reflects light—and deflects attention—into the space in a rapid, entropic display. The reflections also activate the dimensions of the ‘empty’ space and display what Moholy-Nagy terms ‘virtual volume’, which I will address later in the chapter. What is important at this stage is that Moholy-Nagy orchestrates two effects: actual movement and the vibrating virtual volume. Movement is positioned as the fulcrum that connects both actual and virtual images together, forming a whole ensemble of movement. Rather than producing an image of movement that is outside the space and time of the art goer, the multiplicity of movement itself is highlighted through the virtual volume.

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737 Moholy-Nagy Vision in Motion, p. 237.
738 Ibid., p. 241.
739 Ibid., p. 237.
740 Ibid., p. 237. See also: G Brett, Kinetic Art, p. 22.
741 Ibid., 241.
743 Deleuze depicts modern avant-garde artists as having a preoccupation with movement and time. Deleuze, Cinema 1, pp. 58-72. See also: Deleuze, Cinema 2, pp. 1-24.
In addition to its kinetic movement, Moholy-Nagy created the Light Space Modulator to be a machine of mediated movement rhythms through the theatrical, photographic, and cinematic representations of its form and movement. As a machine that produced multiple experiences and representations of movement, this is precisely the productive nature that Moholy-Nagy had referred to in ‘Production- Reproduction’.⁷⁴⁴ Rather than presenting mediation as a reduction of movement, he demonstrates that the Light Space Modulator performs multiple experiences and mediations of movement, which are produced from it, thereby mobilising the perception of movement in relation to space and time.⁷⁴⁵ It is a work that produces forms, perceptions, and expressions of movement and time through mechanical repetition.

Perceiving both the object in movement as well as optical light rhythms are the key dual elements of Moholy-Nagy’s work. The sculpture, for example, creates genuine motion, reflecting light (and deflecting attention) into the space in an entropic display of rhythms, repetitions, and collisions of both metal and light. This transformation is based on stasis, movement, modulation, and refraction, each movement creating an entirely new quality of movement that defers from a linear process from movement to acceleration and speed. This orchestrated modulation of light and metal is subtly balanced out with a simple control mechanism that enables the sculpture to be programmed (albeit to a limited extent), where ‘the glow-bulbs flash at different places according to a prearranged scheme’.

Again, there is a dual balance; the sculpture is both chaotic in its movements, as well as controlled.

A critical point of difference between Bergson and Moholy-Nagy’s motion studies lies in Bergson’s resistance to mechanical movement being used for creating images of duration. As noted above, Bergson argues that mechanical media, film, and photography reduce the heterogeneous and qualitative properties of the experience of time. In contrast, Moholy-Nagy prevents representations of movement from being mistaken as actual movement by building a modality of movement that varies between his sculpture, film, and photography. Each representation and production of movement is used to create and explore new effects of movement.

Additionally, Moholy-Nagy uses mechanical media to provide avenues for contemplating the changing tendencies for how temporality is conceptualised by society. For Moholy-Nagy, kinetic sculpture is one of many ways to understand how visual media carry movement in an exploratory way. This is clearly indicated when he says, ‘this accounts for the permanent necessity for new experiments. From this perspective, creative activities are useful only if they produce new, so far unknown relations’ (author’s italics).

The Light Space Modulator is evidence of Moholy-Nagy’s intention to expand perceptions of

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746 Krauss, Passages in Modern Sculpture, p. 207.


749 Ibid., pp. 289-290.
movement and time across various media, which kinesis indicates. The whole orchestration of movement between the Light Space Modulator, Lightplay: Black, White and Grey, and accompanying photographic studies of motion, are direct manifestations of this intent, and point towards technological production—and at times, reproduction—of modern media as a means of creating difference. Therefore, in contrast to Bergson’s argument that mechanical representation can only produce a reduction of duration, Moholy-Nagy brought attention to the perceptible differences between mechanical presentation and representation of movement.

This approach to studying light and motion became central to Moholy-Nagy’s experiments with sculpture, photography, and film during his time as a teacher at Bauhaus. The dynamic effects of motion in art were already heralded as a key trope of modernity throughout various avant-garde movements in Europe, to which Moholy-Nagy regularly attributed the creations of in his essays and texts. Actual movement and light, rather than used as representational media in art, were considered useful for creating ‘new possibilities of optical and kinetic creation’ within art and the greater public arena.

Prior to 1930, sculptural kinetic experiments had appeared in the wider artistic arena within Europe, and Moholy-Nagy’s Light Space Modulator is often grouped with these earlier avant-garde productions in contemporary art history. Aside from Gabo’s Standing

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750 Throughout his time teaching at Bauhaus, his work with sculptural, film, and photographic media, and the statements in Book of New Artists and A New Vision, Moholy-Nagy demonstrated a commitment to exploring the productive nature of modern industrial mechanical media. New media at the time provided opportunities to represent the world in different way than before, as well as to expand the perceptual field of human sensation. See: Moholy-Nagy, Vision in Motion, pp. 216-273 See also: L Moholy-Nagy, ‘Light – Space Modulator for an Electric Stage’ in K Passuth, Moholy-Nagy. Originally published in Die Form, 1930, Vol. 5, Nos. 11-12.

751 Moholy-Nagy, Vision in Motion, pp. 198-203. This includes use of modulation by Paul Cezanne, the technocratic ideals of Russian Constructivist artists, as well as motion studies by Umberto Boccioni, Marcel Duchamp, and Thomas Eakins, who formed a foundation of optical movement in art, which Moholy-Nagy sought to develop through sculpture, photography, and film.

752 L Moholy-Nagy, ‘Light-Space Modulator for an Electric Stage’, Moholy-Nagy predicts that light and movement will become the dominant symbols of modernity, ‘These technics will probably be employed in the near future for advertisements, as entertainments in popular festivals, and in theatres for heightening tension’. Passuth, Moholy-Nagy, p. 310.

Wave; Kinetic Construction (1920), which was a source of inspiration for Moholy-Nagy, constructivists had previously worked in participatory sculptural movement, and Marcel Duchamp and Man Ray had collaborated on the optical illusions produced by Rotary Glass Plate, Precision Optics (1920). While these works are often framed by Western art historical arguments as avant-garde efforts for collapsing the division between art and life, unlike Moholy-Nagy’s Light Space Modulator they were predominantly regarded by the artists as time-space experiments in preparation for following works of art.

While the Light Space Modulator was not the first sculpture to perform actual motion, works such as Marcel Duchamp’s Bicycle Wheel were purely considered as an experiment with motion. Light Space Modulator is considered by historians such as Joyce Tsai as the earliest form of kinesis that exists as a sculpture in its own right, rather than a tool for negotiating movement, or a relaxation device. It is also one of the earlier known

754 Moholy-Nagy, Vision in Motion, pp. 226, 238.
756 The use of movement and light were also popular media for experimentation between the teaching staff at Bauhaus. Three teachers in 1922 Ludwig Hirschfeld Mack, Joseph Hartwig, and Kurt Schwedtfeber created an open air light theatre titled, Reflected Light Plays. This was a year prior to Moholy-Nagy’s residency at Bauhaus. Reflected Light was initially constructed to feature in an exhibition representing the course content of composition and play with materials at Bauhaus. Additionally, in 1924 Herbert Bayer at Bauhaus continued this experimentation with a forty-foot globe with its surface area filled with light globes as a celebratory piece in a pavilion in the German industrial fair which transmitted alphabetic messages in the space of the pavilion. See: W Sharp ‘Luminism and Kineticism’ in G Battcock (ed.), Minimal Art: A Critical Anthology, Berkeley, University of California, 1995, p. 324.
757 Frank Popper in Origins and Developments of Kinetic Art acknowledges the work of automata and the term ‘kinetic’ in relation to the plastic arts was first acknowledged by Gabo. Therefore his Standing Wave Kinetic Construction is often considered as the first kinetic sculpture. See, Origins and Developments of Kinetic Art, p. 95, 121-126. It is also important to note that Marcel Duchamp’s Bicycle Wheel (1913), is at times considered as the earliest kinetic sculpture. See: M Duchamp, The Writings of Marcel Duchamp, New York, Da Capo Press, 1973, pp. 141-142.
758 Ibid., pp. 141-142.
760 Gabo later reflected that Standing Wave Kinetic Construction was created in order to demonstrate to his students that ‘that was done by me in order to show them what I mean by ‘kinetic rhythms’. This piece is only a basic example of one single movement – nothing more’. See: Gabo, ‘The Kinetic Construction of 1920 (1969), Gabo on Gabo, p. 262
sculptures to present and modulate its own movement for multiple environments and
exhibition spaces in contemporary art history.\textsuperscript{762} Moholy-Nagy’s use of modulation,
refraction, and illusion with mechanical media is directly in tune with the artist’s intention
to explore the creative and productive uses of industrial media rather than their
reproductive functions.\textsuperscript{763}

Kinesis in sculpture plays a pivotal role in relation to Moholy-Nagy’s frustration with film
and photography at the time.\textsuperscript{764} In 1932 Moholy-Nagy considered film to still be ‘governed
by conceptions derived from traditional studio painting’, rather than as a medium that
achieves what others cannot.\textsuperscript{765} Moholy-Nagy particularly stressed that, ‘motion is still so
primitively handled in the majority of films.’\textsuperscript{766} The orchestration of actual movement in
sculpture and the study and recomposition of motion in film enabled Moholy-Nagy to
explore the differences between action motion and its mediation, as well as the possibility
of ‘painting with light’ and with movement.\textsuperscript{767} Working with non-figural light as a medium
itself enabled Moholy-Nagy to prevent distinctions between the original light source and
the modulated image of light. The hanging and rotating fixtures of the piece enable the
reflections to intersect with one other, providing both fractions and convergences of light
that ensure that the viewer cannot distinguish a hierarchy between images of light, their
motions, refractions, and convergences.

The \textit{Light Space Modulator} was not created solely as a moving sculpture for exhibition,
but also as a machine for creating multiple representations of movement in film (titled,
\textit{Light Play: Black, White and Gray}), photography, and creating moving background
settings in theatre.\textsuperscript{768} As a machine that produced multiple experiences and representations
of movement, this is precisely the productive nature that Moholy-Nagy had referred to in

\begin{footnotesize}
\begin{enumerate}
\item\textsuperscript{762} Burnham, \textit{Beyond Modern Sculpture}, pp. 291-292.
\item\textsuperscript{765} \textit{Ibid.}, p. 131.
\item\textsuperscript{766} Moholy-Nagy, ‘Problems with Modern Film’, \textit{Moholy-Nagy} by Kostelnetz, pp. 131-138.
\item\textsuperscript{767} Moholy-Nagy, ‘Light: A New Medium of Expression’ in Kostelanetz, \textit{Moholy-Nagy}, pp. 151-55.
\item\textsuperscript{768} Tsai, pp. 227-303.
\end{enumerate}
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Rather than considering mechanical mediation as a reduction of movement, Moholy-Nagy demonstrates that through the *Light Space Modulator* multiple experiences and mediations of movement are produced. It is a work that produces forms, perceptions, and expressions of movement and time through the technology of mechanical reproduction.

The film *Light Play: Black, White and Gray* demonstrates Moholy-Nagy’s interest in using film to create new effects of movement and time through the cut of mobile sections. The film’s only surviving sequence shows a variety of light sources, and focuses on their intensity and texture of light, each differing from the next. As Moholy-Nagy’s script describes, ‘[d]istortion of reflections. Pendulum. Blinding moving light flashes. Revolving spiral, reappearing, again and again. Rotation increases; all concrete shapes dissolve in light’. Each scene within the montage is a visual break down of a texture of light, and it is a linear rendition of what is orchestrated by the kineticism in Moholy-Nagy’s sculpture.

Each scene in the film produces an image of time that has the ability to mobilise the perceptions of space and time within this media. Attention is also paced out to focus on producing and enframing new perceptions that the sculpture produces. This is precisely the difference that Sibyl Moholy-Nagy, his partner at the time, also noted when she described the first meeting with the Light Space Modulator,

> In the centre of a workshop stood a construction – half sculpture and half machine – a combination of chromium, glass, wire, and rods, in which I recognized the forms of the light-display film. As it turned slowly, invisible lights flared up and

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774 Tsai, pp. 227-303.
turned off, producing gigantic shadows on the wall and the ceiling…and I suddenly saw the difference between concept and reality.\textsuperscript{775}

To highlight the perceptual differences between the film and kinetic sculpture separates the \textit{Light Space Modulator} from experiments purely concerned with objects in kinesis. This is why Moholy-Nagy’s experimentation with movement does not stand alone solely with the \textit{Light Space Modulator} but, rather, a variety of motion rhythms, produced through film, photography, and the sculpture, demonstrates the perceptual differences and unique relationship to movement each medium has in relation to one another.

The artist’s notes in the posthumously published \textit{Vision in Motion} shows his interest in a moving object transforming in time, inhabiting new rhythms, natures, and structures: ‘sculpture…has tactile existence but may be changed to visual grasp: from static to kinetic; from mass to space-time relationship’.\textsuperscript{776} Both the gradual transformation through time, as well as the change to modulation and representation of the sculpture through photography and film are included within this expression of temporality. Moholy-Nagy’s open-ended view of how the sculpture was to be received indicates that there is not only one way to experience the works of art, but that the modulations of light that are produced are multiple.\textsuperscript{777}

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  \item \textsuperscript{775} S Moholy-Nagy, 1970, p. 147.
  \item \textsuperscript{776} Moholy-Nagy, \textit{The New Vision}, p. 129.
  \item \textsuperscript{777} This variability of the work contributed to Moholy-Nagy’s utopian avant-garde aesthetic that was influenced through Constructivist, Bauhaus, Futurist aspiring relationship between art and life. Moholy-Nagy’s approach is also unique where the question of producing a means for new actual movement in sculpture was a key concern. That is, rather than representing or adopting positivistic approaches to motion, where the imperceptible is made visible to art-goers, such as Umberto Boccioni’s bronze movement sculptures.
\end{itemize}
\end{footnotesize}
It is here that a critical point of difference exists between Bergson’s duration and Moholy-Nagy’s motion studies. Bergson, as explained above, expressed reservation towards mechanical reproduction of movement being used for creating images of duration. Bergson’s argument centres on film and photography reducing the heterogeneous and qualitative properties of the experience of time, while Moholy-Nagy prevents representations of movement from being mistaken as actual movement by building a modality of variation between his sculpture, film, and photography. This affords Moholy-Nagy the ability to be attuned to each mediation movement as its own experience of duration. Movement is carried by the sculpture in duration, performing rhythms of movement reflections, refractions, and modulations. It is also designed to move between images in his photographic studies and is presented as mobile cuts of movement in film, enabling a process of mediation to produce new sensations and perceptions of motion.

