



Deep Time/s

A media archaeological survey of Steina and Woody Vasulkas' expansion of aesthetic notions of the electronic image, 1969-1978.

Erin Honeycutt

**Lokaverkefni til MA-gráðu
Háskóli Íslands
Hugvísindasvið**



HÁSKÓLI ÍSLANDS

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I borrow my title ‘Deep Time/s’ from Siegfried Zielinski’s *Deep Time of the Media* (2006). Zielinski’s concept of “deep time” offers a history of technology framed by qualitative milestones mirrored by the analogy that the evolution of the earth was a nonlinear, dynamic process of build-up, break-down, and shift. Zielinski’s “anarchaeology” is a significant thread to the story of the Vasulkas’ technical explorations as the term implies an open-ended methodology which does not follow a standardized practice of analysis in favor of success or failure, but rather encourages the trailing tangents which lead to unexpected potential finds. ‘Deep Time/s’ also alludes to the type of epochal, holistic thinking that considers the material duration and cultural impact of our media and touches on the aesthetic effect of post-human relationship to the surrounding environment.

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Abstract

The creative process of video art pioneers Steina and Woody Vasulka are a case study in media archaeology, a recent field that blends new film studies and media theory. Media archaeological thinking is threaded by many branches of media and cultural theory including Foucault's archaeology of knowledge and Benjamin's dialectical image. This thesis examines the time period from 1969-1978 in which the Vasulkas were mainly working out of Buffalo, New York. During this time, the Vasulkas worked in collaboration with engineers to develop video processing tools such as the Multi-Level Keyer and the Rutt/Etra Scan Processor which allowed them to investigate the medium of video structurally. In treating the electronic image as architectural space made up of time and energy, the Vasulkas were able to expand aesthetic notions of the electronic image.

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1 Introduction

The video art pioneers, Steina and Woody Vasulka, helped to establish video art as a viable medium through their experimentations with electronic tools and tool processes beginning in the late 1960's. They contributed by building a vocabulary for electronic imagery through analog and digital processes. In exploring the audiovisual layers of video, Steina and Woody Vasulka have expanded aesthetic notions of the electronic image by treating these layers as architectural structures. The Vasulkas' structural visualization of the electronic image can be correlated to Walter Benjamin's dialectical image. His notion of the dialectical image, of something pointing at both the past and the future but situated in the now, is closely linked to an historical materialism in the arts and an investigation into the origins of the time-based image and its perceptual effects. Benjamin's description of aura is as a strange texture of space and time, or the unique appearance of distance.¹ According to him, the development of film and photographs has led to the aura's disappearance and in its place we find the dialectical image. Benjamin tries to show that the decline of the aura is not just some aesthetic question, but that it is connected to the traditional philosophical problem of defining truth and the relation between cultural memory and the rational present.

In Benjamin's claims of the existence of a dialectical image, it is never clearly stated in which realm this image belongs. It is seemingly at once belonging to material reality and virtual reality, as well as existing as a picture and a perception.² It is also unclear how to distinguish the hypothetical dialectical image from a metaphor. In Benjamin's magnum opus *Arcades Project*, or *Passagen-werk*, he presents "an image in which a construction site seems to merge with a ruin."³ This image offers an explanation of the dialectical in regards to the archaeology of the recent past.⁴

High-tech decay, digital artifacts, media archeology; this mediation of past and future which usurps linear time is crucial to an understanding of the temporal condition of media which the Vasulkas explored in depth. There is a dialectical image at the center of

¹ Walter Benjamin, "Work of Art," 255.

² Anthony Auerbach, "Imagine No Metaphors: The Dialectical Image of Walter Benjamin."

³ Ibid.

⁴ Ibid.

exploration, as well as an exploration of the architecture of that dialectical image, down to the grain of crystal that sets the inner metronome of the camera rolling, the temporal process is explored into a multidimensional space. The Vasulkas' work also speaks of a metaphysical understanding of the future of art and human-machine interaction and clues as to where the overlapping of art, technology, and media are leading. These considerations speak of the deep past/s and the deep future/s of our media use as they are for example elaborated in the writings of Vilem Flusser. In Flusser's text from 1985, *Into the Universe of Technical Images*, he details the modes of communication that have developed throughout history, beginning with the invention of writing, to the invention of photography, and finally to the (then) current state of the technical image. Through tools and apparatus' the image is created. The Vasulkas explored the possibilities of image-making with tools and programming, contributing to the evolution of the technical image from analog into digital.

Flusser discusses how apparatuses were invented to aid man's search for eternal life, as man's answer to death has been to "inform" his surroundings, and in this way "technical images are reservoirs of information that serve our immortality."⁵ The uncanny ability of the 'key', or interface, in technology comes from the ability of the 'key' to reach over into the gigantic, by their being infinitely small in size. They are instruments capable of reaching into the mass of particles for us operating in a time unrelated to everyday human-time and exist in an infinitesimal particle universe.⁶ They bridge the atomic, human, and astronomical, exercising the monumentality of scale as they sort out for the apparatus the enormous field of possibilities made up of particles.⁷ What is invisible to the naked human eye is for the apparatus another set of possible functions.

Considering the extent to which a 'memento mori' can be read in the technical image, it would be best implied by the fact that the technical image, through its pixilated medium of being both infinitely small and infinitely large simultaneously, occurs in a "field of possibilities... from which something accidentally emerges."⁸ Flusser uses "possibility" in

⁵ Vilem Flusser, *Into the Universe of Technical Images*, 18.

⁶ Ibid.

⁷ Ibid.

⁸ Ibid, 16.

this sense to mean “the stuff of the universe and the consciousness that is emerging.”⁹ In the production of a technical image, we use a ‘key’ to make this connection between the micro and macro. Perhaps the same thing that inspired the ‘vanitas’ still life paintings, a ‘memento mori’, is what also inspired us to create apparatuses that serve our immortality; a continuous thread in the human urge to create because all creativity has its roots in suffering. Another consideration is that the ‘memento mori’ of media art is inherent in it being time-based. In being engaged with the span of the artwork, we are experiencing time passing, time that has passed, and time that is passing in the present moment, as well as time that will be played an infinite amount of times again. The ‘memento mori’ of media art is its time-based nature. The ‘memento mori’ analogy is apt in the Vasulkas’ work as well for their use of imagery such as fruit and bread, objects they chose for its symbolism in paintings.

Flusser describes how his whole treatise on the emerging universe of technical images is, in fact, about the effort to become immortal through images. He describes how memory is the opposite of death, and therefore the underlying theme throughout his book. Relating this back to the placement of the body in the technical image universe, the only place in which suffering, both physiological and existential, can exist, is in the human body; technology cannot do it for us.¹⁰

Woody Vasulka saw electronics as a source of poetic language; a consciousness perhaps similar to the way Flusser imagined the ‘key’. Both were born in former Czechoslovakia in between the two world wars (Flusser was born in Prague in 1920; Vasulka was born in Brno in 1937) at a time in which the influx of machine technology coincided with war and suffering. Woody recalls that some of his first memories were of excavating materials left over from World War II in the field behind his childhood home in Brno. In Paul Virilio’s *War and Cinema*, he describes how technology we use every day was created in times of war: “Just as weapons and armory developed in unison throughout history, so visibility and invisibility now began to evolve together, eventually producing invisible weapons that make things visible - radar, sonar, and the high-definition camera of spy satellites.”¹¹ This theme is explored further in Woody Vasulka’s film *The Art of Memory* (1987) in which images from

⁹ Ibid.

¹⁰ Ibid, 145.

¹¹ Paul Virilio, “A Traveling Shot over Eighty Years,” 71.

warfare are displayed amongst landscapes of the American Southwest, as well as the installation *The Brotherhood* (1990-1998) in which he explores masculinity and mythologies of war.

Deleuze and Guattari's exploration of the open-ended topology of the nomad in *Nomadology: The War Machine* is associated with technical innovation. The construction and movement of space for the nomad is not sedentary, and therefore illustrative of how space exists in an electronic environment, unconfined by location or physicality. Many of these nomadic tendencies can be seen in the approach of the Vasulkas as they proceed with their technological innovations without heed to consumer markets, consistently exploring new possibilities. Deleuze and Guattari's 'nomadology' is a very apt description of the research methods of the Vasulkas: "a mode of knowledge and production that emphasizes new connections that are not reproductions of what exists- but produce new modes of existing, thinking and creating."¹²

The cultural historian, Jussi Parikka, has helped to define media archaeology as a research methodology and genre itself. His research will be crucial in laying the groundwork for discussing the Vasulkas' career through media archaeological discussions. Recent publications such as *Media Archaeology: Approaches, Applications, and Implications* (2011) and *What is Media Archaeology?* (2012) offer a framework of the use of the term since about 1980 and also offer ways to differentiate between the various threads of media archaeological theorists and their versions of the term. Parikka explains the origins of media archaeology in Foucault's archaeologies of knowledge, Benjamin's alternatives to historicism, and in the materialist media theories of Ernst and Kittler.