In his influential essay, ‘Production – Reproduction’, published in *Der Strum* (1923), Moholy-Nagy described his main motivations for interdisciplinary artistic production;
experimenting with the technological expansions of the industrial revolution provides a means for producing new stimuli, rather than merely reproducing repetitive experiences. He proclaims, ‘man will be most perfect in his own time if the functional apparatuses of which he is composed…are conscious and trained to the limit of their capacity. Art actually performs such a training’. This approach echoes the teachings of the Bauhaus (where he was teaching at the time), that recognise that the creation and experience of art in everyday life enables humanity to not only live harmoniously, but also in a higher more complex state.

Even though Moholy-Nagy claimed to be interested in the potential for all artistic media to open ‘all the channels of intuition’, he explicitly strove for the exploration of new industrial media in art. In ‘Production – Reproduction’ Moholy-Nagy explicitly sought the development of total art through machinic creative production, rather than considering industrial media as a means for repetitive reproduction. Creative production, rather than reproduction, is approached by Moholy-Nagy as a key tenant of avant-garde experimentation as, ‘since it is primarily production (productive creation) that serves human construction, we must strive to turn the apparatuses (instruments), used so far only for reproductive purposes, into ones that can be used for productive purposes as well’. Considering this, The Light Space Modulator participates in an array of experiments with movement, mediation, and modulation as a demonstration of productive creation on multiple levels. Each context of the sculpture plays with the form of each medium inherent to its own capacities, and expressing its own rhythms of motion.

For Moholy-Nagy kinetic sculpture is one of many ways to understand how visual media carries movement in an exploratory way. This was directly indicated when he said, ‘this accounts for the permanent necessity for new experiments. From this perspective, creative activities are useful only if they produce new, so far unknown relations’ (author’s italics). In light of ‘Production – Reproduction’, the Light Space Modulator is further
evidence of Moholy-Nagy’s intention to expand perceptions of movement and time through modern media, within which kinesis is integral to his approach. While actual motion is performed by the sculpture, the transformation, variety, and creative production of this actual movement is of equal importance in the quest to explore the limits of human perception and sensation.

In this regard, technological production is a key practice for exploring the limits of human perception and producing experiences through spectacles of the present. The whole orchestration of movement between the Light Space Modulator, the film Lightplay: Black, White and Grey, and accompanying photographic studies of motion are direct manifestations of this intent. Through this Moholy-Nagy understands technological production (and at times, reproduction) as a means for creating difference, rather than colonising perceptual fields with technocratic similitude.

Therefore, rather than perpetuating the three theses of modern movement as proposed by Bergson, Moholy-Nagy sought the perceptible differences between each mediation, and the temporal play that can be engaged through them, with the intention of forming new expressions of time through industrial media. The experience of time when presented or represented, even when it is divided into distorted recompositions, serialised instances, or modulated by projection and reflection, has the possibility to bring more than three expressions of movement within the whole duration. Western society, Moholy-Nagy shows, is receptive to new conceptualisations of movement through modern industrial mechanisms.

783 Moholy-Nagy’s perspective was largely influenced by earlier Futurist and Constructivist artists concerned with the use of movement in art, particularly the work by Naum Gabo, Umberto Boccioni, Marcel Duchamp’s cubist painting Nude Descending Staircase Vision in Motion, (1912). See: Moholy-Nagy, Vision in Motion, pp. 216-257.

784 Popper, Origins and Developments of Kinetic Art, pp. 224-243. See also: Manning, Relationscapes, pp. 77-81. See also See also: Palmer, ‘The Art of Real Time’, pp. 156-184.

785 Deleuze, Cinema 2, p. 82.
Blurring Time with Virtual Volumes

In ways differently to Moholy-Nagy’s *Light Space Modulator*, Gabo’s sculpture *Kinetic Construction; Standing Wave* (1920) problematises the relationship between the presentation, representation, and perception of movement in several ways. Gabo’s sculpture was created, as was often referred to by the artist, as an instructional device to demonstrate to his students how to explore the potential for ‘kinetic rhythms’ to transform the static form of sculpture to an illusory volume.\(^{786}\) *Kinetic Construction* is a small and simple work that consists of a vertical rod that stands out from its mount (standing at 616 x 241 x 190mm), within which lies a small motor that propels the rod into motion\(^ {787}\). The combination of speed of movement, flexibility, and length of the rod creates an appearance of a semi-opaque three-dimensional vibrating crescent, or as Gabo describes, a ‘virtual volume’.\(^{788}\) This volume expands and pulses according to the stress of the rod before it returns to rest, giving the appearance of a static volume, even though the appearance of movement is evident.\(^{789}\) While the standing wave is a three-dimensional movement, reconstructions such as those at the Berlinische Galerie in Berlin exhibit the work encased inside a wall with a glass window, which emphasises the optical qualities of the piece.\(^{790}\)

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\(^{786}\) Gabo has said, ‘When I showed it to the students I made it emphatically clear that this was done by me in order to show them what I mean by “kinetic rhythms”. This piece is only a basic example of one single movement- nothing more’. See: N Gabo and W Wittenbert, ‘Naum Gabo’s ‘Kinetic Construction: Construction and Reconstruction’, *Techne: A Project and Process Paper*, New York, vol.1, no.1 14 April 1969. Although it is possible that the artist began working on the sculpture before the manifesto was made public, as Gabo has recalled the work took almost a year to create. See M. Hammer and C. Lodder *Constructing Modernity: The Art and Career of Naum Gabo*, New Haven, Yale University, 2000, p. 69.

\(^{787}\) Measurements of the work can be found at ‘Kinetic Construction (Standing Wave)’, *Tate –Art and Artists*, url: [http://www.tate.org.uk/art/artworks/gabo-kinetic-construction-standing-wave-t00827](http://www.tate.org.uk/art/artworks/gabo-kinetic-construction-standing-wave-t00827) [accessed 20th May 2012].

\(^{788}\) Although it is important to note that when observing the work, movement is apparent. As Kirby writes, ‘Again movement is apparent. It is a quality of the image. But the image does not change with time.’ See M Kirby, *The Art of Time*, p. 251.

\(^{789}\) *Kirby, The Art of Time*, p. 251.

As with Bergson, Gabo’s *Realistic Manifesto* and *Kinetic Construction*, emphasises time as a constant and concrete element defined by qualitative change.\(^{791}\) Gabo’s decision to make the rod propel into motion, and then return to stasis rather than remaining in perpetual motion, may have in some ways been a technological consideration. Despite this possibility, the movement from stasis to motion creates a unique effect: the work performs a qualitative transformation through time from a stationary rod into a vibrating wave of movement, in time with the viewer.\(^{792}\) Gabo’s virtual volume reveals that the perception of time can be manipulated through actual movement, rather than static representation, without distorting or simplifying the duration as a transformation. This is what Michael Kirby has described as the ‘transitional mode of kinetic perception in kinetic sculpture’: changing perception occurs in time with the viewer, whose perception, moves with the movement of the sculpture. For Gabo, this is the key function of the virtual volume.\(^{793}\) Rather than creating illusions of movement, this optical image is created from actual movement.

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\(^{792}\) M Hammer and C Lodder, ‘Revolutionary Russia’, *Constructing Modernity*, p. 69.


\(^{794}\) Gabo, *Gabo on Gabo*, p. 42.
When considering the problems of space and time in relation to De Stijl Constructivists, he writes, ‘where the concept of time is concerned, it is […] a concept for movement itself without reference to cause and effect’.\(^{795}\) For Gabo, movement is a flow of constant change, and this includes the actual movement of the sculpture, as well as the optical images it produces. This is a key point of difference between Bergson’s duration and Gabo’s kineticism. While Bergson is open to the movement of the projector, camera, and operator in film and photography as a form of duration, he remains adamant that duration cannot be produced as a representation.\(^{796}\) In contrast to Bergson, Gabo’s *Kinetic Construction* produces actual and optical experiences of movement that are mutually


\(^{796}\) Bergson, *Creative Evolution*, pp. 320-323.
exclusive, and yet defer to one another. Gabo presents both a presentation and a representation through movement, rather than representational distortion.

While for Bergson mediation, modulation, and illusion produce simplified representations of the nature of duration, Gabo uses the limits of human perception to produce an image that is a conglomerate of tenses. The perception of the volume presents perception as something that is malleable, and subject to manipulation in relation to perceiving time. The blur of the standing wave produces an image that is an amalgamation of both present and past motions that stretch together into one blurred impression. Understanding the perceptual limits of movement is therefore to acknowledge the perceptual limits of time, through modern machinery. This also strikes a chord with Bergson, who considers that ‘what is real is the continual change of form: form is only a snapshot view of a transition…our perception manages to solidify into discontinuous images the fluid continuity of the real’. However, just as importantly, unlike Bergson, Gabo develops the movement of the rod as a continual change in order to produce an optical distortion of a new form that waves and vibrates, in a semi-opaque form.

Gabo’s Realistic Manifesto (1920) was exhibited by being read aloud by Gabo and his brother Antoine Pevsner. It is arguably the earliest piece of literature that explicitly refers to kinetic motion as a tool for criticising traditional modes of representation. The manifesto concentrated on creating a new order of art that drew upon actual movement, time, and space rather than depictions of them. Frequently described by Gabo and his peers

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798 Bergson, Creative Evolution, pp. 323-347.

799 Gabo, Gabo on Gabo, p. 42.

800 Kirby, pp. 243-255.

801 Bergson, Creative Evolution, p. 12.

802 While many sources claim that the manifesto was co-authored by Gabo and Pevsner, it was later reflected by Gabo that he had written it entirely and allowed Pevsner to sign it because of their common artistic goals. This is stated in: N Gabo, ‘Naum Gabo and the Constructivist Tradition’ Studio International (London), vol. 171, no. 876, April 1966, p. 125
as a key early Constructivist statement, his manifesto claimed, ‘building the future, building a new society and culture, building a new art in accordance with the form as of space and time on which life is built’. Like many avant-garde manifestos of the time, *Realistic Manifesto* collapsed the distinction between art and life by championing the chaos and complexity of real life, movement, space, and time. Composing real time and actual movement in sculpture prevents metaphorical and fictional expressions. By regarding them as independent concrete forces, and composing actual experiences of them, Gabo concentrated on the ‘perceptions’ of the forms of space and time, as well as how these perceptions change, and that representation is a distortion of space and time. Gabo and Pevsner state that bringing such changes into being are the ‘sole aim’ of their art in the manifesto.

Exhibited as a poster during the Open Air exhibition with Hustav Kucis on Tverskoie Boulevard in Moscow, *Realistic Manifesto* criticised the fictional and metaphorical functions of representation used by modern artists to connote speed, rather than celebrating actual mechanical and modern movement. This was a key mechanism for motivating and ensuring the futurity of socialism throughout the nation; an artistic practice that, so they claimed, does not lie to its people. In order to achieve this, the manifesto states, real-time movement in art propels its viewers to bring their attention to the present, while representations of movement provide images of the past: ‘[t]he attempts of the Cubists and the Futurists to lift the visual arts from the bogs of the past have led to only new delusions…We assert that the shouts about the future are for us the same as the tears about the past: a renovated day-dream of the romantics…Today we take the present’.

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804 Hammer and Lodder, *Gabo on Gabo*, p. 22.
805 Danchev, pp. 42.
808 Gabo, ‘Realist Manifesto’ in Danchev, *100 Manifestos*, p. 93.
perception of perceiving in the temporal present as a means for attaining attention of the present in the present.

While Gabo was also intent on understanding time as a perception of change, or in his words, ‘concrete movement which changes before the eyes’, 812 _Kinetic Construction_ demonstrates Gabo’s interest in bringing not only real time into consciousness but, also how the perceptions of it change through subjectivity. Real movement of actual matter was the key tool to making time ‘active and perceivable’, rather than creating significations that distorts its rhythms. 813 Therefore, what is unique to Gabo’s approach to actual movement in relation to Moholy-Nagy and Bergson is how he understood mechanical motion and repetition to persuade time-space perceptions. The movement of _Kinetic Construction_ draws attention to the heterogeneous nature of mechanical media in motion that holds both discrete and continuous properties. The sculpture is both rapidly moving while giving an impression of a vibrating form, it is both actual and illusory, and produces perceptions of the present and past within the one transformation. At the same time, the work is also binary and discrete; it is a self-contained work that is either in motion, or not. Each performance of movement is then an interval of movement that returns to extended periods of stasis.

Gabo, like Moholy-Nagy, also saw mechanical production as a means for creating a new order of art, with new perceptions and sensations that were not previously activated prior to the technological expansion of the industrial revolution. Perception is open to illusion, as demonstrated by _Kinetic Construction_, which transforms in time to produce an optical volume that is also an alternative impression to the actual moving rod. In light of the _Realist Manifesto_, where Gabo states his interest in the ‘basic forms of our perception of real time’, 814 _Kinetic Construction_ is as much a work about actual motion as it is about the perception of and within temporality. To bring the present into consciousness through actual motion is to also create an image of temporality during the artistic experience. Focusing on the present is best explored through artworks that exactly work within this temporality in actual form, which were already in existence in the arts of music, theatre,

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812 _Ibid._, p. 93.


814 Gabo, _Realistic Manifesto_, p. 93.
and dance.\textsuperscript{815} It is in this respect that movement of mechanical media was used to open new expressions of temporality that had otherwise been unexplored by European artists at the time, who had largely concentrated on images of past and future.

**Accumulating Temporalities**

The construction of actual movement and virtual volumes in motion is evidence of Gabo’s resistance to traditional modes of movement in modernity.\textsuperscript{816} Unlike painting, film, and photography, Gabo considered kinesis as the primary means to engage the viewer in the present temporality.\textsuperscript{817} The virtual volume therefore exists as an articulation of time as a transformation in the present. The volume also produces an impression of time that consists of various folds of temporalities. While the rod moves in real time, the virtual volume is produced because the human eye cannot accurately trace and process its movement. In that sense past impressions of its movement are preserved during perception, which produces the virtual volume.\textsuperscript{818} The volume is therefore an accumulation of perceived temporalities. This indicates that the virtual volume is a technique for artists working with kinesis to use movement to create new conceptions of temporality. Rather than considering time as a linear state, Gabo’s virtual volume articulates time as an accumulation of states, as well as a continuous transformation. Mehanical movement, repetition, and the effect of the virtual volume is used not to distort but, to encourage new images of duration.