Siegfried Zielinski's *Deep Time of the Media* (2006) discusses the author's version of an archaeology of media which is actually closer to concepts within geology and paleontology. Zielinski's concept of "deep time" is a critique of technical progress and offers a history of technology framed by qualitative milestones and is mirrored by the analogy that the evolution of the earth was a nonlinear, dynamic process of build-up, break-down, and shift. Zielinski's preferred term "anarchaeology" will be perhaps the most significant thread to the story of the Vasulkas' technical explorations as the term implies an open-ended

¹² Jussi Parikka, *What is Media Archaeology?*, 161.

methodology which does not follow a standardized practice of analysis in favor of success or failure, but rather encourages the trailing tangents which lead to unexpected potential finds.

1.1 Outline

During the 1970's Steina and Woody Vasulka explored the potential of video through the use and creation of video processing tools. As the focus here is on this period of their career, it is difficult to separate them as individual artists as their work was very intertwined until about 1980. The research aim is to investigate how their exploration with video processing tools of the architectural dimensions of the electronic image expanded aesthetic notions of the electronic image. Using the framework of research outlined by media archaeology, a method which, according to Wolfgang Ernst, "... pays attention to the subconscious qualities of technical media..." and to the "non-discursive infrastructure" of media, the layers of meaning in the use and invention of video processing tools and other media apparatus' used and co-created by the Vasulkas will be investigated.¹³ The prolific period of the 1970's will be taken into consideration as it is exemplary of the kind of media archaeological investigation called forth by the Vasulkas' metaphorical and literal action of 'breaking into the screen' and discovering the reflexivity of the video medium as well as its malleable composition of electronic signal.

In the early 1970's, Woody's video experiments developed from an interest in the raw function of machine processes into programming.¹⁴ Electronic signal became his new building material, which he also found in the digital image. In digital image processing, the "smallest programmable unit" is used as a point of departure for building a new language of imagery. This collide of approaches towards video and computer was happening at the same time that analog and digital were defining the specific natures of different mediums. The Vasulkas were important in their role at this juncture in recognizing the specific nature of this new medium and how it needed to be acknowledged in its own right. In articulating the nature of video, they used tools such as processors, mixers, and computers to manipulate and generate the

¹³ Wolfgang Ernst, "Media Archaeography; Method and Machine versus History and Narrative of Media," 242.

¹⁴ Yvonne Spielmann, "The Aesthetics of Steina and Woody Vasulka."

electronic signal.¹⁵ This manipulation via programming through a machine created a new meaning of the 'image.' The 'image' became a multidimensional space. The electronic image, by its nature of being composed of a complexity of layers, produces a spatial order through the layering of images, which "foregrounds the matrix of digital space."¹⁶ In the Ars Electronica exhibition in Linz, Austria in 1992, the Vasulkas curated the show titled *Eigenwelt der apparatwelt* or *The Apparatus World- A World unto Itself* in which they presented all of the apparatuses they had invented over the years in collaboration with electronic engineers and scientists. The exhibition showcased the technical aspects of the devices and presented how these were components for aesthetic exploration of the properties of the image.

As will be outlined through media archaeological investigations, it is time itself upon which all media is based and through which it is the strongest manipulator of reality. With the electronic image becoming apparent as a multidimensional workspace, it is therefore in balance to discuss the aesthetics of space in a mediated framework. Just as space projected into time turns temporality into terrain, time projected into space transforms space into narrative, or journey-form. This aspect can be seen in pieces such as *Time/Energy Structure of the Electronic Image* from 1974-75 which was created by the Rutt/Etra Scan Processor and emphasizes the frame structure of the electronic image and its structural element, the waveform. The Rutt/Etra Scan Processor's ability to examine the waveform to infinite inspection is related to German A. Duarte's notion of the 'fractal narrative' which suggests that the image is a representation of infinite process and the perpetual movement of order.

The multi-dimensionality of video aesthetics which the Vasulkas helped to expand have the ability to be present within multiple structures, such as the computer. Over the course of the Vasulkas career, they were able to show the electronic and the digital share certain characteristics which are encountered in exploring the medium from the inside, as a "matrix phenomenon."¹⁷ This matrix, or network, is a medium for new artistic forms such as net.art, computer art, and forms of post-digital art, as well as a medium that connects humanity within multiple spheres of communication and connection.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

1.2 The Vasulkas

When the Vasulkas arrived in New York City in 1965 from Prague, they were met with a burgeoning cultural revolution of which electronic technology was at the forefront. As pioneers of video art who helped to shape the medium, the Vasulkas were also crucial in their role as cultural archivists whose life work bridged the transitions made by electronic devices and their impact in the cultural sphere. Steina, from Iceland, was studying violin and composition at the Prague Conservatory when she met Woody, from Czechoslovakia, who was studying documentary filmmaking although he had previously studied machine engineering. Woody, however, was writing a lot of poetry and fiction at this time and wanted to develop this narrative affinity within film. Their respective backgrounds helped to shape the breadth of their exploration of video in theory and practice, and also in inception and trajectory.¹⁸

In New York City, Steina pursued freelance music gigs while Woody worked in the editing department for Harvey Lloyd Films whose film equipment the Vasulkas would use for their first experiments. There were many avant-garde activities going on around them at the time in which they would only later begin to participate. Many of these early cinematic experiments were sometimes termed ‘intermedia’ as they included light shows as well as multiple-film projections that played with a plethora of sensory spheres. They were influenced by Marshall McLuhan’s theories of media popularized at the time and whom the Vasulkas definitely did not miss. McLuhan’s theory is based on the premise that all media are extensions of the human nervous system, including television and radio, which therefore act as man’s cybernetic extensions.¹⁹

In 1967, Woody participated in the development of a multi-screen exhibition for Expo ‘67 in Montreal. This invitation to experiment with multi-screen exhibitions made him realize the flexibility of video that film, with its convention of narrative, and the film industry did not allow. In the years following, he would work primarily with video, sharing it with Steina as well. What also fascinated Woody about video was its presence; in a later interview he recalls: “When I first saw video feedback, I knew I had seen the cave fire. It had nothing to do

¹⁸ Lucinda Furlong, “A History of Image-Processed Video; Steina and Woody Vasulka,” 12.

¹⁹ Ibid.

with anything, just a perpetuation of some kind of energy.”²⁰ Although the Vasulkas’ early video experiments were not unique as they were making feedback loops with audio to rearrange the video signal which others had previously done, there was still an atmosphere of being pioneers in the landscape of video. This was perpetuated by the informal nature of its exchange as information spread by word of mouth at lofts and clubs, or via small ads in the Village Voice or the East Village Other.²¹ They found themselves in the midst of the exploration of video’s potential for creative expression as well as socio-political tool. In an article in *Afterimage* in 1983, it is recounted that the Vasulkas found themselves in the early stages of video “situated somewhere between the established artists who were doing conceptual pieces in mainstream galleries and politically active community access groups.”²²

In 1971 the Vasulkas had their first public showing of video work at Max’s Kansas City, a music venue and restaurant in New York City. Among the audience members was a friend of theirs, Andy Mannik, who would later find the building space that would eventually become The Kitchen, as it was in the old kitchen of the Broadway Central Hotel on Mercer Street.²³ After two months of renovation, The Kitchen (**Image 1.2**) opened on June 15 and became a multi-media arts center which exhibited mostly video and electronic media performance and music as well as holding a space for new media artists to experiment with sound and images. It would be a place where artists such as Vito Acconci, Joan Jonas and Bill Viola would exhibit their first works. The context of the exhibition space allowed them to develop a spatial language within their work and allow them to explore video in a variety of contexts. Their goal was to hold an open and informal experimental space for situations to occur that didn’t involve formal curating on the Vasulkas’ part. Electronic musician Rhys Chatham became the music director and would invite musicians such as LaMonte Young, Tony Conrad, and Alvin Lucier. Their first piece from this era called *Participation* (1969-1971) is a documentary style, wide footage exploration of their surroundings in New York.

The Vasulkas moved to Buffalo, New York in 1973 to teach a video workshop at the newly opened Center for Media Study, the first of its kind in the United States, established by

²⁰ Ibid, 13.

²¹ Ibid.

²² Ibid, 14.

²³ Ibid.

Gerald O'Grady. O'Grady was teaching literature and communication studies and directing community organizations devoted to participation in communication processes at all levels when he organized a 20-week workshop on film and video offered for free to the community. He says the idea behind the workshop was about the continuation of literature into media:

“Literacy’s been with us now since the nineteenth century and is pretty much accepted to be a universal thrust... we should move towards what I call ‘mediacy.’ It’s a political issue: one cannot participate in society unless one can use the channels or codes of communication that are current in the time that one lives.”²⁴

The workshop’s aim was to get people to participate in all manifestations of media in the hopes that participants would continue spreading the knowledge and start media study units of their own in the principle of a distribution network. Steina and Woody would eventually take teaching positions at the State University of New York at Buffalo. It was in Buffalo that their practices diverged and Woody became more interested in digital image manipulation and the invention of new tools for video processing. The artistic and intellectual atmosphere in Buffalo at this time was ripe for dialogue about new directions in video, film, and music composition. At first there was hesitancy in accepting video artists into the media department as it was mostly composed of filmmakers, although there were certain affinities with digital creation amongst Hollis Frampton, for example, who would later on lead a digital workshop with Woody.²⁵ There was also Paul Sharits who, along with Woody, was interested in the material nature of media and what was hidden from the viewer during its operation such as the film’s perforation.²⁶ Woody and Paul Sharits would collaborate on a machine at this time that would allow Sharit’s “flicker film” projects an electronic analogy. Tony Conrad, another resident of Buffalo, would create the algorithmic program for this machine. The piece *Noisefields* (1974) by the Vasulkas can be considered a product of these experiments as the Video Sequencer is used to create a representation of the dual input of audio and visual noise.

Further research about this era can be found in *The Emergence of Video Processing Tools; Television Becoming Unglued* from 2014 which presents an examination of the contributions made by collaborations between the arts and sciences during the late 1960’s and

²⁴ Karen Mooney, “Gerald O’Grady: The Perspective from Buffalo.”

²⁵ Lenka Dolanova, “Dialogue with the Demons of the Tools. Buffalo 1973-1979.”

²⁶ Ibid.

1970's.²⁷ Particular sections such as “Woody Vasulka: Dialogue With the (Demons in the) Tool” by Lenka Dolanova with Woody Vasulka are an important reference in our context. In 1979, the Vasulkas moved to Santa Fe, New Mexico where they continue to live and work. In New Mexico, they investigated technological debris sites such as the Los Alamos Scientific Laboratory, becoming true archaeologists in their investigations and re-use of apparatuses.

At the Vasulka Symposium in 2014, *Thinking Media: Talking Digital* which coincided with the opening of the Vasulka Chamber at the National Gallery of Iceland, many people who have worked with the Vasulka archive over the years presented their thoughts and concerns. One was Jean Gagnon, director of the Daniel Langlois Foundation in Montreal, who described how when their archive was transferred in 1999 to Montreal they began to document and study the technologic instrumentation which was at stake in these early video experiments by the Vasulkas and others. Their works called for a new approach to archiving media art. Gagnon explains that “instead of looking at formal aspects, at content relating considerations or stylistic appearances, they were pushing at the forefront of their analysis, a study of instruments and their impact on aesthetic values.”²⁸

Another speaker at the conference was media theorist Don Foresta who professes the Vasulkas’ profound exploration of the medium and their playful investigation of its potential as a tool. He describes how, as a teacher of video throughout the 1970’s and 1980’s at art schools in France, he saw how digital technology changed significantly when people were given sealed cameras and non-transparent machines that were very difficult to break into to see what was going on with the technology inside.²⁹ This also is parallel to the planned obsolescence of electronics as a consumer is forced to contend with the hard encasement of their apparatus, keeping the user from exploring its meaning psychologically as well. Electronics are more readily discarded the more veiled their inner mechanism, a production tactic causing the user to buy new electronics instead of investigating the issue through repair. Foresta stressed the importance of the Vasulkas in getting people to question their technology instead of just accepting it at face value through their on-going commitment to bringing the tools and programming to the forefront of the artistry.

²⁷ Kathy High et al., *The Emergence of Video Processing Tools; Television Becoming Unglued*.

²⁸ Jean Gagnon, “Daniel Langlois Foundation, Montreal.”

²⁹ Don Foresta, “A New Renaissance.”

Most recently, a collection of the Vasulkas' work has been established in Reykjavik, Iceland. Under the direction of Icelandic video artist, Kristin Scheving, the Vasulka Chamber, which is situated within the National Gallery of Iceland, runs an archive of the works of the Vasulkas as well as an experimental workspace for visiting media artists and researchers. The Vasulkas' long and varied artistic careers require innovative research and preservation practices to embrace its scope and legacy. Therefore, the Vasulka Chamber has collaborations with international institutions such as the Nordic Digital Conversation which is a project with Videokunstarkivet in Norway and AV-Arkki in Finland, both long-standing research facilities in the fields of media and digital arts.

2 Media Archaeology

Media archaeology began in earnest in the early 1980's and has similarities to film and media studies, but focuses more on the apparatus itself. It was perhaps brought into discourse as a result of the presence of more and more 'old' media in contemporary art exhibitions. The Vasulkas' five decade long career could be seen as a case study for what media archaeology investigates. As creators of their own video production tools at the birth of video as an artistic medium in the late 1960's, they illustrate the extent to which apparatus' are more than technology but a symbol of cultural revolution.

Media theorist Siegfried Zielinski's form of media archaeology is focused on temporalities of media, or, variantologies- the various threads of media histories, both real and imagined, as outlined in his book from 2008, *Deep Time of the Media; Toward an Archaeology of Hearing and Seeing by Technical Means*. Throughout the book Zielinski explores the forgotten heroes of machine media who are often excluded in major historiographies of media beginning with the inventor of the first theoretically perfect interface, Empedocles in the 5th century BC. Although the Vasulkas are definitely not part of the 'forgotten' they and their generation still inhabit the fringes of the mainstream art world. Zielinski's concept of 'deep time,' adopted from geological terminology for the billions of years the earth has witnessed, offers another consideration for the timeline of media. According to Zielinski, 'deep time' in a media context suggests that media history should also be considered in terms of the span of its long-term existence and impact rather than the time-span of its use-value as technological industries would have it.³⁰

As a core theorist in the media archaeological field, yet albeit reluctant to be labeled as so, Zielinski represents one thread of possibilities of its investigation of the 'old' in the new. One commonality in media archaeological thinking is the cyclical and increasingly plural nature of time, which Zielinski encompasses in his notion of variantology, an international research project aimed at exploring the relationships between the many genealogies of different concepts of media. Alternative temporalities also undermine the hegemony of successive linearity and therefore success as well; what is new or next, is not always better or more user-friendly, nor are they inherently more complex and further in distance from a

³⁰ Jussi Parikka, What is Media Archaeology? 147.

‘simple’ past. This also takes some of the power away from the media economy which strives for capitalist advances rather than artistic research.

Michel Foucault’s text from 1969 *The Archaeology of Knowledge* is a great resource and inspiration for media archaeology. Foucault’s archaeology of knowledge is an archaeology of ‘conditions of existence,’ or in this case, conditions of media apparatus’ in the cultural sphere.³¹ Foucault offers a discourse into media through themes of government, institutional control, and power structures, and an interest in how these technologies are constructed. Likewise, media archaeology searches for the origins of histories not by looking backwards at linear histories but through analysis of marginal knowledge, through questioning progressivism, and by looking carefully at the material basis of communication.

Friedrich Kittler, another prolific inspiration for media archaeology, continues in a more specific vein with Foucault’s ‘conditions’ and relates them to media networks.³² Kittler wanted to provide the same ‘critique of origins’ as offered by Foucault in his genealogies, but for media technology. Both theoreticians use archaeology as the practice was intended, to explore the past in order to understand the present and future. In *Discourse Networks 1800/1900* from 1985, Kittler offers a way to look at technical media as systems of inscription that employ a new system of post-human sensation.

Walter Benjamin’s unfinished *Arcades Project* became a very important textual resource for the investigations of media archaeologists. According to Jussi Parikka and Erkki Huhtamo, two of the foremost scholars on shaping media archaeology’s influences, Benjamin’s *Arcades Project* built an environment of 19th century Paris out of various layers of that place in time while also considering the collective psychology of consumerism and public spectacle of early modernity.³³ Among a myriad of images, Benjamin describes the sensations of the emerging modernity with an allegorical way of seeing.

The early 21st century saw many recontextualizations of art within its traditional texts, an expansion which emerged in the German-speaking world with new ideas about the placement of images in their respective contexts which included images from film,

³¹ Ibid, 6.

³² Ibid.