\textsuperscript{815} Gabo, *The Problem of Space and Time*, p. 42.
\textsuperscript{816} Gabo, ‘Realistic Manifesto’, *100 Manifestos*, p. 93.
\textsuperscript{817} Shanken, ‘From Cybernetics to Telematics’, *Telematic Embrace*, pp. 22-23.
\textsuperscript{818} Hammer and Lodder, *Constructing Modernity*, p. 71.
Figure 20: Naum Gabo, *Sketch for Kinetic Construction* (1922).

The virtual volume is another effect that connects kinesis with new perceptions of temporality with kinetic sculpture. The earliest reference to virtual volumes is Gabo’s *Standing Wave*, which was created to explore the edge between the transformation from movement to static form to optical volume. During this transformation viewers perceive with the work: that is, the volume is not an image of transformation but, an experience of transformation in real-time. Each pulse, rhythm, and repetition is also felt with the optical illusion of an alternative volume that exists in the same temporality. The transformation from a static rod to a virtual volume creates an appearance of weightlessness. This is because the volume pulses and oscillates seemingly unattached to its base as the rod bends and repeats its motions. It is an effect that is actual in its temporality but illusory in its form because its optical appearance (the volume) is different to its actual form (a straight rod).

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820 Shanken, ‘Cybernetics and Art’, p. 263.
821 Brett, *Kinetic Art*, p. 22.
This use of the term ‘virtual’ differs from Bergson’s understanding of the term. For Bergson, the virtual can be considered as the infinite state of forms that becomes actualised in the present in its continual state of becoming, and yet does not temporally coincide with the actualised present. Despite seeming like opposite conditions, the virtual and the actual are equally real.\textsuperscript{822} To consider the virtual through the role of affect in art is a useful example: While affects are exactly what a work of art produces, they are only actualised through perception.\textsuperscript{823} For Bergson, the affects that are not produced lie dormant in a realm of chaotic potential until they are actualised.

Unlike Bergson’s use of the term ‘the virtual’, Gabo’s virtual volume in \textit{Kinetic Construction} is an optical sensation in actual time. It is an optical effect of rapid movement.\textsuperscript{824} For Gabo, ‘the standing waves had attracted my attention since my student days, in particular the facet that when you look at a standing wave, the image become three-dimensional…I decided to construct a standing wave which would be vibrating on one fixed point and rigid enough to indeed be a ‘standing wave’’.\textsuperscript{825} This enables Gabo to straddle a line between what is optically actual through appearance but, what is not actual matter. The material rod and its virtual volume exist simultaneously within the same temporality, which gives a point of indiscernibility between the form volume and actual rod.\textsuperscript{826} To see a form in motion that is an alternative to its actual composite suggests

\textsuperscript{822} Parr, p. 297.


\textsuperscript{824} This is similar to Bergson’s understanding that perception is cinematic in kind. He states, ‘Instead of attaching ourselves to the inner becoming of things, we place ourselves outside them in order to recompose their becoming artificially. We take snapshots, as it were, of the passing reality, and, as these are characteristic of the reality, we have only to string them on a becoming abstract, uniform and invisible, situated at the back other apparatus of knowledge, in order to imitate what there is that is characteristic in this becoming itself’. See, Bergson, \textit{Creative Evolution}, pp. 322-323.

\textsuperscript{825} Gabo, cited in \textit{Constructing Modernity}, p. 69.
Gabó’s approach to virtuality as a real entity providing the object in motion with a multiplicity.

*Kinetic Construction* was Gabó’s first and only attempt to orchestrate motion in this manner,\(^{827}\) and had been referred to by the artist as an early example for future, more complicated kinetic rhythms.\(^{828}\) This short lived experimentation with kinetic dynamism is due to the artist’s belief at the time that technology would not advance far enough in his lifetime to be able to explore other rhythms of actual movement; the possibility and experimentation of kinetic dynamism was considered by Gabó as a ‘task for future generations’.\(^{829}\)

Years after Gabó’s *Kinetic Construction* Moholy-Nagy drew inspiration from Gabó’s work and considered *Light Space Modulator* and his photographic studies of virtual volumes as spectacles of the modern technological expansion.\(^{830}\) In *Vision in Motion* Moholy-Nagy explained both sculptural and photographic media as explorations of the form of movement as well as the affect of movement in real-time.\(^{831}\) His blurred photographs are static representations of virtual volumes by showing the repetitive motions or movement that extend and pass through over time within a single frame. Rather than capturing and isolating instances, they, like the experience of viewing *Kinetic Construction*, express movement through time that has been synthesised together. Unlike other practices of

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\(^{827}\) Brett, *Kinetic Art*, p. 22.


\(^{829}\) Ibid.

\(^{830}\) Other artists who have explored the effects of virtual volumes in sculpture include: *Yaacov Agam’s Beating Heart (moods)* (1969), Jean Tinguely’s *Translation No 1 - pour un triangle* (1958), *The Mallas* by Elias Crespin (2002), *Flower of Life* (2011) by Dianne Harris.

\(^{831}\) Moholy-Nagy, *Vision in Motion*, pp. 236-252.
photography at the time, which were used to render perceptible what is ordinarily imperceptible.\footnote{Manning, \textit{Relationscapes} pp. 83-111. See also: Solnit, \textit{Motion Studies: Time, Space and Eadweard Muybridge}, London, Bloomsbury, 2003, pp. 209-213.}

Moholy-Nagy’s photos were created to explore the new representations of movement and time specific to the medium. Their virtual volumes are often compositions of urban scapes, neon flashing signs, long exposures of street traffic at night, carnivals, and spinning toys. They demonstrate that the modulation of time and space is already within the modern everyday.\footnote{See L Moholy-Nagy, \textit{The New Vision}, p. 142 for photographic pedagogical demonstrations of virtual volumes.} For Moholy-Nagy virtual volumes were not only produced by kinetic sculpture and photography but, were laced within spectacles of modern urban life. Everyday uses of artificial light were key sources for experiencing virtual volumes outside art.\footnote{\textit{Ibid.}, p. 42.} It is partly for this reason that light was considered a democratic artistic medium, because it can be created and consumed in everyday experiences in modern urban life.

Alternatively, another work by Moholy-Nagy, \textit{Kinetic Sculpture} (1930-1936), is an apparatus that unlike the \textit{Light Space Modulator} and \textit{Standing Wave; Kinetic Construction}, is not propelled by an industrial motor, but by the viewer’s participation. The work consists of two square cage-like forms, made from glass tubing filled with mercury, which protrude out from a steel plate and can be spun in rotation. The speed of their motion, as well as the reflections cast from the glass and mercury, create visual effects of virtual volumes similar to Gabo’s \textit{Kinetic Construction}. Again, the work transforms from static material to the weightless virtual volumes through participation and motion.

The virtual volumes developed by each of these two artists are explicit attempts to draw out and expand perceptions of the present. What is specific to Moholy-Nagy’s photographic study of virtual volumes is that they are singular images of the past and present in one temporal frame. This encourages a perceived image of the present that is expanded, stretched out, to portray a crystalised continual transformation.\footnote{J Burnham, ‘On Moholy’s Sculpture’, in Kostelanetz, \textit{Moholy-Nagy}, pp. 110-112. Also Kirby describes this as, ‘transitional mode of kinetic perception in kinetic sculpture’. See: Kirby \textit{The Art of Time}, p. 253.} Whereas the virtual volumes created in \textit{Light Space Modulator, Kinetic Sculpture,} and \textit{Kinetic}
Construction are produced in real-time with the viewer’s perception, rather than presenting a whole synthesised image of time continually unfolding.

Figure 20: László Moholy-Nagy, *Kinetic Sculpture* (1930-1936).

The transformation from heavy materials to an appearance of weightlessness is also integral to Moholy-Nagy’s appropriation of the virtual volume. As he describes, the sculpture ‘transforms itself into spheric extension, becomes completely without mass and heaviness’. Both material form and the weightless volume simultaneously exist in the one form but optically transform to express a dynamic of ‘volume relationships’.

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sculpture presents a modulation of movement in its performance but, also a modulation of
time through the virtual volume. Gabo and Moholy-Nagy’s virtual volumes attempt to give
an appearance of matter transforming into light and movement.

We also feel the very edge between the rhythms of movement in kinetic sculpture: the
transition from weighty material into virtual volumes, or the movement of light as it is
modulated, refracted, and projected. In these movements of qualitative transformation
there is both the experience of movement carried by the work, as well as a sense of the
movements that are not actualised. These works not only make visible the invisible, in the
sense that they are virtualisations (in a Bergsonian sense) from the chaotic field of
potential forms but, we also feel their intensities through the composition of actual
movement. Perception of any artwork – static or moving, comes in drabs, fragments,
rhythms, and holes.\(^{839}\) Gabo and Moholy-Nagy’s use of repetitive motions further makes it
clear that there is difference in each repetition of rhythm,\(^ {840}\) that is, the production of affect
through duration.\(^ {841}\)

Both Gabo and Moholy-Nagy explore the felt hesitation of change in the temporal present
and the nature of this temporality as a productive event. Rhythm, repetition, and speed
create a new image – the virtual volume – and draw attention to the present temporality.
The elements of speed, repetition, and rhythm, also create a visual image for the viewer,
which is an optical effect. Although mechanically repeatable each artist focuses on the
transformation from one move or action to another as a state of becoming as the temporal
present unfolds.\(^ {842}\)

Likewise, Moholy-Nagy’s Light Space Modulator was intended to draw attention away
from the mechanical component of the sculpture, and dissolve into an orchestration of
modulated light textures. Using light to give the appearance of visually dissolving matter
was a key effect for these artists concerned with transforming matter into weightless

\(^{839}\) Deleuze, *Francis Bacon*, pp. 31-38.


\(^{841}\) For Spinoza, ‘affect’ is understood as ‘the affections of the body by which the body’s
power of acting is increased or diminished, aided or restrained’. Affect can therefore be
considered as a change in state. See: *A Spinoza Reader: The Ethics and Other Works*,

\(^{842}\) Gabo, *Gabo on Gabo* p. 42.
optical sensations and virtual volumes. For instance, the use of light in *Light Space Modulator* and *Kinetic Construction, Standing Wave* permits the sculptures to not only transform in their own rhythms of duration but also perform a variety of movement intensities. Rather than considering intensity according to speed, both artists consider the intensity during perception closer to the rhythm of change in movement.

While for Bergson intensity is ‘the image of a present contraction and consequently a future expansion’, the very awareness of this edge between contraction and expansion could be an effect of assembling movement in real time together. This refers to a specific event or rupture that creates a qualitative difference in the art-goer, which occurs during an encounter with art. Deleuze extends this notion further by stating that speed forms a role in enhancing the affect of intensity. From this regard intensity resides at the interface of affect; a fuelling force even.

Just as virtual volumes could be found and captured in urban spaces, kinetic dynamism for both Moholy-Nagy and Gabo was never intended strictly for the practice of sculpture. Both artists pursued kinesis as an effective form of harnessing attention of temporality that could extend through to experiences of theatre, architecture, and public art spectacles in sites of leisure, arts, and entertainment. Moholy-Nagy specifically commented on this intention a number of times where he glorified the consumption of real movement in public urban industrial spaces. He reflected on this intention for further possibilities of consuming and orchestrating kinesis in the public domain in the future, when technological advancements had been made:

> I dreamed of light-apparatus, which might be controlled either by hand or by an automatic mechanism by means of which it would be possible to produce visions

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844 Bergson, *Time and Free Will*, p. 4.  
845 Manning, p. 143-151.  
849 Such as Moholy-Nagy’s *The Construction Scheme of the Kinetic Constructive System* (1922).
of light, in the air, in large rooms, on screens of unusual nature, on fog, vapour and clouds.  

Moholy-Nagy’s utopian aspirations envisioned mechanical mediations of movement to be ubiquitous, immersive, and potentially a mass public consumption of art and entertainment. The impermanence, weightless, and immaterial nature of light positioned lumia is also an effective medium for reaching large crowds without the permanence of sculpture and architecture. Light and movement in the public domain had already often been utilised as a means to commemorate human accomplishments, political power, or as gateways to further innovation and consumption of technology.  

Moholy-Nagy’s intention for kinesis in art was directed at the potential for whole architectural constructions to reconfigure subjective perceptions of space, time, and movement. This is specifically addressed in his (unrealised) project, *The Construction Scheme of the Kinetic Constructive System* (1922), a cylindrical shaped building used as a recreational multi-purpose space structured with multiple layers of spiralling ramps. For this kinetic construction, the movement that is ‘carried’ is performed not by the apparatus, but the people within it. The inhabitants are instead performers of a spectacle of leisure. Moholy-Nagy dreamed that:

> we can imagine the play of light in community festivals of coming generations. From airplanes and airships they will be able to enjoy the spectacle of gigantic expanses of illumination movement and transformation of lighted areas, which will provide new experiences and open up new joy in life.

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851 For instance El Lissitzky’s prospective public art piece *Electrical Mechanical Spectacle* in 1923 was drafted as a sculpture of scaffolding where beams of light follow the movements of light mirrors bifurcating light profiles in a public square as a form of ‘spectacle machinery’. Vladimir Tatlin’s *Monument to Third International* (1919), and various Alexander Rodchenko’s sculptural works are other similar examples of avant-garde kinetic spectacles used for public attention and affect for mass viewing and consumption. For earlier attempts of creating light spectacles in the nineteenth century see M Carolyn, *When Old Technologies Were New*, Oxford, Oxford University Press, 1988.


The intentions for kinetic sculpture in the future, held by Moholy-Nagy in the mid-1930s, is that of public, or at least communal enjoyment that reside in the common time and space of its audiences. Additionally, experiencing virtual volumes in urban landscapes such as advertising signs, evening traffic, fireworks and profile searchlights, reveals the virtual volume as an element of the modern everyday. The volumes are therefore, for Moholy-Nagy, also an articulation of the experience of urban temporality and the attention that it demands. He describes them as, ‘sculpture = material + mass relationships’, and positions public activity as catalysts for these mass relationships. Moholy-Nagy’s unrealised projects using motion and light in open areas, or large rooms with multiple projectors performing an entropy of movement, are an explicit desire for creating an aesthetic that harnesses the perceptual edge between what is moving, how that movement will transform in the future, and how the public also transforms within this spectacle.

If, for Bergson, intensity points to both the swell and expansion of the present that extends to the future, then public, theatrical, and architectural performances of kinesis expand on the temporal present, but do so with a state of intensity. The virtual volumes transform material sculpture to become both weightless and actual in the present, and also activates the space of the public installation as a specific temporal present. They not only happen in real time but also position the present as constantly unfolding, expanding, and passing, because the volume is a visual accumulation of temporalities. The space activated by the lights in Gabo and Moholy-Nagy’s projects is both virtual and actual, both unfolding and refracting in the actual present.