³³ Jussi Parikka and Erkki Huhtamo, “The Archaeology of Media Archaeology,” 6.

photography, and consumer images as well. Aby Warburg was especially influential in this regard with his unfinished *Mnemosyne Atlas* which portrayed a nonlinear understanding of image motifs. *Mnemosyne Atlas* was also influential in that it raised “the issue of intermediality by pointing out motifs that shifted and transformed across what we would now call media platforms, pointing out how images and motifs in themselves could function as time machines in a fashion to the task of media archaeology.”³⁴

Media archaeology also takes into account the notion of effect on the body. The capacity of the phenomenological body to differentiate the senses leads to a questioning of the visual, something media scholars such as Jonathan Crary have explored. Crary’s ‘technics of the body’ are inscribed on the environment. Crary traces the historical evolution of a new machine vision and its effects of control. The term ‘docile body’ was first used by Foucault in his book published in 1975, *Discipline and Punish; The Birth of the Prison*, in which he considers, among many things, how the body came to be likened to an economic asset of military importance. Foucault’s ideas form part of the foundation of Jonathan Crary’s thoughts in his book from 2001, *Suspensions of Perception*, in which the author reviews the history of humanity’s attentiveness, and the way it has been dissected into quantitative classifications, while ignoring its qualitative nature in a current of overwhelming technological and political progression. Crary proposes that society has produced ‘docile bodies’ in the “enforced attentiveness implicit in the diffusion of the personal computer.”³⁵ He claims that the majority of all basic technological objects are similar in that they arrange the body in such a way that isolates and separates, which is just another method of governing attention even as the user is given the illusion of free will and interaction with the device.³⁶

A historical analysis of human beings and machine interfaces/systems of all kinds has been assessed in the work of Deleuze, who proposes that Foucault’s original model of ‘societies in control’ has been modified as there now exists a vast network combining “a global market, information technology, and the irresistible imperative of communication” which “produces continuous and unbounded effects of control.”³⁷ The extent to which the human

³⁴ Ibid, 7.

³⁵ Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern culture*, 37.

³⁶ Ibid, 74-75.

³⁷ Ibid, 75-76.

body has been subject to more and more disciplinary procedures in the onset of more and more technological consumption, correlates to the consumption of more and more technological images as well. This is further reason why a thorough look at the technology of our media apparatus' is important on a personal and cultural level. The work of the Vasulkas can be seen to be exemplary in this regard as they create their own apparatus' in collaboration with engineers.

However, according to Kittler, it is not upon the human body that an understanding of technical media is to be found, but in the materiality of technical media- the quantifiable forms in mathematics and physics that form the conditions of technical media.³⁸ Kittler argues that the technical contents of media, i.e. a pixel-composition, require a phenomenological visibility beyond human optics.³⁹ Kittler describes, for example, how computer graphics are composed of a coordinated space of two-dimensional pixel groups, each made up of a variety of primary color densities. The techniques of manipulation are very different when working with pixels as composed to chemical-based images such as film. Similar to a pre-cinematic use of paint on a canvas but without the painterly gestures, the culture of image manipulation now lies in photo-shop technologies and all of its intricacies and capacities. This is the reality of current codec culture in which images are algorithms made visible with the aid of historical techniques of manipulating light- the material of visual culture, which is also the material of radiosity.⁴⁰

Another media archaeologist who is especially involved with the 'techno-epistemological configurations' of media apparatuses is Wolfgang Ernst, who is the director of the Media Archaeology Fundus at Humboldt University in Berlin. Sometimes referred to as a partaker in 'reverse-engineering' and 'techno-fetishism,' Ernst is admittedly more interested in the means of the machine rather than its cultural semiotics. He explains that "media are not only objects but also subjects ("authors") of media archaeology."⁴¹ Ernst claims that the actions expressed in media archaeological analysis easily conform to the structure of linear

³⁸ Jussi Parikka, *What is Media Archaeology?*, 34.

³⁹ *Ibid*, 35.

⁴⁰ *Ibid*, 36.

⁴¹ Wolfgang Ernst, "Media Archaeography," 242.

narratives of media, something “not easy for human subjectivity to overcome.”⁴² This is where machines have the ability to lift humans out of such limiting structures into more transcendental temporalities. The media themselves belong to a different temporal structure that requires a different means of description than the content of its mass media.⁴³

Ernst’s concern with the time of media is also present in Woody Vasulka’s exploration of machine code. Woody describes his work with the Rutt/Etra Scan Processor as “the inevitable descent into the analysis of smaller and smaller time sequences.”⁴⁴ These time sequences are essentially new codes whose language is extracted from nature. Ernst similarly relates “microprocessual timing” and “macrotemporal processes” as not only being related by their ratio of scale, rather by the nature of repeated confrontation of temporal processes throughout history with new models of time.⁴⁵ The inner workings of media objects are still present in their sphere of influence even if their outer hardware is no longer visible. The artifact, as the object of fascination for archaeologists, is differentiated by the fact that the technical artifact only reveals its function when in operation. This display of function reaches micro-layers of revelation in the multiple devices used by Woody Vasulka; the multiplicities of code inherent in each temporal layer of the device and eventually operate as an expression of their own machine logic originating from their own temporality. These layers represent temporalities embedded in the functions of the machine. The Vasulka’s use of tools is seemingly inspired by an interest in the various levels of organization within the machine which are normally thwarted under the guise of commercial productions.⁴⁶

Ernst differentiates between the terms *media archaeography* and *media archaeology*. This is important in the context of the Vasulkas as their works were often co-created by machines. In media archaeology the media are both subject and object, whereas in media archaeography the expressions of media are not written by humans but by the machines.

Technological media that operate on the symbolic level (i.e. computing) differ from traditional symbolic tools of cultural engineering (like writing in the alphabet)

⁴² Ibid, 240.

⁴³ Ibid.

⁴⁴ “Drift!,” The Vasulkas Inc.

⁴⁵ Wolfgang Ernst, “Media Archaeography,” 241.

⁴⁶ Maureen Turim and Scott Nygren, “Reading the Tools, Writing the Image,” 26.

by their registering and processing not just semiotic signs but physically real signals. The focus shifts to digital signal processing as cultural technology instead of cultural semiotics.⁴⁷

The proximity of writing by machines vs. humans lies in the distance between narrating and numbers. Accordingly, “mathematics could actually be connected to the way we understand narratives and, more widely, aesthetics.”⁴⁸ Ernst claims that media archaeology is different from cultural history in that media archaeology is more about the physical processes in which stories are recorded; “the archaeology of the apparatus that conveys the past as fact not just as a story.”⁴⁹ Similarly, Woody Vasulka’s work has reoriented itself towards a new linearity of spatializing time as well as cause and effect, a linearity which is reflective of the experience of the birth of hyper-culture.

The media archaeologist, according to Ernst, is a reverse engineer, insisting on an understanding of the epistemological context of technical media. Relating this to culture, he claims that “it is the calculation- and number logic- based ontology of technical (and especially computational) media through which cultural memory is articulated.”⁵⁰ The media of culture are essentially media which began as experiments of measuring events. Cybernetics uses epistemology in a time-based way which is representative of the media technologies themselves which are not based on static moments but processes. The archaeology of media is therefore the uncovering of the ontology of a temporal event, at both the micro and the macro level. At the macro-historical level, the idea is that the reading of media is not chronologically read from photography towards internet, but from a genealogy borrowed from Foucault which looks at these events as relationships in a communicative network of actions.

In considering the archive, Ernst speaks of its role in/after postmodernism as a “topology of documents” awaiting a reconfiguration based on an aesthetics without hierarchy “as part of a very real, very material network of power over memory.”⁵¹ In suggesting an

⁴⁷ Wolfgang Ernst, “Media Archaeography,” 242.

⁴⁸ Jussi Parikka, “Archival Media Theory: An Introduction to Wolfgang Ernst’s Media Archaeology,” 4.

⁴⁹ Ibid, 7.

⁵⁰ Ibid, 9.

⁵¹ Geert Lovink, “Archive Rumbblings; An Interview with Wolfgang Ernst,” 195.

aesthetic return to the apparatus world of objects from the 1970's and 1980's, there is an inherent archival process to perceiving an apparatus. The engineering of these apparatuses by the Vasulkas and collaborators during this period was a media archaeological investigation as it is now as well. The media archaeological practice of today “describes the non-discursive practices specified in the elements of the techno-cultural archive.”⁵² Ernst and the ‘German’ media studies approach to media is by their informatic structure as well as their physical hardware, a fitting context with which to investigate these apparatuses along with the expanded aesthetic notions of electronic art to which they contributed and helped shape.

The Vasulkas’ five decade long career sees many media archaeological investigations. As they created their own video production tools in the late 1960's, helping to define video as a medium in its own right, they illustrate the extent to which apparatus’ are more than technology but a symbol of cultural revolution. Theorists such as Foucault and Kittler provide important foundations for media archaeological thinking. Kittler wanted to provide the same ‘critique of origins’ as offered by Foucault in his genealogies, but for media technology. Walter Benjamin’s unfinished *Arcades Project* became a very important textual resource for the investigations of media archaeologists as it considered the collective psychology of consumerism and public spectacle of early modernity.⁵³ Media archaeology also takes into account the notion of effect on the body. However, according to Kittler, it is not upon the human body that an understanding of technical media is to be found, but in the materiality of technical media- the quantifiable forms in mathematics and physics that form the conditions of technical media.⁵⁴ Like Kittler, Ernst is also admittedly more interested in the means of the machine rather than its cultural semiotics. This investigation into the technology of the electronic image will be a starting point into how the Vasulkas explored the architectural space of the medium, working against a linear model of elements in favor of a network of coordinates, essentially breaking the frame of temporality as well as perspective.

⁵² Ibid, 196.

⁵³ Jussi Parikka and Erkki Huhtamo, “The Archaeology of Media Archaeology,” 6.

⁵⁴ Jussi Parikka, *What is Media Archaeology?*, 34.

3 Breaking the Frame; Building a Code

Longtime friend and researcher of the Vasulkas, Gene Youngblood, wrote in his 1970 work *Expanded Cinema* that what he actually means by ‘expanded cinema’ is ‘expanded consciousness’ in the sense that it is a process of becoming more similar to life than to cinema.⁵⁵ It is the continuous historical impetus to visualize consciousness in front of ones eyes, a feat which becomes more complex with the mediated networks of the electronic image. The battery-operated Portapak camera by Sony emerged in 1965 (**Image 3.1**) and magnetic tapes that could be rewound or fast-forward and videocassette recorders (VCRs) in 1969.⁵⁶ By 1971, portable video technology with videotapes became available. Along with the Vasulkas, other early pioneers who explored the medium’s various arrangements were Nam June Paik, Dan Sandin, and Gary Hill.⁵⁷ The exploration of video was part of a shift taking place during this time in the wider artistic sphere, a shift away from the idea of a pure medium. This was perpetuated by the Fluxus artist, Dick Higgins, as well as the influence of conceptual artists such as Sol Lewitt whose aesthetic output was increasingly without object.⁵⁸ The artistic shift was mostly headed towards time-based media as the newest realm of aesthetic territory which had inherent ties to technology creating greater discourse around the process of constructing electronic images.⁵⁹

Youngblood wrote that the messages expressed by television and media bypass the actual needs of society and contribute to “blind enculturation, confusion, and disharmony.”⁶⁰ The reception of video art by the viewer was likely confounded by their experiences of television, an experience which was described by the artist Dan Graham as a simultaneously heightened physical immediacy and psychological intimacy:

TV gains much of its effect from the fact that it appears to depict a world which is immediately and fully present. The viewer assumes that the TV image is both

⁵⁵ Gene Youngblood, *Expanded Cinema*, 41.

⁵⁶ Yvonne Spielmann, “Video, an audiovisual medium,” 2.

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ Chris Hill, Attention! Production! Audience! Performing Video in its First Decade, 16.

⁶⁰ Gene Youngblood, *Expanded Cinema*, 42.

immediate and contiguous as to time with the shared social time and parallel 'real world' of its perceivers- even when that may not be the case.⁶¹

What video artists did was question the structure of television's dimensions and the particulars of its representational address to the viewer. Society was already 'televisual' at this point, and so video artists had to address their viewers in the same manner to establish a critical engagement about this new cultural form. Youngblood expresses why aesthetic freedom is so important for the evolution of a medium for culture and society:

The prevailing messages of the so-called popular media have lost their relevance because a socioeconomic system that substitutes the profit motive for use value separates man from himself and art from life. When we're enslaved to any system, the creative impulse is dulled and the tendency to imitate increases. Thus arises the phenomenon of commercial entertainment distinct from art, a system of temporality gratifying, without really fulfilling, the experiential needs of an aesthetically impoverished culture.⁶²

The Vasulkas were certainly aware of Youngblood's ideas as they began their video experiments, subverting the television medium for their own artistic purposes. The composer and artist, Arnold Dreyblatt, found that the emergence of video as an artistic medium should not only be interpreted in the context of visual aesthetics but also in the developing understanding of time, energy, and information systems which have their own philosophical implications.⁶³ The post-war military complex produced an increasing volume of technological systems that allowed exceedingly large amounts of information to be held in increasingly smaller physical conditions. This trend also included temporal processes that were foreign to human processes, for example the effect of energy being modulated based on a temporal structure may or may not always result in linear situations.

Two exhibitions in 1965 are considered the pioneering exhibitions of computer arts, one at the Howard Wise Gallery in New York City titled *Computer-Generated Images* and another at Technische Hochschule in Stuttgart, Germany titled *Generative Computergrafik*.⁶⁴

⁶¹ Chris Hill, *Attention! Production! Audience!*, 21.

⁶² Gene Youngblood, *Expanded Cinema*, 42.

⁶³ Arnold Dreyblatt, "Video and the Electronic Arts."

⁶⁴ "History," Digital Art Museum, <http://digitalartmuseum.org/history/>

In 'Deep Time of the Media,' Zielinski makes note of two other exhibitions which took place at the end of the 1960's, each with the objective of making investigations into the relationship between science, technology, art and media.⁶⁵ One of the exhibitions was a retrospective at the New York Museum of Modern Art in 1968 titled *The Machine as Seen at the End of the Mechanical Age*. The show explored avant-garde movements that occurred during the industrial revolution as commentary on the ways artists have viewed technology with works such as Jean Tinguely's *Metamatic No. 8*, Duchamp's *The Bride*, and Moholy-Nagy's *Light-Space Modulator*.⁶⁶ The other exhibition was at the London Institute of Contemporary Arts in 1968, under the title *Cybernetic Serendipity*. Zielinski remarks that these two exhibitions were legendary for their times as they highlighted the pioneers of future technologies in the fields of electronic and computer arts. Three years later, an exhibition titled *Dialogue with the Machine* at the same gallery gave a space for artists and scientists from all over the world to collaborate on their approaches to computer-generated art.⁶⁷ Still these exhibition titles did not mention the word *art* as this was still considered visual research.

In 1969, an exhibition at the Howard Wise Gallery in New York City titled *TV as a Creative Medium* was witnessed by Steina and Woody Vasulka and inspired them to work further with video. The exhibition linked the kinetic art of the 1960s with the emerging art form of video and would include many of the Vasulkas' future collaborators including Nam June Paik and Charlotte Moorman. Howard Wise would later found Electronic Arts Intermix in 1971, one of the first nonprofit organizations in the United States dedicated to supporting video as an art form. *TV as a Creative Medium* was a twelve-artist show that cannot be underestimated for the aesthetic and cultural changes it brought about.

Nam June Paik exhibited two works at the exhibition that explored the paradoxes of the television experience in a piece called *Participation TV* in which a television monitor shows live footage of the gallery visitors in an unfixed matrix which makes the image appear spectral with multicolored spectrums. Another piece of the exhibition was by Frank Gillette and Ira Schneider who collaborated on *Wipe Cycle* in which nine television monitors face

⁶⁵ Siegfried Zielinski, "Conclusions: Including a Proposal for the Cartography of Media Anarchaeology," 11.

⁶⁶ Ibid.

⁶⁷ Ibid, 12.

visitors arriving to the gallery from an elevator.⁶⁸ The images on the monitors went through a rotating cycle of the exact scene in various delayed increments or manipulations of live broadcasts. Gillette had close connections to Marshall McLuhan, whose thinking was ever-present over the exhibition space and whom Howard Wise mentioned in the exhibition brochure as recognizing the impact of mass media. Less than two years after the exhibition, Howard Wise would decide that these artists would be his career focus. After closing his gallery, he focused on supporting the needs of individual artists who were often marginalized as they worked outside of the organizational structure of foundations and industries.⁶⁹ Without the support and vision of Howard Wise, who recognized early on that multi-media artists would never fit into the traditional gallery network, many of the experiments of the Vasulkas and others would not have been manifested. According to Ben Portis, “*TV as a Creative Medium* could be characterized as a fulcrum upon which the ready spirit of one age pried and levered a new era.”⁷⁰

In *Media Archaeography; Method and Machine versus History and Narrative of Media*, Wolfgang Ernst expresses the temporal regime of the media themselves and how they “became archaeologists of physical realities that are often inaccessible to human senses...”⁷¹ In looking at the Vasulka’s early processes through a media archaeological lens, certain elements can be revealed that highlight the aesthetic function of their work. The process that so expanded aesthetic notions of the electronic image was a symptom of their treatment. By not treating video as a container of content but rather an entity in itself, a new aesthetic language had to be developed, one that embraced the expanded notions of relating to time, energy, and space in a newly mediated intimacy.

The electronic signal which makes up the video image represents both time and energy while also being in control of them. In this way, according to Ernst, “media are not only objects but also subjects...”⁷² Light information is transformed into electronic information once it is detected by the ‘pickup tube’ and it is here that the signal becomes malleable since

⁶⁸ Ben Portis, “The Fulcrum: TV as a Creative Medium,” 3.