For Gabo, the production of real movement and time enabled the artist to express and critique the unfolding present as an accumulation of multiple temporal modes. Moholy-Nagy’s appropriation of Gabo’s virtual volume articulated this through his photographic motion studies, and also emphasised the virtual volume as a means for sculpture to simultaneously be mechanical and weightless. The virtual volume plays an integral role throughout Gabo and Moholy-Nagy’s experiments with kinetic movement in their sculptures. Not only does the virtual volume produce appearances of a weightless object that oscillates between present and past temporal modes but, they also contribute to a

855 Ibid., p. 129.
856 Bergson, *Time and Free Will*, p. 3
perception of time as a transformation that moves with the viewer’s perception through
time from mass to weightlessness.

For instance, their virtual volumes, and their approaches to the term ‘virtual’ in general,
are also important because they contributes to an avant-garde use of kinesis in art that is
both actual and virtual: these sculptures are tactile and optical, material and weightless,
virtual and actual, and blur the impressions of present and past actions. Many of the
writings by these artists indicate an interest in the forms that mechanical kinesis can bring,
as well as the unseen but felt ways that kinesis can affect their viewers. In this light, virtual
volumes and kinetic movement exist in time, but offer alternative visual perceptions of
 temporality - they offer to produce optical illusions which are visually true, but alternative
to their actual forms.

**Conclusion: Pioneering a Kinetic a Consciousness of Time**

Throughout this chapter I have approached Moholy-Nagy, Gabo, and Bergson as three
figures whom, when considered together, form a consciousness of time. This
consciousness is geared towards the perception of universal (duration) and subjective
(psychological) time that are continual transformations. Bergson, Moholy-Nagy, and Gabo
also consider the role of mechanical movement and representation to articulate duration
differently. I have highlighted Bergson’s criticism for the way in which Western
representations of movement distort the actual experience and perception of time. For
Bergson, the gap between representation and the real was more than a problem of
misrepresentation. Repetitive reproductions of these distortions led to a common
architecture for understanding time in modernity that distorts the subjective experience of
time and confuses mediated representations of movement with movement itself.

Moholy-Nagy and Gabo’s orchestration and study of kinesis have been used to
problematise Bergson’s regard for modern mechanical media in a number of ways. These
artists both consider kinesis as a tool for drawing attention to the present temporality in an
attempt to explore the role and function of time in art. Moholy-Nagy’s *Light Space Modulator*
is highlighted as a machine that performs movement as a kinetic sculpture, but
also a machine that Moholy-Nagy mediates through film and photography. The *Light
Space Modulator* is therefore a machine that moves and is also a production of movement,
mediations, and rhythms that articulates Moholy-Nagy’s interest in the creative production of industrial media. Rather than distorting time, the study of movement, modulation, and mediation through kinesis, film, and photography is Moholy-Nagy’s attempt to explore different ways to articulate movement, space, and time.

While Bergson was wary of mechanical representation and reproduction, this chapter has highlighted Moholy-Nagy’s interest in mechanical kinesis and representation as a means for producing new perceptions and experiences of movement in relation to space and time. Each perception, mediation, and modulation is not considered as a reduction of duration, as Bergson expressed but, a new perception of movement within the viewer’s duration. In this respect, mediation has the ability to assemble new percepts and affects to experiences of art. Through Light Space Modulator Moholy-Nagy uses kinesis to experiment with mechanical movement as an arrangement of multiplicity. The mediation and representation of the sculpture of movement from Moholy-Nagy’s perspective does not produce a reduction of movement but, instead, additional perceptions of motion rhythms. The creative productive abilities of mechanical motion open opportunities for new perceptions of, and relationships to, temporality that can be orchestrated in relation to actual duration.

Virtual volumes produced by Gabo, and later appropriated by Moholy-Nagy, further emphasise the ability for kinetic sculpture and photographic media to articulate the present as an accumulation of temporalities as they unfold. Viewing Kinetic Construction is an experience of movement that synthesises perceptions of the present and past together. Rather than attempting to spatialise time, virtual volumes are produced to highlight movement that transforms in real-time duration, with the view to creating a new understanding of time in art. Moholy-Nagy and Gabo’s creation of virtual volumes through kinetic sculpture is also significant because they regard the virtual as a term that depicts materiality and immateriality simultaneously: these sculptures are tactile while optical, material and weightless, virtual and actual, and blur the perception of present and past together. In this light, virtual volumes and kinetic movement exist in time, offering alternative visual perceptions of temporality, and producing optical illusions that are visually true but also, alternative to their actual forms.

For Moholy-Nagy and Gabo the virtual volume is an optical effect that is a product of the movement of modern mechanical form. In this regard Moholy-Nagy describes sculpture as ‘both material volume and its transformation into virtual volume; it has tactile existence
but may be changed to visual grasp; from static to kinetic; from mass to space-time relationships”. In addition to considering early avant-garde kinetic art as a primitive form of digital and virtual art, this consideration for movement to allude to and create the virtual also creates an opening for considering the articulation of duration, and the virtual in contemporary installation. The next chapter addresses Olafur Eliasson’s *Your Negotiable Panorama* (2009) as a continued desire to articulate the present as ancrystallisation of temporalities, and the use of motion to guide a perceptual edge between actual movement and its emergence from incipience.

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858 Popper, *From Technological to Virtual Art*, p. 1.
CHAPTER 6:

YOUR NEGOTIABLE PANORAMA: THE SEEPING EDGES OF PERCEIVING
YOURSELF PERCEIVING

Light is not the opposite of materiality.\textsuperscript{859}

Figure 21: Olafur Eliasson, \textit{Your Negotiable Panorama} (2009). Installation view at ARKEN, Copenhagen, 2011.

As demonstrated in the previous chapter, Naum Gabo and László Moholy-Nagy used virtual volumes to consider the simultaneously material and immaterial effects of movement. However, since their kinetic experiments in the 1920s, the terms ‘virtuality’ and ‘the virtual’ have developed as ambiguous umbrella terms in the field of digital art.

Frank Popper, like others, has considered virtual art as a tendency that ‘leads continuously from materialized’ work towards immateriality, which involves ‘the humanizing of technology through interactivity and neocommunicability as well as sensory immersion and multisensoriality’. Popper argues in *From Technological to Virtual Art*, that virtual art stems from early avant-garde kinetic artists such as Gabo and Moholy-Nagy and their experiments with virtual volumes. For Popper, these artists are chronologically and conceptually rudimentary precursors of virtual art because they developed the optical effects of weightlessness in their work. Furthermore, Popper considers that the study of virtual art necessitates a shift away from the study of motion, towards a cybernetic systems based vocabulary. While this position facilitates and encourages a rigorous study of digital and virtual art, it does so by suggesting that actual movement in art is not effective for discussing the representation or allusion to the virtual.

However, as I will argue in this chapter, there is a continued tendency in art to use movement in a similar manner to Moholy-Nagy and Gabo’s experiments with virtual

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862 Popper, ‘Origins to Virtualism’, p. 66.


864 However others such as Oliver Grau have argued that virtual art is derived from early forms of panorama. See: O Grau, *Virtual Art: From Illusion to Immersion*.

865 Popper, *From Technological to Virtual Art*, pp. 17-18.

volumes. Rather than considering kinetic virtual volumes as an early form of postmodern virtual art as Popper does, this chapter is focused on movement that is used to perceive the virtual as a means to produce material and immaterial effects, and to contribute to a consciousness of time that resonates with Moholy-Nagy, Gabo, and Bergson’s understanding of the virtual. This analysis cleaves new possibilities for considering a history of contemporary kinetic art history that does not move from mechanical kinesis towards immaterial digital art, as Popper suggests. Olafur Eliasson’s *Your Negotiable Panorama* (2009) is one work that allows for such an approach to the virtual as it orchestrates movement in such a way as to build a consciousness of movement that is simultaneously material and immaterial in relation to the virtual.

Eliasson’s work is also valuable for considering another element of Smith’s approach to contemporary art that in part resensationalises aspects of modern art. If, according to Terry Smith, contemporary art has a specific relationship with temporality that requires ‘many kinds of time from its audiences and offers many in return’, Eliasson contributes to contemporaneity now by being primarily concerned with measuring the present as it passes. This is because Eliasson continues Bergson’s modern conceptualisation of time: the present is articulated as an antiphrasis; as it unfolds it progresses, while memory in the present also gathers together and preserves the past. This chapter is therefore specifically engaged with this relationship between movement, the virtual, and the actual, and considers a continuation of movement instigated by Moholy-Nagy and Gabo and continued by Eliasson. In doing so, not only does Eliasson’s work continue to use movement and time to draw his audiences in to be conscious of the unfolding nature of time but, the artist uses these elements to consider the virtual as a part of this consciousness of time.

This chapter will begin by addressing the key understandings of Popper’s concept of virtual art, and identify how he excludes virtual art from a modality of actual movement in


art. This differs from Chapter 4 in that there the focus was on Popper’s de-emphasis of kineticism in virtual art builds a distinctive rupture in the interpretation of kinesis in contemporary art, and restricts the virtual solely to a simulation of the real. Popper’s use of the term ‘virtual’ in *Art and Electronic Media* and *From Technological to Virtual Art* is narrowly applied to a select range of digital art that was made since the last decade of the twentieth century, and, as I argued in Chapter 4, facilitates a technological determinism that excludes the virtual from other forms of media.

Secondly, I will present *Your Negotiable Panorama* as a continuation of engaging with the virtual that resonates with Gabo and Moholy-Nagy’s use of the term. In this artwork Eliasson uses movement to explore the limits of perception, where images of movement oscillate between appearances of materiality and immateriality. This oscillation produces a specific consciousness of temporality as a constant state of becoming that accumulates the past within it. Eliasson’s interest in the time as a construction of perception is emphasised to facilitate movement as a vehicle that extends the threshold of the present.

Because of this, the chapter draws from Bergson’s understanding of the relationship between duration and the virtual, as well as Deleuze’s emphasis on the virtual as a chaotic field that becomes actualised in the present. Bergson’s and Deleuze’s perspectives are useful resources for bringing kineticism and the virtual together under the same discourse, and understanding some of the affects of movement in contemporary installation. In light of Bergson and Deleuze, I argue in this chapter that perceiving movement in works such as *Your Negotiable Panorama* can act as a visual gauge for negotiating the perception of the actual from the virtual, and for contemplating the crystalline images that arise when the distinction between the actual and virtual are indiscernible.

**Frank Popper: From Kinetic to Virtual Art**

‘Virtual’ and ‘virtuality’ are terms that have persisted throughout contemporary kinetic art history, often to describe the optical effects of movement from either static representation

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870 This is further addressed in Chapter 5 of this thesis where I argue that Moholy-Nagy and Gabo use movement to create optical illusions and renegotiate the dynamics between materiality, motion and time.

or actual movement. From as early as László Moholy-Nagy and Naum Gabo’s experiments with form, movement, and light to produce ‘virtual volumes’, optical illusions were used to give mechanical media an appearance of weightlessness and alternative forms. Artists after WW2 also experimented with virtual volumes such as Jean Tinguely’s collaboration with Yves Klein in *Translation No. 1, pour un triangle* (1958), Tsai Wen-Ting *Double Diffraction* (1972), Len Lye’s *Grass* (1965), and Gerhard von Graevenitz’s *Kinetic Object* (1965) with new media at the time. For many of these artists virtual volumes were a way to explore movement as a means for enabling mechanical media to be material and also weightless in appearance and enabling their work to oscillate between these two states. Using movement to create a virtual volume gave an appearance of this contrary dynamic in the work, and encouraged viewers to perceive the edges of perception that transforms from stasis to movement, and to create images of the past in the actual present. For these artists the virtual is an effect that resides in the present, and is an optical effect of movement to produce a blurring of past and present movement. What is unique to artists using kinesis to form experiences of virtual volumes is that the effect is primarily used to create forms that oscillate between materiality and immateriality.

Contrary to this, Popper’s *Art and Electronic Media* and *From Technological to Virtual Art* approaches the virtual in art as a means for world making, or simulating reality. In these texts, virtual art is comprised of ‘elements from all the arts made with the technical media developed at the end of the 1980s’, and that enables the simulation of reality by encouraging experiences of immersion, interaction, and poly-sensorial engagements with digital representation. Popper’s distinction pinpoints the beginning of virtual art in a time where artists ‘mastered’ technological media such as holography, computer graphics,

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872 For instance, Guy Brett in *Kinetic Art* describes the virtual effects of optical kinetic art by artists such as Jesus Rafael Soto, Bridget Riley and Yaacov Agam.


876 Popper, *From Technological to Virtual Art*, pp. 396-397.

wearable interfaces, and screen based technologies to produce simulations of reality. Popper’s chronological distinction excludes modern industrial mechanical media because, according to him, it lacks the potential to be used to present simulations of reality. For instance, the optical, kinetic, and participatory art that Popper draws upon in *Art, Action and Participation* and *Origins and Developments of Kinetic Art* are focused on the actual technological and relational movements that occur in artistic experiences. Here, the motions in virtual art are primarily focused on those that simulate a constructed time and space, and mimic corporeal senses with digital representation. This is why Popper explains that virtual art has little to do with the experience and perception of actual movement. In Popper’s words, the virtual signifies ‘that we were in the presence not only of reality itself but also the simulation of reality’. Popper continues that ‘[f]rom an ontological point of view, contemporary virtual art represents a departure from technological art since it can be realized as many different actualities’. This approach to virtual art is largely influenced by the writings by Edmond Couchot, who has brought an awareness of the virtual as something that is opposed to what is actual, but can be translated by technological art through simulation. Both Popper and Couchot echo a Deleuzian vocabulary for these concepts to highlight a tension between the virtual and the actual. In Popper’s words ‘the virtual as a power opposed to the actual, but whose function, technologically speaking, is a way of being via digital simulation that can lead toward a certain expression of the operator’s subjectivity’. Popper considers virtuality to be a part of a plural and chaotic realm that has the potential to change the actual in a multitude of ways. Despite this technologically neutral definition of the virtual, Popper is adamant that exploring and representing the virtual in art in this way is strictly only possible through advanced technological media that emerged in the final decades of the twentieth century. This is evidenced in *From Technological to Virtual Art*, pp. 1-3.