⁶⁹ Ibid.

⁷⁰ Ibid.

⁷¹ Wolfgang Ernst, *Media Archaeography*, 242.

⁷² Ibid, 242.

time/energy relations can be modified.⁷³ It is in this state that the signal, when introduced to “computerized modules and audio systems,” can allow experimentation. Never in a static state, the signal occurs periodically as it deflects the beam of an electron at “525 lines 15,750 times a second in two groups 60 times a second each.”⁷⁴ This signal, which is actually a waveform at this point, contains information pertaining to its image, color and timing. It is in these permutations of unpredictability that the medium of video feedback illuminates the video artist and engineer’s challenge or manipulation and approach.

Once the Vasulkas, along with Nam June Paik and Skip Sweeney, discovered the strong increase in electronic waveforms through video feedback, they began to manipulate the line configurations of the usually consistent vertical and horizontal movements of the video signal through image and sound signal, as well as the raster image.⁷⁵ The variability of electronic wave forms under different frequencies were tested through a combination of electromagnets, synthesizers, and image processors which resulted in more knowledge about how the image content is affected as well as the possible transformations through processes such as from audio to video and signal direction.⁷⁶

The malleable structure of video signal was clearly imprintable by both audio and visual access. Through experiments with an oscilloscope, the Vasulka’s attentiveness to video structure was formed, as the instrument made the electronic signal visual in the waveform. The electronic image is organized basically as one layer of latent signal code and another layer of organization through which the image content is visualized. The multiple possibilities of its formation on the monitor shows how broad the spectrum of relationship is between the signal’s code and its physical manifestation.⁷⁷ One could see the infinite possibilities of manifestation along the spectrum of coincidental combinations of signal code and physicality as akin to the organization of sensual phenomena in human perception.

Essentially, the Vasulkas made a consistent effort, along with others during these initial stages, to go beyond the prescribed framing of the video image. With obvious cultural

⁷³ Arnold Dreyblatt, “Video and the Electronic Arts.”

⁷⁴ Ibid.

⁷⁵ Yvonne Spielmann, “Video, an audiovisual medium,” 2.

⁷⁶ Ibid.

⁷⁷ Lenka Dolanova, “Woody Vasulka: Dialogue with the (Demons in the) Tool,” 278.

relevancy as a reclamation of the ubiquitous television, their desire to ‘break the frame’ was also about exploring beyond the human eye’s supremacy in perception, for example in Steina’s *Allvision* (1976) and *Machine Vision* (1978) which were shown in an exhibition at the Albright-Knox Gallery in Buffalo, New York in 1978 (**Image 3.2**). *Machine Vision* is composed of multiple video installations that revolve around *Allvision*, an installation composed of a spherical mirror, two cameras and two monitors to represent an intelligent vision that was not completely human. The installation signifies at once the act of seeing as well as the source of the image while taking place in a cyclical mechanized rotation. The interlocking systems at work here are *Allvision*, which sees all of the space, the ‘pan’ mirror which views the space horizontally, the ‘round-turn’ element which rotates the image forward into the space, and the ‘tilt’ mirror which views the space vertically.⁷⁸

Also in the exhibition were Woody’s *Descriptions* which comes from his interest in revealing the underlying visual language of code variations that create the image. Through collections of his own photographs of the cathode ray tube which he made to better his own understanding of his craft, *Descriptions* presents eight tableaus showing the broad visual language available and the possibilities of generating images without the ‘pinhole’ camera principle. Together, the Vasulkas create an alternative experience of organizing ones’ perception.

It is the same quality of the interface proposed in Vilem Flusser’s *Into the Universe of the Technical Image* that performs the action of organizing infinite amounts of information. Flusser offers media archaeological investigations in the sense that he advocates a post-historical viewpoint of the technical image. Flusser advocates for the type of investigations the Vasulkas take part in: “... to live and think on the level on which techno-images are made.”⁷⁹ We are still reading technical images as if they were traditional images, i.e. linear texts in a narrative, allowing them to keep dominate the viewer into the “apparatus-operator complex.”⁸⁰ It is in Flusser’s “conscious techno-imagination” that the Vasulka’s seem capable of adapting in their attentiveness to the architecture of video.

⁷⁸ Albright-Knox Gallery Exhibition Catalogue, 9.

⁷⁹ Vilem Flusser, *Variantology 4. On Deep Time Relations of Arts, Sciences and Technologies in the Arabic-Islamic World and Beyond*, 115.

⁸⁰ Ibid.

In Peter Rubin's documentary from 1987, *42 Miles from Big Brother* one can see the Vasulkas and other collectors scavenging within the gates of a collection of discarded military equipment in Los Alamos where the US government researched the development of the first atomic bomb. Steina finds a metal two-seated couch on wheels that she surmises would be perfect for attaching cameras. Woody discusses how he grew up doing similar activities in Brno, Czechoslovakia as Europe after World War II was strewn with discarded machines and technology. In *Dialogue with the (Demons in the) Tool*, Lenka Dolanova relates Woody's interest in machine scavenging with his interest in mushrooms; both are "related to a kind of natural survival instinct, collecting technology and its underlying codes is a process of collecting knowledge, necessary for survival in today's 'society of control' where codes dictate who gets access to information."⁸¹

In a dialogue from 1989 between Peter Weibel, the Vasulkas, and Gene Youngblood titled *Cinema and Code* the expansion of cinematic language is discussed as it is contingent on mediums. Aesthetic perception is considered as inherent to linguistic possibilities. As Woody created a new image vocabulary, the viewer was able to likewise read the image with new perceptual abilities. One cannot perceive visually what one does not have a language for: "Each new medium modifies and extends the linguistic possibilities of the moving image, subsumes the syntaxes of previous media negating them."⁸² Woody considers the moving image as a phenomenology that is expressed in the way the image is expressed on the screen, something that can be continued across all mediums.⁸³ In a similar vein as Flusser, Woody explains:

There are no digital images that have not been prefigured in painting, film, and video. With the code we can only summarize them, elaborate and unfold them, exercise modalities... There are not new classes of images, there are only new variations, and new epistemological and ontological conditions for generating and witnessing those variations.⁸⁴

Weibel, however, describes the medium as being made up of aesthetic strategies, for example, strategies invented by photography and cinema such as scaling, mattes, and perspectives are

⁸¹ Lenka Dolanova, "Dialogue with the (Demons) in the Tool," 276.

⁸² Gene Youngblood, "Cinema and the Code," 157.

⁸³ Ibid.

⁸⁴ Ibid.

now realized through an interface as a coded instrument. Through code, aesthetic strategies become the ground from which to build the new medium and these are the ones used more frequently, but not necessarily with more meaning. However, Woody points out that the language of the machines is already inherent in them and it is up to him to decipher it. “To what extent does the artist transform effect into expressions?” is the question which determines the potential for expansion in each new medium as well as being a parallel to human perception. The development of perception was assisted through instruments which have continued to assist in the evolution of human vision.⁸⁵ Weibel also notes that language and perception have co-evolved “...only to the extent that the syntactic possibilities of technological systems are made the subject of aesthetic inquiry.”⁸⁶ The modes of aesthetic perception are built on the same vocabulary as the technology used to create video art. Just as the electronic signal is coded information, our visual perception is a coded vocabulary of knowledge. Just as photography encoded the vocabulary of perception at that moment in history, so did video encapsulate the limits of our perceptual knowledge.

Video art expanded aesthetic notions of the electronic image due to several of its inherent capabilities and characteristics. As outlined in the *Mediascape* catalogue exhibition from 1996 featuring the Vasulkas, the first of these characteristics is that the video image is an image always in transition which forces the viewer to focus on the variability of forms, a break from the 19th century idealization of aesthetic contemplation.⁸⁷ The second of these characteristics is the dispersal of vision caused by multiple monitors screening a myriad of synchronous images which effects the viewer’s nervous system because of the scattered focus of attention.⁸⁸ The third characteristic is the sequential narrative of images, corresponding to film aesthetics as both are about the development of an image sequence over time rather than a static presence that can be surmised in a glance.⁸⁹ Video, however, is still more spontaneous and ‘painterly’ than film. The fourth characteristic is one that leads towards virtual reality,

⁸⁵ Ibid, 159.

⁸⁶ Ibid.

⁸⁷ Matthew Drutt, MEDIASCAPE Catalogue Exhibition, 1.

⁸⁸ Ibid.