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878 Popper, *From Technological to Virtual Art*, pp. 1-3.
881 Popper, *From Technological to Virtual Art*, p. 2.
885 Popper, *From Technological to Virtual Art*, p. 3.
Art, where Popper draws an explicit transition away from the study of movement in technological media that he outlays in Origins and Developments in Kinetic Art. In his interview with Joseph Nechvatal, Popper makes this clear by stating that movement ‘is no longer a prerequisite for my interest in works of art’ because virtual art is considered as a departure from kineticism. For Popper, there is little cross over between the movement in kineticism and the responsive, interactive, and tactile movements in virtual art and virtual reality.

Even though Popper gives attention to Moholy-Nagy and Gabo’s early avant-garde virtual volumes in their art in the 1920s, they are only briefly mentioned as precursors to virtual art. Again, kineticism is to draw binary distinctions between analogue and digital media: Popper associates kinetic sculpture with the mechanical and material, while digital art is considered as being media for virtual and immaterial art. Although Popper’s argument services digital media art with a heritage of machinic art, it does so through a misinterpretation of how early avant-garde kinetic artists explored the concept of virtuality in their art. As I address in chapter 5 of this thesis, Moholy-Nagy and Gabo create virtual volumes to enable their sculptural material to oscillate between tangible and optical forms, and highlight the embedded qualities of their mechanical works as holding simultaneous qualities of material and immateriality. The virtual is not considered as an additional dimension or simulation of reality, but embedded within the ontological realm.

Because of this technological and chronological distinction, Popper also understands virtual art as the most technically demanding and sophisticated form of technological art, and stands as the most refined means for humanising technology. Even though he and Joel Slayton claim that virtual art has been deliberately constructed to have open and ambiguous definitions, Popper’s digital determinism greatly restricts discussions of the

888 Moholy-Nagy pays tribute to Gabo’s virtual volumes and his realistic Manifesto and continues to describe the dual materiality and immateriality of kineticism. See: The New Vision, pp. 136-147.
889 Ibid., p. 129.
890 Ibid., p. 65.
891 J Slayton, From Technological to Virtual Art, p. ix.
virtual being derived from mechanical kineticism. This is particularly significant because his scholarship on the field of kinetic art since 1968 has been the key framework in which kinetic art history has been interpreted. Despite this, Popper’s technologically determinist view also provides an opportunity for considering alternative approaches to the virtual in relation to kinetic art in order to discuss the roles and effects of kinetic sculpture in contemporary art.

**Your Negotiable Panorama**

Installed at the ARKEN Museum on the outskirts of Copenhagen *Your Negotiable Panorama* is a work like many of Eliasson’s: a machine of reflection and refraction that the artist uses to explore alternative perceptions of movement, space, and time.\(^{892}\) When approaching the installation viewers are invited to walk over a ramp installed at the entrance of a circular space that has been sectioned off from the rest of the open gallery. This action triggers a pump that sets a pool of water at the centre of the space in motion. Installed above the water is the source of light projection: A glass prism and an HMI lamp, which illuminates, reflects and projects the ripples of the water onto the wall, producing a kinetic wave horizon that moves rapidly, before gradually calming down and creating smoother ripples along the walls. When viewers step onto and over the ramp they activate the movement and projection of water and, as a result, the form of the horizon on the walls articulates the weight, duration, and dynamic of the viewer’s step. As Eliasson describes, it is their ‘negotiable panorama’.

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\(^{892}\) Other works that are created with reflection and refraction to alter the perception of space and/or time are: *Your Watercolor Horizon* (2009), *Color Spectrum Kaleidoscope* (2003), *Dodecahedron Lamp* (2005), *Concentric Mirror* (2004), and *Your Black Horizon* (2005).
Art historians such as Eve Blau have previously drawn parallels between the works by Eliasson and Moholy-Nagy. In ways not dissimilar to Moholy-Nagy’s *Light Space Modulator*, Eliasson brings attention to the space that surrounds the viewer by using projection of light and movement, and de-emphasising the contraptions that create and project the light forms. In both cases kineticism is the primary focus of the experience, rather than the object of movement (which in Eliasson’s work is the moving water). Like

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Gabo, Moholy-Nagy, and Bergson before him, Eliasson uses space as a coordinate of movement and compels his audience to focus on their perception on the movement of the horizon and to monitor its flow and changing rhythms before it settles. Each person’s stride, weight, speed, and/or hesitation when walking over the ramp effects how the light wave moves, as well as its duration for movement before returning to stillness. The movement that they perceive in the present has a dual kineticism, as it is an unfolding mediation of the reflection and refraction of light, as well as a response to the viewer’s passage over the ramp that activated its movement.

Like Moholy-Nagy, Eliasson regards light as a carrier of motion; rather than using light to illuminate or signify forms, it is used to bring attention to the dynamics of perceiving motion. However, unlike Moholy-Nagy and Gabo, Eliasson’s light is not used to study the effects of light that give the impression of a weightless, mechanical sculpture in movement. Instead Eliasson focuses on the materiality of light itself. This has been previously suggested by Mieke Bal who stresses that Eliasson often uses light as its own medium. In Bal’s words: ‘[l]ight is not the opposite of materiality. Rather, Eliasson’s rich exploitation of light achieves a reconciliation of matter and light: he invites us to experience the very materiality of light itself. Light, if taken seriously is a material element and not just as a tool for visibility’. Bal’s interpretation of Eliasson’s use of light and kinesis conflicts with earlier interpretations of kinetic lumia that emphasise light as an inherently ephemeral and immaterial medium. Instead, Eliasson’s light occupies both material and immaterial effects.

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895 Ibid., p. 237.
896 In Chapter 5 of this thesis I suggest that Moholy-Nagy and Gabo create virtual volumes to enable their sculpture to oscillate between materiality and immateriality though the manipulation of movement and light.
898 Ibid., p. 169.
899 Popper has argued that the increasing use of light in art suggests a trend in artists crating kinetic sculpture that moves increasingly toward immateriality, demateriality and ephemerality. See:
Like many of his works constructed with water, light, and motion, Eliasson imitates and abstracts everyday experiences and the perceptions of natural phenomena in *Your Negotiable Panorama*. For instance, other works by the artist involve reconstructions of waterfalls, rainbows produced by artificial, indoor rainfall, the manipulation of perception through prisms, horizons, and reconstructed suns that loom over cityscapes or museum halls. In the case of *Your Negotiable Panorama*, viewers are required to renegotiate Euclidian rationalisations of form and perspective with an artificial and dynamic horizon. Eliasson orchestrates these experiences to highlight the perceptual idiosyncrasies that occur in natural and urban environments to encourage viewers to perceive them in new ways. By isolating the experience of a horizon and resituation in a gallery setting, Eliasson requires his viewers to relinquish the visual baggage that is normally associated with these everyday experiences, and reexamine their movements and manipulation of sensation and perception in a new environment.

While historians and critics such as Burnham have previously regarded kinetic sculpture to be created to be mimetic of human life, Mirjam Schaub has argued that Eliasson experiments with the empathetic relations between viewer and object without attempting to humanise technology. Rather than making ‘the physiological more “human”’. Schaub argues that Eliasson tends to asks viewers, ‘to think of it from the perspective “of the objects”, the “things” and their “colors” that it produces as if they actually existed outside of one’s own retina: an art of after images, trick images, of the reversal and immobilization of movement’. For Schaub, Eliasson’s kinesis presents a spectacle of perception, rather than of mimesis.

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Additionally Mieke Bal considers Eliasson’s intrigue with phenomenology has a direct consequence on the individual perception of time. She suggests that Eliasson makes his viewers engage with the perception of time anew by ‘shifting time away from its ‘natural’ space so that our belatedness becomes the primary condition of existence’.

Abstracting the movement of natural phenomena and centralising the viewer’s perception of them in the gallery space erodes the conventional mechanised rationalisations of time. As Eliasson describes,

> [t]aking one’s time means to engage actively in a spatial and temporal situation, either within the museum or in the outside world. It requires attention to the changeability of our surroundings. You could say that it heightens awareness of the fact that our actions have a specific speed, depending on the situation.

If, as Smith suggests, contemporary artists often require many kinds of time from their audiences in order to offer many in return, Eliasson offers a present that is centred on the subjective awareness of time at the centre of the experience. In exchange for giving one’s time when viewing the installation, Eliasson abstracts, reengages and directs the viewer’s attention onto the present to heighten sensations and perceptions of time as a state of constant transformation. The artist also continues a tradition within contemporary kinetic art history by using movement to draw attention in towards time as a constant transition that is changeable in its rhythms. Eliasson encourages a phenomenological perception of time that implicates the subjective perceptions of the viewer at the centre of the installation.

As described by Pamela Lee, ‘Eliasson has produced a body of work that variously engages questions of subject-object relations, exploring the ways in which the subject’s encounter with his or her surroundings prompts larger revelations about the nature of

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910 Exhibitions such as *Direction in Kinetic Art* particularly emphasised a Bergsonian approach to movement in kinetic art. See: P Selz, *Art in a Turbulent Era*.
perception itself'. In the case of Your Negotiable Panorama the installation that surrounds the viewer is a mediated mirror of the viewer’s movement in order to bring the viewer’s durational experience into the centre of the work as a site of privilege, possession and transformation. For instance, the work and titles of Your Only Real Thing is Time (2001), Your Strange Certainty Kept Still (1996), Your Waste of Time (2006), and Your Wave Is (2006), Take Your Time, (2008) and exhibitions such as Your Intuitive Surroundings Versus Your Surrounded Intuition (2000), indicate that transformation occurs as the work unfolds—with the viewer’s subjective experience.

Eliasson pursues a phenomenological approach to his work in order to emphasise the experience of ‘perceiving yourself perceiving’ space as a coordinate of movement. In doing so Eliasson’s experimentation is useful for considering further the implications of movement as an incipient and emergent process, as well as considering art historical understandings of the virtual that have been used to build a consciousness of time through movement. This is because Eliasson’s understanding of the virtual is geared according to the process of becoming actualised in the present.

This is also affirmed by Eliasson who described his interest in phenomenology as an ongoing theatrical dynamic between the object and the viewer’s perception of it. He also defends the theatricality of the dematerilised work of art that he actively engages with against Michael Fried’s objecthood. See: Eliasson, Take Your Time, p. 51.

Ibid., p. 34.

Ibid., p. 35.


Whereas Bergson argued that representation in Western society predominantly nutrues perceptions of movement as a coordinate of space. See: H Bergson, Creative Evolution, pp. 317-347.

Eliasson also defends the theatricality of the dematerilised work of art that he actively engages with against Michael Fried’s objecthood. See: Eliasson, Take Your Time, p. 51.

says, ‘...I don’t think that the object actually does anything. But it is also not that I am saying that the subject is everything. I think that the subject has an impact on the object, and vice versa, the object has an impact on the subject.’\textsuperscript{918} As an example of this intention viewers of \textit{Your Negotiable Panorama} are surrounded by the wave horizon. This wave is a translation of their own movements over the ramp in order to enable ‘[their] experience of the thing [to be] integrated as a part of the thing itself’\textsuperscript{919} and to find a bleed between the subject’s actions and their perceptions of the installation.

Smith has referred to Eliasson as an artist who resides in his third current of contemporary art – one that ‘manifests the conditions of contemporaneity – who rejects grand statements and finds himself exploring ways of taking small, but hopefully significant, steps within this seemingly limitless stream of times.’\textsuperscript{920} However, Eliasson also resensationalises modern approaches to art, particularly through his emphasis on presenting a consciousness of time through his work. As with modern artists before him Eliasson is focused on the ceaseless shifting of time from the past into the present.\textsuperscript{921} This resensationalisation of modern time requires his viewers to be consumed by the flow of time that is played to them instantly.\textsuperscript{922} Eliasson emphasises this continuity of time in \textit{Your Negotiable Panorama} by projecting the movement rhythms of the water out onto the surrounding walls. The wave foregrounds movement and time as continuous and changing in its rhythm. It coincides with the expansion and contraction of perception, action, and sensation, and pulls the viewer’s attention towards the present as a construct of perception.\textsuperscript{923} The present is an important feature of \textit{Your Negotiable Panorama}, as well as many of the artist’s other works. As Eliasson describes through an analogy, he aims to draw together his installations as events of the present temporality:

There is only a ‘now’. But I think that people might believe that there is a time. Let me try to explain through an example: if I am sitting in a boat, like I did this

\textsuperscript{918} Eliasson, \textit{Your Only Real Thing is Time}, p. 17.
\textsuperscript{919} Eliasson, ‘Take your Time’, p. 54.
\textsuperscript{920} Smith, \textit{What is Contemporary Art?} p. 198.
\textsuperscript{921} Smith, \textit{What is Contemporary Art?}, p. 196. Here Smith emphasises expression of time as a continual line from the present into the past is a primary conception for modern artists.
\textsuperscript{922} Smith, \textit{What is Contemporary Art?}, p. 197.
\textsuperscript{923} J Morgan and O Eliasson, \textit{Your Only Real Thing is Time}, p. 16.
summer, going down a river, I am ‘now’ in the boat, at this spot on the river, and
the landscape on the banks passes me as time. If I stand on the bank and the river
passes me, the water which is further up the river is also ‘now’ even though I know
that it is not yet here. Our belief in time is just a construct. For Eliasson, because time is a construct of perception, or, perhaps more precisely, of
imagination, the processes of perception and sensation, are active, rather than passive
participants in the flow of time as it unfolds with them. In Your Negotiable Panorama the
viewer’s perceptions and actions are at the frontier of this now. Eliasson encourages his
audiences to consider each action as a motion that pushes the horizon of the present into a
new field of actions. By making the projected horizon on the wall responsive to the
viewer’s motion, its movement in the present is continuous and relative in nature as each
step and wave of the horizon brings attention to the action that activates space and time
and affects its surrounding variables. Each rhythm in the wave corresponds to the
dynamics of each individual step on the ramp to highlight that action produces a ripple
effect of responding motion.

Considering Eliasson’s position on kineticism, time, and perception, a Bergson-Deleuzian
interpretation of Your Negotiable Panorama is useful for understanding the incipient
nature of movement that is in a process of actualisation from the virtual. Bergson and
Deleuze’s understanding of time, memory, and the virtual are also useful for considering
kineticism in art as an ongoing contemporary practice that diverges away from a digitally
determinist reading of the virtual. Additionally, this analysis also demonstrates that kinetic
dynamism is a useful tool for discussing the facets of Bergson and Deleuze’s
understanding of the relationship between the actual and the virtual.

Intersections with the Virtual: Eliasson, Deleuze and Bergson

As I highlighted earlier, Popper echoes Bergson’s approach to describing the virtual and
duration when analysing kinetic art. However, despite this, there is a distinctive
difference between Deleuze and Bergson’s approaches and Popper’s. While Popper

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924 Ibid., p. 16.
considers the virtual as a simulation that exists in the actual, ontological realm, Deleuze
draws from Bergson to regard the virtual differently to the actual, that becomes actualised
in the present. In *Bergsonism* the relationship between the virtual and actual is described
as:

The possible has no reality (although it may have an actuality); conversely, the
virtual is not actual, but *as such, possess a reality*. The virtual on the other hand
does not have to be realized, but rather actualized; and the rules of actualization are
not those of resemblance and limitation, but those of difference or divergence and
of creation.\(^{926}\)

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\(^{926}\) Deleuze, *Bergsonism*, pp. 96-97.
Deleuze makes it clear that while the virtual is opposed to the actual, the virtual also ‘possesses a full reality by itself’, and this reality is not a unity but ‘designates a pure multiplicity’ that is yet to be actualised in the present. Because of this, the relationship between the virtual and actual is in a continual process of actualisation, or becoming. Simon O’Sullivan has interpreted this relationship between the virtual and the actual clearly by emphasising the virtual as a state of becoming:

The possible names a logic of Being (ontology of stasis), the virtual affirms a logic of becoming (ontology or process). [...] The virtual, or rather the actualisation of the virtual, is then the creative act – precisely the production, or actualisation, of difference and thus diversity from a pre-existing field of potentialities.

This field is a chaotic realm that becomes unified in the present when actualised. The process of actualisation is also a continual process and, as Bergson describes, ‘the virtual image evolves towards the virtual sensation, and the virtual sensation towards real movement’. It is also important to note that this transition from the virtual to the actual occurs by degree. For Bergson realising this transformation from the virtual to the actual also brings attention to the sensations that have ‘tried to embody itself in the sensation’. In this regard an affective potential of kinetic movement lies in its ability as a medium to elaborate on the incipient nature of the actual from the virtual. That is, kineticism can be used to emphasise the temporal aspects of the virtual. This is because kineticism brings attention to movement as incipient and emergent, and gives rise to the perceptual edge between the natural continuation of the present, and what virtual states are yet to be embodied in the actual.

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927 Deleuze Difference and Repetition, p. 211.
928 Ibid., p. 211.
930 Bergson, Matter and Memory, p. 168.
931 Ibid., p. 168.
932 Ibid., p. 169.
933 Bergson, Matter and Memory, p. 169.
When interpreting *Your Negotiable Panorama* from Deleuze and Bergson’s understanding of the virtual, rather than a more strict phenomenological approach,\(^{934}\) the installation acts as an event horizon of actualisation that brings attention to the relationship between the virtual and the actual. Eliasson’s horizon of light and water articulates force through the actions of the viewers as well as the systematic coordinates of light, water, movement, prism, and projection that come together to produce the horizon on the wall. Motion highlights the process of actualisation as continual rather than discrete, and is a process of becoming that is uncertain, unstable, and yet constant. The movement of the projected horizon produces a sense of the actual being drawn from what O’Sullivan has highlighted as the ‘pre-existing field of potentialities’,\(^{935}\) because of its unfolding durational rhythm. In this regard, Eliasson encourages his viewers to move with what Brian Massumi describes as a manner of seeking ‘the seeping edge of perception’\(^{936}\) as the horizon moves.

Because the wave is an echo of the viewer’s movement, the horizon is not only a presentation of movement but, also a transduction of energy that has moved from the viewer’s actions onto the ramp, and to the centrepiece of the installation. The refraction and projection of the wave unfolds in the present, yet it is also an echo from the past. For the artist, this is much like how memory is activated and recalled in the present: ‘[t]o say that memories are just representational does not do justice to the memory. Sure, memories are representational in the way that they are stored, but a memory only exists in the now […] You can experience something in the past. So memory is representational but it is also now – it has this ambiguity’.\(^{937}\) Eliasson points out the antonymous nature of memory that can be applied to the wave in *Your Negotiable Panorama*, where it is a wave that is unfolding in the present but, at the same time, a stored continuity from the past. Considering Eliasson’s description, the present is rich with folds of the temporalities within it, as it also unfolds.

\(^{934}\) It is important to note that Deleuze does not utilise a phenomenological approach to his philosophy and my study is focused on how Deleuze’s approach to the virtual and the actual can be used as tools for new interpretations of the artwork. See: G Deleuze & F Guattari, *What is Philosophy*, trans. H Tomlinson & G Burchell, New York, Columbia University Press, 1994.

\(^{935}\) O’Sullivan, p. 103.


\(^{937}\) Eliasson, *Your Only Real Thing is Time*, p. 22.
This orchestration of movement resonates with Bergson’s concept of duration as a continual, unfolding process of creation and differentiation. For Bergson, ‘duration means invention, the creation of forms, the continual elaboration of the absolutely new’, 938 which Eliasson explored through the panoramic horizon. By positioning the subject’s perception at the centre of the installation, and their actions at the frontier of the experience of the installation, Eliasson highlights experiential time as a creative process where action propels the actual and pulls the virtual into the present.

Another way to consider the virtual in relation to the actual is through Bergson’s elaboration on memory. 939 In his writings, Bergson argues that the past is coextensive with the present. 940 The virtual is not only what is yet to be actualised, but also what has passed from the actual into the past, in a process of deactualisation. Memory, then, is a way of recalling the past and bringing it into the present. In this sense, ‘memory does not consist in a regression from the present to the past, but, on the contrary, in a progression from the past to the present.’ 941 As Simon O’Sullivan has highlighted, the ‘virtual can be understood as a temporal dimension of the object’, 942 because the actual is not only an unfolding of the present, but is also a site for preserving the past within it. 943

Eliasson echoes a similar attitude when he explains that perception in the present is informed by the accumulation of sensations that are built by memory:

[t]he sense of time that I work with is the idea of a ‘now’. I would say that there is a timeline, which is obviously divided by ‘now’ and the past and the future. But I don’t think it is really possible to talk about the past and the future – however, maybe it is possible to talk about memory and expectations. My ‘now’, my sensation of now, comes from the idea of the subject from which it derives. I can

938 Bergson, *Creative Evolution*, p. 11.
943 Bergson, *Matter and Memory*, p. 193. This is also emphasised by Deleuze in *Bergsonism*, pp. 51-53.
say that my past and future are ‘now’, for the world (in my work). Or your memory and your expectations are now for me.\textsuperscript{944}

To experience \textit{Your Negotiable Panorama} is to engage with a consciousness of temporalities that explicitly fold together, rather than being distributed on a linear plane. Eliasson presents both a stored continuity of time as well as a performance in the present in the installation. This is achieved by making the horizon perform movement in the actual present, while also translating a past action. The artist explains that the slippage between the past and present in his works articulates the antonymous nature of the present because it is both unfolding as it progresses, as well as recalling the past within it. Eliasson has attributed a direct interest in Bergson’s understanding of the relationship between the present and the past embedded within it, and explained that ‘[t]o me the richness of Bergson’s thought lies in his idea of temporal density. He doesn’t see time as a line; time is non-linear, and he would say that space is \textit{of} time, not \textit{in} time. One can’t talk about matter at all if one doesn’t take the temporal aspect into consideration’.\textsuperscript{945} Eliasson’s movement of the horizon is an echo from the past, unfolding in the present and explores this temporal density of Bergson’s thought that Eliasson is interested in.

As Bergson argued, the problem with representation is the inability to store continuity.\textsuperscript{946} Bergson also emphasises that the representation of movement is only produced due to the actual movement of the projector.\textsuperscript{947} Actual kinesis in sculpture and installation, however, performs this continuity, thereby avoiding the polemic of distorting duration. However, the kinetic dynamism utilised by Eliasson brings this polemic between Bergson’s duration and representation to the fore in \textit{Your Negotiable Panorama}. The kinesis in this installation performs a moment of movement that highlights the emerging and yet ungraspable nature of the present. The wave of the horizon is a translation of the viewer’s passing over the ramp, as well as performing a transduction of energy, from the viewer to the projected walls. While Eliasson has constructed this space specifically to react to the viewer’s entrance in the room, he does so to demonstrate that all movement produces ripple counter

\textsuperscript{944} Eliasson, \textit{Your Only Real Thing is Time}, p. 16.


\textsuperscript{946} Bergson, \textit{Creative Evolution}, pp. 321-323.

\textsuperscript{947} Ibid., p. 322.
effects of motion. While the wave makes this perceptible, it acts to allude to the relational movements between particulars,\textsuperscript{948} which inevitably occur in duration.

Eliasson’s installations are not simulations of the natural world, but they are what Boris Groys would suggest of contemporary installation, a way of reterritorialising temporality in art. For Groys, contemporary installation art is increasingly performed by artists as a way to express the nature of contemporaneity in contemporary art.\textsuperscript{949} Groys argues that each reproduction or reconstruction is never entirely a repetition of the work, because each viewing of the installation is a new encounter that pulls new perceptions, associations, and reactions from the work.

For Erin Manning, to ‘see yourself seeing’ uniquely describes the perception of movement as it unfolds.\textsuperscript{950} To feel movement as it forms, is an act of looking with form as it is moving, rather than looking-for evidence of movement passing.\textsuperscript{951} Manning borrows from Bergson to emphasise that movement can never be accurately represented by media because each representation is an act of isolation and abstraction away from movement’s rhythm as it comes into and out of form. This is why Manning argues that to feel movement moving, or in Eliasson’s terms, to see yourself seeing movement, is to sense movement in the actual that emerges from an incipient state.

In this regard installation art has a unique potential to act as an assemblage that builds an experience more than an object.\textsuperscript{952} Eliasson uses this affective potential to encourage his viewers to ‘see yourself seeing’ in the present.\textsuperscript{953} The artist explains:

\textsuperscript{948} As Adrian Parr has highlighted, Deleuze’s interpretation of Bergson’s duration can be described as, ‘the immediate awareness of the flow of changes that simultaneously constitute differences and relationships between particulars’. See: Parr, p. 79.


\textsuperscript{951} Manning, p. 95.


\textsuperscript{953} Eliasson, \textit{Take Your Time}, p. 55.
What is special in the case of conditional experience is, I think, what I sometimes call the introspective quality of seeing: you see whatever you’re looking at, but you also see the way you’re seeing. You can find pleasure or fear in what you’re experiencing, but your experience of the thing is integrated as a part of the thing itself.954

Eliasson’s phenomenological description of the affects positions the subject at the centre of the experience; they are both the subject and object of the moment constructed by Eliasson. The movement of Your Negotiable Panorama then begins with the viewer at the centre of motion and action.

**Deleuze’s Crystalline Experiences of Temporality**

Art historian Philip Ursprung has argued that Eliasson creates works in reference to a system of surfaces that are refracted and reflected when viewers encounter the installations. Ursprung proposes, ‘I would call this structure “crystalline”. It reveals itself through a specific, finely faceted surface that produces countless mirror images of anyone who moves in front of or inside it’.955 Some of Eliasson’s works are indeed crystalline in appearance. They are installations that take the form of refracted mirrors, kaleidoscopes, and mosaics,956 while in other works Eliasson centralises perception to produce infinite images that enable the viewer to ‘see themselves seeing’.957 As Ursprung explains, these latter works refract their surfaces, which ‘could be described simply as the product of never-ending faceting, complex contortions and undulations, in which the image of the surroundings is broken down, prism-like, into an infinite number of new images in which every observer can ultimately recognize him- or herself’.958 Drawing from Frederic

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954 Ibid., p. 54.
957 Eliasson, Take Your Time, p. 55.
Jameson, Ursprung considers the postmodern distribution of surfaces that constitute a hyperspace\(^{959}\) to be central to understanding Eliasson’s work.\(^{960}\)

However, Ursprung’s focus on the material and perceptual surfaces of Eliasson’s artworks does not tend to the temporal layering that is constructed in *Your Negotiable Panorama*. While the installation works within Ursprung’s rubric by presenting a mechanism that refracts images and creates a wave horizon, this interpretation is made with a de-emphasis of the dense folds between perceptions of the past, present, and memory in this installation. When considering the work from a temporal point of view, there is a stronger potential to discuss a Deleuzian approach to the crystalline.\(^{961}\) Doing so is useful for understanding further the relationship between movement in the actual in relation to the virtual, while also bringing forth new ways to discuss and interpret Deleuze’s framework for the crystalline image. Additionally, the temporal layering that can be perceived in the experience of *Your Negotiable Panorama* is heightened further by using the crystalline as a tool for interpreting and discussing the movement of the installation.

While Deleuze discussed the crystalline regime through his interpretation of modern film in *Cinema 2: The Time Image*, his analysis contains key philosophical tools useful for the practical philosophy related to time-based media, events, and experiences. In contrast to Ursprung, Deleuze’s crystalline image is primarily regarded through a temporal, rather than a spatial regime, that is qualitative, nonlinear, and folding, and produced purely through the perception of optical and aural stimulus.\(^{962}\) As I addressed earlier, Deleuze understands the virtual and the actual to be in opposition to one another, and yet involved in a continual process of actualisation from the virtual. There are, however, moments when the distinctions between the virtual and the actual coalesce with one another and become unclear. As Deleuze explains, ‘[t]he two modes of existence are … combined in a circuit where the real and the imaginary, the actual and the virtual, chase after each other, exchange their roles and become indiscernible’.\(^{963}\) This indiscernible quality is a core

\(^{959}\) Jameson, *Postmodernism, or the Cultural Logic of Late Capitalism*, p. 43.

\(^{960}\) Ibid., p. 14. Ursprung directly draws from Jameson’s use of the term ‘hyperspace’ to unpack his interpretation of ‘crystalline surfaces’.

\(^{961}\) Deleuze, *Cinema 2*, pp. 68-97, 126-129.

\(^{962}\) Schaub, p. 5.

\(^{963}\) Deleuze, *Cinema 2*, p. 127.
aspect of the crystalline image. For Deleuze this new image does not collapse the seemingly opposing qualities of the virtual and actual, but, rather, can be used to describe when the differences between the actual and the virtual cannot be located.

The crystalline is more than an unclear perception of the distinctions between the actual and the virtual, but a separate regime of images. Deleuze explicitly acknowledges this when he describes that the crystalline ‘is completely different’ from the actual and virtual.\textsuperscript{964} He continues, ‘the actual is cut off from its motor linkages, or the real from its legal connections, and the virtual, for its part, detaches itself from its actualizations, starts to be valid for itself’.\textsuperscript{965} The crystalline therefore resides at the intersection between two systems of images, the organic (containing the virtual and the actual) and crystalline images. Perception can be mobilised to enable ‘passages from one regime to the other, from the organic to the crystalline, can take place imperceptibly or there can be constant overlapping’,\textsuperscript{966} and challenge a Euclidian system of representation.