⁸⁹ Ibid.

spatial simulation, which the electronic image allows through effects of depth illusion.⁹⁰ The fifth characteristic is the materiality of the electronic images, or rather, immateriality, as they exist in a constantly shifting pixellation of possible outcomes.⁹¹ The electronic image has no ‘aura’ according to Benjamin, since it is another example of mechanical reproduction that can be produced to infinity in any place. It is the nature of the electronic image to exist in copies, defying the concept of ‘unique’ and ‘original’ and therefore its value as an art object bypasses the standards previously held for artistic value. The sixth characteristic is the influence of the viewer, which beckons the image towards interactive exploration rather than only removed contemplation.⁹² Aesthetic perception is placed amongst a myriad of possibilities, allowing interactivity that “approaches reality but is never reality itself.”⁹³

The first piece by the Vasulkas that represents their attentiveness to structure in investigating electronic images was *Matrix I*, from 1970-1972 (**Image 3.3**). Steering the television monitor away from its traditional space as capital entertainment towards aesthetic explorations, *Matrix I* is a formal representation of these early experiments. In *Matrix I*, twenty monitors are aligned into a visual tableau of the Vasulkas’ early exploration into the connection between sound and video. Multi-monitor video displays were new at that time and represented a break in the single-channel video work. Consistently developing technology for aesthetic means, tools were developed in line with the works. Along with the help of engineer George Brown, the Vasulkas developed a *keyer*, a tool which regulates two visual signals coming together into layers. The electronic signals being generated in *Matrix I* are made by sound which creates abstract images that pulse horizontally across the video monitors in a wave-like impression. This wave-like horizontal movement was actually a breakthrough in image manipulation as before the passing of image between screens had only been possible through a vertical motion. Matthew Drutt relates the geometric character of imagery in *Matrix I* to the experimental films of the 1920s by artists such as Laszlo Moholy-Nagy, for example, whose abstract compositions are manipulated into a rhythmic fluctuation having a musical

⁹⁰ Ibid.

⁹¹ Ibid.

⁹² Ibid.

⁹³ Ibid.

harmony. However the Vasulkas cite that their more immediate influences were Salvador Dali and M.C. Escher in their investigation of visual perception.⁹⁴

As the Vasulkas and other early video artists questioned the structure of television's dimensions and the particulars of its representational address to the viewer. In looking at the Vasulka's early processes through a media archaeological lens, certain elements can be revealed that highlight the aesthetic function of their work. The process that so expanded aesthetic notions of the electronic image was a symptom of their treatment. By not treating video as a container of content but rather an entity in itself, a new aesthetic language had to be developed, one that embraced the expanded notions of relating to time, energy, and space in a newly mediated intimacy. Once the Vasulkas discovered the strong increase in electronic waveforms through video feedback, they began to manipulate the line configurations of the usually consistent vertical and horizontal movements of the video signal through image and sound signal, as well as the raster image.⁹⁵ Essentially, the Vasulkas made a consistent effort, along with others during these initial stages, to go beyond the prescribed framing of the video image. With obvious cultural relevancy as a reclamation of the ubiquitous television, their desire to 'break the frame' was also about exploring beyond the human eye's supremacy in perception. Just as photography encoded the vocabulary of perception at that moment in history, so did video encapsulate the limits of our perceptual knowledge. Video art expanded aesthetic notions of the electronic image due to several of its inherent capabilities and characteristics which the Vasulkas sought to explore and expand.

⁹⁴ Ibid, 51.

⁹⁵ Yvonne Spielmann, "Video, an audiovisual medium," 2.

4 “The Apparatus World- A World Unto Itself”

“There are no audio-visual aesthetics per se, but only the technology.”⁹⁶

This statement by Woody calls for a deeper investigation into the tool processes for a theoretical application. After initial focus on mainly horizontal drift and audiovisual relationships, the Vasulkas continued in the modernist tendency to breakdown established traditions by expanding their repertoire and joining various engineers to assist them in building specialized video tools. In a 1971 show at the Whitney Museum of Art, the Vasulkas said of their early tapes that “they resemble something you remember from dreams or pieces of organic nature, but they never were real objects, they have all been made artificially from various frequencies, from sounds, from inaudible pitches and their beats.”⁹⁷

Originally dismissed by critics for their similarity to abstract paintings, their work, being based on electromagnetic energy, could be correlated to modern art in its realization of new perspectives, but it is in the exploration of tools that the Vasulkas’ broke from previous trends. However, aesthetics have been influenced by machines throughout modern art. According to Peter Weibel: “Machine and machine-supported media art is not only a logical consequence of the visual arts, it is indeed the prerequisite of modern art.”⁹⁸ The resistance to machines in the modern art world is the threat of autonomy between man and machine. The classical artist as sole creator using a pure medium became irreconcilable with art made by machines as the autonomous world of images emerged, replacing the ontological aesthetic with a semiotic aesthetic.⁹⁹ According to Weibel, media art is a postmodern redefinition of the project modernity began as well as founding the very logic upon which modernity stands. In the 1992 exhibition at Ars Electronica, *Eigenwelt der Apparatewelt (The Apparatus World – A World unto Itself)*; *Pioneers of Electronic Art* an overview of the electronic arts are presented with the tools as the main protagonist. Directed by friend and collaborator of the Vasulkas’, Peter Weibel, and curated by the Vasulkas themselves, many of their former collaborators were called upon in assessing the current status of these devices. Ralph

⁹⁶ “Drift!,” The Vasulkas Inc, 1.

⁹⁷ Ibid, 2.

⁹⁸ Peter Weibel, “The Apparatus World- A World Unto Itself,” 16.

⁹⁹ Ibid, 19.

Hocking, founder of the Experimental Television Center in New York, was at the time of the exhibition the only large scale producer of custom-built video instruments. Ralph and his wife, Sherry Miller, were then the only collectors and archivists of these instruments.¹⁰⁰ Woody stated in the catalogue introduction that compared to electronic audio instruments, video instruments held no comparable intellectual context in which to consider them as cultural artifacts. Instead of showing works in the exhibition through pictorial or conceptual influences arising from the art world influences at the time, the Vasulkas as curators chose to focus on describing works in the context of their state as audio/video electronic signal, the state in which they can be altered by electronic instruments.

There were plenty of curators at the time showing video works as end products without showing their development but that was not the Vasulkas' aim with this exhibition. The composer, David Dunn, situates the historical importance of electronic music pioneers in the development of video tools, as it was an inherited world that video gained from audio. His focus is on how the video processing tools' concerns were first seen in the context of audio tools and similar issues are repeated. Thinkers such as McLuhan and Buckminster Fuller greatly influenced this generation of artists in their assertion that any negative effects of technological innovation could also be opportunities for better understanding. Also, the idea that technology could be used as a counter-cultural force and social critique was a driving factor that pushed these artists into their experiments, however, for some their contributions were eventually fallen into use for industrial profit and commercial market forces.¹⁰¹

These factors applied to video pioneers dealing with the same issues, namely, the social effects of these technologies. According to Johanna Branson Gill in the *Eigenwelt der Apparatewelt* catalogue, "They feel that the structure of electronic tools reflects as well as informs our thinking, and by using tools that produce visual patterns, they hope to reveal to us our social and technological directions."¹⁰² A detailed description of the origins and processes of each tool will provide a reference for understanding the aesthetic properties each tools shaped.

¹⁰⁰ Woody Vasulka, "Introduction," 11.

¹⁰¹ David Dunn, "A History of Electronic Music Pioneers," 60.

¹⁰² Johanna Brandon Gill, "Video: State of the Art," 64.

4.1 “The Putney” Model VCS, 1968

Of importance in the context of the Vasulkas in chronological order is firstly the audio synthesizer, “The Putney” Model VCS (Voltage Controlled Studio) 3 from 1968 (**Image 4.2**).

Progressively, through new tools, we learned the principles of generating and processing images, having access to internal structuring of the video signal itself. A decisive tool in our early collection was a sound synthesizer (Putney) which pointed us in the direction in sounds and image generation and in a mutual interchangeability of both.¹⁰³

The Putney was used in early studies by the Vasulkas from 1970-1971. It is made up of three oscillators; one whose waveforms cover a range from 1Hz-20KHz that can be mixed so as to also provide a range of timbres, a second oscillator with the same frequency control but with a shape controller that allows the waveforms to vary in shape from asymmetrical, symmetrical, and an asymmetrical mirror image, and a third oscillator with the same control options as the second oscillator but with a very low frequency range (1 cycle every 20 seconds) which allows very slow voltage control transitions.¹⁰⁴

4.2 The Video Sequencer a.k.a. Field Flip/Flop Switcher, 1972

The Video Sequencer a.k.a. Field Flip/Flop Switcher with digital control was invented by the Vasulkas in 1972 in collaboration with George Brown, a self-educated electrician and designer. Woody recounts in the *Eigenwelt der Apparatwelt* catalogue that the Video Sequencer was inspired by experiments with binoculars as well as by the painter, Alphonse Schilling, with whom Woody shared a flat with in New York City during the summer of 1967 while Steina worked in Paris. Together, they experimented with 3-D and Woody began to build projectors and make stroboscopic recordings. In 1972, Woody and Schilling exhibited *3-D Binocular Vision / “14 Street-Out”* at The Kitchen, described as a “stereo-slide show” documenting their earlier experiments which led to the conceptualization of the Video

¹⁰³ *Machine Vision* Exhibition Catalogue.