When considering Deleuze’s use of the crystalline, it become apparent that Eliasson takes advantage of a system of perception that fold, coalesces, and blurs images of temporality in \textit{Your Negotiable Panorama}. The projected panorama forms and moves in the present, but it does so as a signification of the viewer’s step off the ramp that occurred previously. Although it is clear that the movement of the water is occurring in the same time and space as the viewer (and because of this the installation falls short of a purely Deleuzian crystalline image), Eliasson uses the movement of the water to foreground the temporal folds that exist within the present. If the wave can be perceived as a representation of the past and simultaneously also a presentation of the present, there is an intersection between a perception of the past and, also, a perception of the present within the same image of movement.\textsuperscript{967} Furthermore, because of Eliasson’s experimentation with Bergson’s approach to the present as a process of unfolding time, and preserving the past within it, Eliasson highlights the multiplicity of temporality and the folds within it.

\textsuperscript{964} \textit{Ibid.}, p. 127.
\textsuperscript{965} \textit{Ibid.}, p. 127.
\textsuperscript{966} \textit{Ibid.}, p. 127
\textsuperscript{967} Although it is important to keep in mind that the wave is not what Bergson would describe as a recollection, but a signification of past actions.
Conclusion: Resensationalising Kinetic Trends

Figure 24: Olafur Eliasson, *Your Negotiable Panorama* (2009). Detail of installation view at ARKEN, Copenhagen, 2011.

My approach to *Your Negotiable Panorama* is a diversion from Popper’s understanding of the virtual and virtual art, where he and others focus on immateriality and a simulation of reality. Emphasising the temporal aspects of the virtual is consistent with Moholy-Nagy and Gabo’s experiments with their virtual volumes and suggests multiple approaches to the virtual in kinetic art. In *Your Negotiable Panorama* Eliasson is careful to emphasise the perception of movement as it is actualised in the present in order to highlight the virtual as a part of the real, rather than a simulation of it. Therefore, while Popper suggests that early avant-garde kinetic art is a ‘starting point for the context of high technology art’,[96] such as what he regards as virtual art, my analysis of Eliasson’s installation in reference to my

early approach to Moholy-Nagy and Gabo cleaves a new connection between avant-garde and contemporary kineticism with the virtual. Therefore, as I have suggested, artists working with kineticism have the potential to examine the relationship between the virtual and the actual in time that moves with the viewer. What is unique to Eliasson’s *Your Negotiable Panorama* is his ability to use movement, projection and representation to also express the present as an antiphrasis that folds the past within it while it also unfolds through a crystalline regime of images.

Eliasson therefore contributes to the *peculiar time* of contemporary art and society by resensationalising Bergson’s modern concept of duration in a contemporary technological context. This not only contemporises Bergson’s approach to time, movement, and the virtual but also illuminates an historical pattern in kinetic sculpture and installation that uses movement to make machinic media oscillate between materiality, immateriality, the virtual, and the actual. The motion rhythms that emerge in the experience of *Your Negotiable Panorama* therefore highlight motion as an effective tool for exploring the nature of perception. This chapter has focused on how Eliasson uses movement to require a self-reflexive renegotiation of perception, time, and space, and can be used to encourage the material and immaterial properties of motion in both digital and analogue media.

Eliasson renegotiates movement in relation to the virtual that situates perceiving yourself perceiving movement as it arises from the virtual and forms in the actual present. This present is antiphrastic in nature; as it is a visualisation of the present unraveling in time, while also preserving perceptions in the past within it.

Additionally, discussing movement in the actual as an incipient process that emerges from the chaotic virtual plane is useful for contemplating Deleuze’s crystalline regime of images, as well as Bergson’s argument that the memory in the present preserves the past within it, as it unfolds. While Eliasson is explicitly interested in constructing phenomenological experimentations of perception, his works such as *Your Negotiable Panorama* also visually resonate with Bergson and Deleuze’s approach to the virtual. As an image of time, Eliasson encourages a perception of the crystalline that intersect on a temporal, rather than a spatial plane. This is useful for considering relationships between kineticism and the virtual that diverge from nurturing virtuality as a visual effective of digital representation and simulation of reality as suggested by Popper in *From Technological to Virtual Art and Art and Electronic Media*. 
This temporal reading of Eliasson’s work is an investigation of the implications behind Smith’s description that there is a tendency in contemporary art for artists to recall and perpetuate modern tropes. In the case of Eliasson I have addressed *Your Negotiable Panorama* in order to elaborate on contemporaneity through a Deleuze-Bergsonain understanding of temporality as a constant becoming that preserves the past within it. Crystalline images are used to create indiscernibility between images of the past and present as they emerge from a state of incipience. Eliasson’s installation therefore also contemporises Bergon’s modern conception of duration. Smith’s remodernism is also useful for reconsidering the dominant tendencies within contemporary art history of kinetic sculpture, particularly Popper’s regard for kinesis in regard to the virtual. By considering the material and immaterial affects of the virtual, kinetic sculpture is not only considered as a mechanical precursor to digital art, as Popper suggests, but also an avenue for exploring the changing conceptions of movement and time.
CONCLUSION

CONSCIOUSNESS OF TIME:
LOOKING BACK AND MOVING FORWARD

‘Art today is shaped most profoundly by its situation within contemporaneity…. Contemporaneity itself has many histories, and histories within the histories of art’. 969

This thesis has focused on how actual movement in art has been used to form a consciousness of time in contemporary society. The practice of using movement to orchestrate perceptions of time has been a longstanding feature of contemporary art history. For instance, from as early as 1919 Gabo encouraged his audiences to seize the present in his Realistic Manifesto970 and created Kinetic Construction: Standing Wave as a sculptural experiment that uses movement to bring attention to and create new perceptions of time. Additionally, Tinguely used his auto destructive sculptures to emphasise time as something that is inherently unpredictable, and which is rationalised and regulated by technology, while Olafur Eliasson focused on the subjective perceptions of ‘now’ in the kinetic rhythms of Your Negotiable Panorama. Throughout this thesis I have drawn from the works and writings of Gabo and Tinguely, as well as McCall, Kapoor, Haacke, and Moholy-Nagy, specifically because each of these artists use movement to orchestrate being with time in different ways. This thesis has therefore been broadly concerned with the roles and effects of kinetic sculpture as a means for engaging with the changing conceptions and expressions of contemporaneity. This tendency to use movement to express time, as I have argued, contributes to a wider consciousness of different technological ages each rationalising a specific peculiar time.

Chapter 1 addressed the view that avant-garde kinetic sculpture and installation has recently experienced a renaissance in contemporary art institutions. A number of large-scale exhibitions have returned to avant-garde kinetic artists, and, at times, exhibited their

969 Smith, What is Contemporary Art?, p. 6.
works alongside contemporary artworks in order to reflect on the continued, and yet changing expressions of movement in real-time. There have also been a number of contemporary exhibitions that have brought attention to earlier artistic experiments with kinesis in order to seek new relationships between a history of kinetic art in relation to the contemporary.\textsuperscript{971} This recent trend suggests that there is attention to avant-garde kinetic art in the wider milieu of contemporary art for a variety of reasons that contribute to a wider understanding of contemporary art history and facets of what it means to be with time.

It is the contemporary art historical perspectives of kinetic art that this thesis is most focused on. A contemporary interpretation of kinetic art is useful not only for considering the changing expressions of time in art, but, also, for considering how these artworks are framed and interpreted by contemporary perspectives, which differ from those previously held. In doing so, this thesis contributes to a contemporary consciousness of time in art.

The term ‘kinetic’ has therefore been used throughout this thesis in a self-reflexive manner in order to examine various ways in which kinetic sculpture and installation have, at times, been pursued and marginalised by art theory, criticism, and art history. Perhaps rather than considering that kinetic artists failed and became unrequited in their aims, as Burnham has argued, which chapter 3 focused on, kinetic sculpture and installation has succeeded as a contemporary and historical experimentation with technological media to form expressions of time with movement.

In light of this I drew upon Sydney’s Sixteenth Biennale titled, \textit{Revolutions – Forms that Turn} as one example of how contemporary art is, in part, characterised by drawing on the recent past to unpack and reflect on contemporary identity. I argued that this exhibition draws upon kinetic art to reflect on the changing expressions of temporality and contemporaneity through multiple technological ages. I highlighted that the exhibition draws from avant-garde and contemporary artists to examine the term ‘contemporary’ as a continual accumulation and preservation of art history in the present. Contemporary art history is therefore an amassing of previous historical modes, rather than a resistance or

\textsuperscript{971} For instance \textit{Vibration}, \textit{Vibração}, \textit{Vibración: Latin American Kinetic Art of the 1960s and ‘70s} (2004) curated by Susan Best intended to consider ‘alter-forms’ of kinetic art that have been marginalised by dominant art historical narratives. Another exhibition titled, \textit{Points of Contact} at the Govett Brewster Gallery exhibited kinetic sculpture, installation and environments by Hélio Oiticica, Len Lye and Jim Allen in order to reassess the influences and impact of kineticism in New Zealand that is specific to the nation’s identity and art history.
departure from modern and postmodern frameworks. While the Biennale exhibited a range of contemporary and historical artists associated with a variety of modern movements such as Futurism, Constructivism, Minimalism, and Dadism, my focus on the effects of incorporating kinetic artists within the exhibition is used to engage with expressions of time through movement in contemporary art history. My emphasis on the kinetic artworks in the biennale is valuable for considering kineticism to be at once, contemporary and historical. As noted at the start of this thesis, Christov-Bakargiev takes the view that: ‘everything that exists in the world is of my time’. Christov-Bakargiev therefore curated historical avant-garde works alongside contemporary pieces, in order to communicate that what is recalled by contemporary art history is also contemporary. In the scope of *Revolutions- Forms that Turn*, the works included in the biennale therefore inform audiences to reflect on what it means to be contemporary today.

I have drawn upon *Revolutions – Forms that Turn* to raise questions around how and why avant-garde kinetic art is often interpreted as an historical, antiquated, and obsolete practice, particularly when movement continues to be used in sculpture and installation by contemporary artists. Rather than regarding avant-garde kinetic art as a practice that is forgotten, early mechanical experimentations of movement were curated in the Biennale to gather in avant-garde understandings of movement, time, and the machine as a continued concern related to contemporary identity. My approach to *Revolutions – Forms that Turn* also highlights a wider need for further discussion around the roles and effects of kinetic art and its relationship to temporality. For instance, if avant-garde and contemporary kinetic artists contribute to an understanding of contemporaneity today, what are the reasons that kineticism has generated claims of no longer being with time and being an obsolete, unrequited, forgotten and antiquated practice. Furthermore, exhibitions such as *Revolutions Forms that Turn* bring into question how avant-garde kinetic artists contribute to a consciousness of time today.

Chapter 2 draws on the arguments presented by art historians Lee and Smith who claim that the contemporary relationships to time are influenced by the turbulent social, technological, and political changes in Europe and North America during the 1960s. For Lee, ‘[t]he sixties are endless. We still live within them….The Sixties are endless in

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972 Christov-Bakargiev, ‘Revolutions Forms that Turn’, p. 33.
staging endlessness as a cultural phenomenon...This is one legacy of sixties art that
continues to haunt us today. 974 Like Lee, Smith argues that not only is the reflection of
past expressions of conceptions of time in art informant of contemporaneity today but, this
is also further complicated because contemporaneity during the 1960s is marked by an
evasive and contradictory nature.975 In light of Smith and Lee I argued that the 1960s is
marked by a turbulent relationship to time. I draw upon Michael Fried’s seminal essay that
objects to the role of duration in art in his ‘Art and Objecthood’ as a prime example of the
trepidation around time in art. I also drew upon the auto-destructive artworks by Tinguely,
Homage to New York (1960) and Study for an End of the World No. 2 (1962), to articulate
the turbulent consciousness of time in art. While the reasons for this turbulence are
addressed, I argued that kinetic artists such as Tinguely contributed to a turbulent
consciousness of time by orchestrating new perceptions of time with mechanical and tele-
communicational media. While both works are auto-destructive in nature, I focused on the
differences between these two works to argue that Tinguely’s kineticism is sensitive to the
ways that different technologies can be used to rationalise time in different ways, and that,
at times, can also be incompatible with one another. The combination of Tinguely’s
artworks, Peter Selz’s curatorial direction in Directions of Kinetic Sculpture, and Fried’s
attack on the incorporation of duration in art describes a period of temporal turbulence that
has extended through to contemporary perspectives of time and art.

Another key aspect of the approaches to kinetic art history today, and also this thesis, are
the influential writings on the intersections between art, science, and technology by
and his book Beyond Modern Sculpture as central texts that have influenced the historical
approach to kinetic art in relation to contemporaneity today. As Jones has recently
explained in Artforum, Burnham’s argument in ‘Systems Esthetics’ has come to embody
many key characteristics of contemporary conceptual art today,976 and is an influential text

974 Lee, Chronophobia, p. 259.

975 Smith, What is Contemporary Art? pp. 1-10; Smith, ‘Contemporaneity in the History of
Art: A Clark Workshop 2009, Summaries of Papers and Notes on Discussions’,
Contemporaneity, vol. 1, 2011, pp. 5-33. url:

976 Jones, ‘System Symptoms’ pp. 113-114
for contemporary media art history. Across these texts Burnham describes kinesis in art at the time as an ‘unrequited’ machinic practice that failed to be relevant to the emerging postmodern approaches to interpreting and producing art, such as the appropriation of general systems theory. For Burnham, Ludwig von Bertalanffy’s *General Systems Theory* was a key influential concept that depicted key aspects of society during the 1950s and 1960s. Burnham’s appropriation of systems theory was used to propose a new way of producing, engaging with, and critiquing art that was emerging at a time that, Burnham argued, kinetic sculpture was no longer relevant.

Chapter 3 argued that Burnham’s criticism of kinesis in art strengthens an association between kinetic sculpture and modern antiquity because he associates kineticism with a machine aesthetic rather than an exploration of movement across a variety of media. Instead of affirming an incompatibility between kinetic artworks and systems theory, I demonstrated that the works by artists such as Haacke, can be understood as works that express temporality systems and systematic processes of perception. Haacke’s early systems art depends on movement to ‘physically communicate to one another’ within the gallery space to highlight immaterial and material effects of perceiving movement in art in ways similar to Burnham’s system aesthetics.

In this regard, Haacke’s use of actual movement resists traditional understandings of a work of art as autonomous, finite, and a product of craft by performing movement in real-time. By identifying Burnham’s approach to kineticism as a polemic in contemporary art history, chapter 3 focused on the subtle, yet important connections, between systems theory and the study of movement in sculpture and installation. This analysis presents the use of form and movement as tools for expressing temporal systems and systems of perception by the viewer in real-time. My analysis of Haacke’s artwork and approach to Burnham’s argument in ‘Systems Esthetics’ is valuable for pursuing new approaches to movement and time from a systems perspective. My interpretation of Haacke’s art emphasises that movement and time are key aspects of the artist’s approach to systems theory, and is useful for making viewers conscious of the systems of perception at play when confronted with ontologically unstable works of art.

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Chapter 4 identified Frank Popper’s scholarship on kinetic art as another polemic within contemporary art history. Here I highlighted that Popper’s extensive understanding of avant-garde kinetic sculpture in relation to other artistic practices leaves little room for considering the role and function of kinetic sculpture in ways that move away from building a genealogy of digital media in art. In this chapter focused on Popper’ arguments in *Art, Action and Participation* and *From Technological to Virtual Art* to bring attention to his approach to kinetic art as a technological, formal, and conceptual precursor to subsequent media and conceptual art practices.

As part of this I pointed to Popper’s attention to demateriality in art as a significant polemic for contemporary kinetic art historical study. This is because, as I emphasised, he asserts that through the popularity of demateriality in art kinetic sculpture became increasingly invisible and irrelevant to emerging artists interested in conceptual art. Popper positions kineticism within a rubric that associates the practise with materiality, the machine aesthetic, and formalism. From this point of view, conceptual and digital art are the dematerialised and ephemeral successors of demateriality, to which a modality of movement is not applied. Therefore, Popper’s argument locates kinetic sculpture as a modern mechanical formal performance of movement that is separated from conceptual and participatory artworks that incorporate movement. This is because, according to Popper, artists in the 1970s became increasingly interested in the conceptual properties, and disregarded the ontological elements of their art. In doing so, communicative, relational, and digital movement became a primary concern in art, rather than experiments with the affect of ontological movement as a focal point. However, Popper considers conceptual art and demateriality to entirely dismiss the effects of form in art. However, while demateriality identifies a separation between the formal and conceptual properties of art, art historians such as Lucy Lippard have drawn attention to the importance of form to act as a gateway for the concepts behind a work of art. Popper’s approach also induces a technological determinism that aligns contemporary digital media art with immateriality and a focus on conceptual properties of a work of art.

In order to demonstrate that Popper creates a digital determinism that prevents kineticism from being discussed according to its material and immaterial qualities, I considered artworks by McCall and Kapoor. My focus on McCall’s *Line Describing a Cone*, and *Shooting into the Corner* by Kapoor emphasises movement as an emergent process that is
formed in an incipient state of preacceleration. This approach to movement opens for the potentiality to discuss the emergent materiality of movement in art. My approach to McCall and Kapoor’s kinesis destabilises Popper’s binary distinction, and opens for discussion of the material and immaterial effects of movement.

Additionally a critical consideration of McCall and Kapoor positions their kineticism as a means to perpetuate modern conceptions of temporality, in part because they self-reflexively engage with breaking from traditional modes of representation in order to gain the attention of their audiences in the present. In this sense, McCall and Kapoor resensationalise temporality as something that is a constant transformation and is unified and eternal. This approach to McCall and Kapoor’s work is important for considering the emergent, material, and durational capacities of kinesis in art, and destabilises Popper’s use of demateriality, while bringing a consciousness of time and its material and immaterial effects to the forefront of kineticism.

Exhibitions such as Revolutions – Forms that Turn position early European avant-garde artists as central figures in contemporary art history. Artists of this period, such as Moholy-Nagy and Gabo, have also featured prominently in contemporary art historical exhibitions and are treated as early pioneers of the modern avant-garde kineticism. In cases such as Revolutions – Forms that Turn a return to the historical avant-garde was not only presented as an historical venture but, also a means to discuss and understand some key influences of contemporaneity in current society. These artists are therefore perpetuated by contemporary art history as influential figures that experimented and discussed the subjective perception of movement from which the ideas of temporality, particularly being with time, in contemporary society stem.

In light of this, Chapter 5 of this thesis focused on three influential figures of this period who pioneered early experiments of sculptural kineticism: Light Space Modulator by Moholy-Nagy and Kinetic Construction: Standing Wave by Gabo, as well as the writings of movement and duration by Bergson. Like Bergson, Moholy-Nagy and Gabo are primarily interested in the subjective perception of time. While Bergson argued that mechanical representation distorts the experience and integrity of duration, I have argued that through their works Moholy-Nagy and Gabo orchestrate a multitude of movement.

979 This is inclusive of Force Fields: Phases in Kinetic Art, Moving Parts: Form of the Kinetic; Ghosts in the Machine, and Geometry of Motion: 1920s/1970s.
rhythms from mechanical media to explore new perceptions and spectacles of duration. In this regard, there are intersecting approaches to the perception of movement and time between each artist and Bergson’s philosophies, and also key differences in expressing and conceptualising duration through visual media.

These two artists are important for understanding how contemporary art history frames kineticism to contribute to a consciousness of time specific to contemporaneity today. Furthermore, the modes of peculiar time that I build through my emphasis of Bergson’s duration in relation to these artists is a conflicted sense of duration: one where new perceptions and sensations of time are orchestrated by repetition, representation, and movement of mechanical media. Bergson’s concept of duration is useful for considering time as a constant transformation that preserves the past within it. For Moholy-Nagy and Gabo, movement in art is used to bring attention to temporality in a spectacle of modern mechanical sensations, and articulates folds of time within the present through Gabo’s virtual volumes and Moholy-Nagy’s modulation and refraction of light.

Finally, Eliasson’s artwork *Your Negotiable Panorama* was addressed in Chapter 6 to highlight a disparity in Popper’s interpretation of the term ‘virtual’. Popper considers virtuality to describe an instantaneous, ephemeral, and immaterial exchange of simulation of reality. Like Moholy-Nagy and Gabo before him, Eliasson is concerned with the material and immaterial effects of movement, and is concerned with the virtual as something that is real, rather than a simulation of the real. Eliasson also orchestrates a consciousness of time that encourages the viewer to bring attention to their perception of movement in time. Eliasson draws from a Bergsonian understanding of the present as a site of differentiation from the virtual to the actual, while also preserving the past within it. Unlike Popper, the virtual for Eliasson becomes actualised and produces materiality. I also elaborated on the crystalline as a way to describe moments of perceiving time as a series of folds of present, past, and future temporalities when viewing the installation.

Throughout the thesis I approached the criticisms that posit kinetic art as an unrequited, obsolete, forgotten cabinet of curiosities as a wider reflection of the changing

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reactions to the relationship between time and art. Each chapter therefore focused on a polemic within the contemporary art history of kinetic sculpture: duration, systems aesthetics, demateriality, and the virtual. Each polemic was considered as a key contributing factor for considering avant-garde kinetic art as an antiquated, mechanical, material, formal, and a precursor to digital, conceptual, and participatory practices in art. That is, each of these polemics have contributed to Pierre’s argument that there is a clear absence of critical historical discussion around the impact of kinetic art in contemporary society. Identifying these polemics aided in identifying the roles and effects of kinetic art history that contribute to contemporary perspectives of contemporaneity.

Throughout this thesis the approach to contemporary art history was largely influenced by Smith’s method for discussing contemporary art in What is Contemporary Art? and Contemporary Art: World Currents. In these texts Smith identifies three intersecting currents that have developed in art since the 1990s, one of which was constructive in this thesis for unpacking the reasons as to why there has been a focus on avant-garde kinetic artists in recent large-scale exhibitions, as well as a discussion around contemporaneity in contemporary art. The discernible and interweaving tendency of artists, institutions, and criticism in the present day is the inclination to resensationalise key tropes of modern art: ‘reflexivity and avant-garde experimentality’. Smith’s approach to defining and discussing contemporary art is useful for reconsidering the roles and functions of avant-garde and contemporary kinetic sculpture and installation. In taking this approach, the thesis expanded on a variety of ways in which artists, historians, and curators have orchestrated and drawn from kineticism to ‘resensationalise’ or ‘remodernise’ contemporary understandings of temporality and contemporaneity. Rather than considering kinetic sculpture as a modern antiquated mechanical medium due to the emerging post-modern aesthetics in the 1970s, I argue that kinetic sculpture is a contemporary and historical practice that can be used to reflect on the nature of contemporaneity in art and society today.

As part of that argument, I addressed a number of areas where artists and curators


984 Smith, What is Contemporary Art?, p. 256.
985 Burnham, Beyond Modern Sculpture, pp. 218-224.
facilitated a tendency of what Smith describes as ‘resensationalisation’ of modern tropes in art, which build a form of remodernism in contemporary art. While Smith elaborates on the renovations of art institutions such as the Tate in London and MoMA in New York, as well as the exhibitions of large-scale modern artworks at the DIA foundation, I applied identified patterns of remodernism in relation to kinetic sculpture. Specifically, the artists and exhibitions that I focused on pay attention to the perception and orchestration of temporality through actual movement. This builds a tendency to engage with kinetic works of art from a temporal, rather than a spatial perspective. Furthermore, the experience of being in real-time movement with the kinetic object has often been interpreted through Bergson’s modern conception of duration that is, the time we experience subjectively.

For instance, the renewed interest in avant-garde kinetic art creates a resensationalisation of the practice for contemporary audiences. While also, as I argued, contemporary artists such as Kapoor and Eliasson remodernise key driving tropes of avant-garde art such as duration, temporality, and orchestrating perceptions of time through actual motion. It is here that this thesis makes a contribution to the field of contemporary art history, and is valuable for discussing the effects of remodernism while focusing on practices that Smith has not yet analysed. In light of the recent surge of exhibitions that focus on the role of time in art as well as kineticism, this analysis will become more important to the fields of contemporary art history.

Throughout this thesis I present kinesis in art as an expression of temporality through the orchestration of actual movement of mechanical media. The conceptualisation of temporality that is often presented through kineticism is one that is universal, of continual becoming and differentiation between the future and present temporalities, and one that regards space as a coordinate of time. As Jameson identified, the rise of postmodern theory in the middle of the twentieth century worked to render temporality ‘as non-person’, a perspective which, facilitated a spatialisation of the hierarchical power structures of modernity. This outlook also aided an association of kinetic sculpture with modern

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988 This is particularly the case with artworks by Eliasson, Haacke, Agam, Tinguely, and exhibitions such as *Directions in Kinetic Sculpture*.

antiquity precisely because of the strong link between kineticism as a means to express and explore the changing conceptions of temporality. The appropriation of general systems theory, as well as the rising popularity of digital media in art, and an approach to art that dematerialises the object from the work of art, reaffirmed a consideration for kinetic sculpture as a formal, discrete, and crafted spectacle of the machine age that in many ways excluded the term ‘kinetic’ from postmodern interpretation.

Additionally, Popper’s consideration of digital art as a virtual, immaterial, conceptual art or the ‘more refined’ heir to early mechanical and technological art such as kinetic sculpture, has received limited critical engagement in the field of media art history. My focus on Popper’s use of concepts such as demateriality and virtuality to perpetuate and justify a post-kinetic framework for media art, attempts to consider new pathways for engaging with and reflecting on the role of actual movement in contemporary art experiences. While Popper has argued that a kineticism is an aspect of media art history that generally moves from the materiality of kinetic movement to immaterial, virtual simulations of movement, I have argued that there are alternative avenues for discussing the roles and effects of kineticism in contemporary art history. Considering the strong influence Popper has within the fields of media art history, technological art, and participatory art, the research in this thesis focuses on only a number of concepts addressed by Popper. Future reflections on Popper’s influence in contemporary media art history and producing new art historical lineages that intersect, contribute to, or run parallel to Popper’s framework, would therefore benefit from the method and findings within this thesis.

My approach to kinetic art history as a mechanism for understanding the facets of contemporaneity in art and society today is therefore also useful for the scholarship that discusses real-time art, time-based art, and movement studies within the wider scope of contemporary art history. An endemic problem with studying kinetic sculpture is that the field of scholarship and artistic practice is incredibly open, particularly with the present day popularity of installation among contemporary artists. The orchestration and study

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of movement in art is a prominent feature in digital, installation, participatory, interactive, and conceptual art, as well as dance, architecture, film, photography, expanded cinema, and theatre.

While this open applicability of the term ‘kinetic’ has been, at times, a problem when discerning the breadth of relevant literature and the structure of the thesis, this also means that the approaches, arguments, and works addressed in this thesis are relevant to a broad variety of intersecting fields of contemporary art and analysis. Throughout this thesis I attempted to provide an approach to kinetic sculpture as a contemporary preoccupation that reflects on Popper and Burnham’s influential approaches to kinetic art, and present further avenues for new discussing of kinesis in relation to contemporary art that intersect with, and at times, run parallel to, their criticisms. More specifically, this approach will be most useful for those interested in examining the role and function of time in art in contemporary society, as well as understanding modernity as, in the words of Habermas, a ‘system that is endless in nature’. 992

For scholarship that focuses on contemporary art and a Bergson-Deleuzian philosophy, there is further research that could focus on aspects of the role of affect in art, the relationship between the virtual and the actual in time, perception, duration, and Deleuze’s movement-image, time-image, and the crystalline. In this thesis I applied and discussed these philosophical terms through an interpretation of the use of actual movement in art and, because of this, my argument cleaves a passage for Bergson and Deleuze to be used to interpret kinetic art in new ways. Such an approach points to further aspects that could be explored through the practical implications of the philosophical concepts of duration, the virtual, and the crystalline regime of images as a means for drawing out the affects of artistic practices such as kinetic art.

As Smith has articulated, ‘[c]ontemporaneity itself has many histories, and histories within the histories of art’. While I have argued throughout this thesis that the effects of kineticism in art and contemporary art history contributes to a consciousness of contemporaneity today, this approach to contemporaneity is one of many ways to understand the peculiar time that is unique to society today. My approach to avant-garde kinetic art as a resource for understanding the expressions and conceptualisations of time today therefore has the potential to intersect with new understandings of contemporaneity in the future.

As demonstrated by the artists, works, and exhibitions that focus on actual movement in art, the role of kinetic art in contemporary art history does not solely function as a mechanical precursor to contemporary art and electronic media. Instead, throughout this thesis I have encouraged a reconsideration of how contemporary and historical uses of movement and time in art can be considered to intersect with, and run parallel to, the genealogy of digital media in art. Therefore, this thesis also invites approaches to art that seek to destabilise binary distinctions between digital and analogue media, as well as examine the material and immaterial effects of movement in art as part of a consideration of the nature of contemporaneity in contemporary art and society.

993 Smith, What is Contemporary Art?, p. 6.


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