¹⁰⁴ Woody Vasulka, “EMS,” 108.

Sequencer (**Image 4.1**). The tool encoded left and right eye perspectives into a video frame sequence that could be recorded to tape.¹⁰⁵

The Video Sequencer (**Image 4.2**) is “a programmable digitally controlled switch between two video sources in a field or frame rate.”¹⁰⁶ Its ability to program this switch between sources in a smooth manner distinguishes its significance as a tool. The tool allows control of two alternating camera sources to be played in real time on the same monitor through determinations of sound and rhythm. The video source switching is controlled through a vertical pulse while factors such as duration and length are set through a collection of switches on the front panel. The sequence length is set at a maximum of fifteen steps whose position is determined by choosing either video source.¹⁰⁷ An example of the Video Sequencer’s smooth switching between video sources can be seen in *Noisefields* by Steina and Woody from 1974 with its flickering effect.

4.3 The Dual Colorizer, 1971

The Dual Colorizer from 1971 was also invented by Eric Siegel and used in all of the Vasulkas’ works for the rest of the decade. This Colorizer was invented parallel to Siegel’s Electronic Video Synthesizer. This tool allows black and white video signals to be synthetically colored using a variety of modulations such as hue, saturation, brightness, and contrast. In the *Eigenwelt der Appartewelt* catalogue, Siegel describes how it is not equipped for coloring precise things like photographs but works well with abstract visual imagery including environmental landscape shots that use large color swaths.¹⁰⁸ Siegel held very high ideals for the consciousness expanding potential of this technology when used for artistic expression. In 1973, he wrote that the sharing of his own perception of reality with these tools were his attempt at putting “a witness deeper into your being.”¹⁰⁹ Recently returning from India, he hoped to imitate moving color mandalas he had seen there with the synthesizer and colorizer and therefore to bring about altered state of consciousness in the viewer.

¹⁰⁵ Woody Vasulka, “George Brown,” 130.

¹⁰⁶ Ibid.

¹⁰⁷ Ibid.

¹⁰⁸ Eric Siegel, “Eric Siegel,” 117.

¹⁰⁹ Ibid, 118.

4.4 The Horizontal Drift Variable Clock, 1972

The Horizontal Drift Variable Clock was invented in 1972 by the Vasulkas and George Brown. In an early work by the Vasulkas from 1971 called *Evolution*, an accident in synchronization of pulses caused the ‘drifting’ of the image from its frame, an effect that was later to become a significant part of their repertoire. *Evolution* consists of video feedback of various image signals controlled by sound synthesizers playing horizontally a strip of images showing the evolution of man based from textbooks while light rays are created with a sound synthesizer. The Horizontal Drift Variable Clock provides an external source of synchronization enabling control of the horizontal movement of the image from frame to frame and also manipulate the image’s velocity and direction proving the electronic signal’s truly malleable state.¹¹⁰ This tool marked an aesthetic shift in their work as they could now visually display the video image’s spatial structure, initiating the use of multiple monitors in their early installations such as *Calligrams* and *Discs* from 1970, and *Matrix I-II* from 1970-72.

4.5 Sandin Image Processor, 1973

In 1973, Dan Sandin developed the Image Processor (**Image 4.3**). According to Jeffrey Schier, the Image Processor is most significant because it promotes anti-commercial creative growth through public access to processing tools, as per Sandin’s educational intention enabling anyone interested to build their own video synthesizer with his instructional tool kits. The Sandin Image Processor is “an analog video processor with video signals sent through processing modules that route to an output color encoder.”¹¹¹ Developed by Sandin based on designs for the Moog Analog Synthesizer from 1964, the Image Processor performs the visual equivalent of the audio synthesizer which is control of the signal being generated visually. The Image Processor allows keying and coloring of the black and white signal in addition to controlling the electronic signal that creates the video frame.¹¹² Woody remarks in the

¹¹⁰ Lenka Dolanova, “Dialogue,” 287.

¹¹¹ Jeffrey Schier, “Dan Sandin,” 132.

¹¹² “Historical Notice,” The Daniel Langlois Foundation.

Eigenwelt der Apparatewelt catalogue that Sandin opened the Vasulkas to ways to further imagine the layering of image planes by showing them “that what appeared as a circle in front of a square with a triangle behind the square, simultaneously showed the triangle in front of the circle.”¹¹³ This holographic way of picturing image planes was also Sandin’s way of breaking from the linear narrative of video that it inherited from film and written text.

4.6 The Multi-Level Keyer, 1973

The Multi-Level Keyer from 1973 (**Image 4.4**) was also engineered by George Brown. Its significance is described through its expansive ability to source multiple images: “Unlike most Keyers, which key two images- one over another- the Multi-Keyer could key up to six images. This allowed images to be manipulated to create foreground-background relationships.”¹¹⁴ The Keyer is made up of a digital sequencer connected to an analog processing rack and is interfaced by a red LED display, seven segment displays and a keypad.¹¹⁵ The analog Keyer organizes the six video sources into multiple image planes and sources them to a single output. This ability to sequence images into layers was not easily possible with other video mixers. Most video works by the Vasulkas made after 1973 involve some composition done in part with the Multi-Level Keyer. Most notably, the Keyer was used in *Vocabulary* from 1973 in which layers of electronic textures, a spherical image, and Woody’s waving hand are permeated through each other, causing a new aesthetic perception of spatial relationship that didn’t follow logic.¹¹⁶ Holding some elements of digital programming, the Keyer was one part of the Vasulkas’ realization towards the automatic processes of the digital programmer.

4.7 The Rutt/Etra Scan Processor, 1974

A year later the Rutt/Etra Scan Processor arrived in 1974 invented by Steve Rutt and Bill and Louise Etra. The backgrounds of Rutt and Etra were neither specifically in science, but in

¹¹³ Woody Vasulka, “Dan Sandin,” 132.

¹¹⁴ “Drift!,” The Vasulkas Inc, 1.

¹¹⁵ Jeffrey Schier, “George Brown,” 131.

¹¹⁶ Ibid.

various electronic fields; Rutt had experience designing stroboscopic devices and in operating analog computers, while Etra had created performances which used oscillators hooked up to monitors. Prototypes of the Rutt/Etra were made in 1972 and 1973, under the company patent name Rutt Electrophysics, based on Nam June Paik and Shuya Abe's *Paik/Abe Scan modulator*, was intended to be mass-produced but failed because of high manufacturing cost and low demand by television broadcasting.¹¹⁷ Of this instrument, Woody recalls:

The instrument called Rutt/Etra, named after their inventors, was a very influential one. Etra, with his art affiliations, had placed the instrument much closer to the hands of individual artists for the right price... Its power was in the transformation of the traditional film frame into an object with lost boundaries, to float in an undefined space of lost identity: no longer the window to 'the' reality, no longer the truth.¹¹⁸

The Rutt/Etra (**Image 4.5**) allows the video raster and images to be contorted through magnetic deflection. What Woody found so attractive about the tool was its precise visual display of electronic waveforms which are the basic elements of video signal, turning his attention to an aesthetic that would be a focus in later works and a new understanding of the electronic image's possibilities. Woody describes how the Rutt/Etra shifted emphasis to the structure of the electronic image as a time/energy object built upon the programmable waveform.¹¹⁹ The Rutt/Etra was a significant turning point in the Vasulkas' exploration of the structure of the electronic image for this reason.

One well-known effect that it caused was giving the appearance of three-dimensional shapes to objects by causing the lighter shaded areas of the frame to be pulled vertically by the raster lines, causing the lines to contour to whatever object is being captured by the camera.¹²⁰ Controlled by magnets, the 525 scan lines of the cathode ray tube are calibrated according to the voltage of both video and audio signal deflecting the matrix of scanned lines to allow specific display functions without affecting the image's resolution.¹²¹ The Rutt/Etra

¹¹⁷ "Historical Notice," The Daniel Langlois Foundation.

¹¹⁸ Woody Vasulka, "Bill Etra and Steve Rutt," 136.

¹¹⁹ "Drift!," The Vasulkas Inc, 2-3.

¹²⁰ Ibid.

¹²¹ Ibid.

allow the user the ability to select an image section and flip it into various directions, generate video waveforms with and without audio, as well as generate audio with video waveforms.¹²²

According to Lenka Dolanova in *Dialogues with the (Demons) in the Tool*, she explains how this work expresses their enduring fascination with the possibilities of video image processing that allow one to experience real time processing as well as manipulations of specific segments.¹²³ Tapes such as *Reminiscence*, *C-Trend*, and *Telc* from 1974 are made in collaboration with the Rutt/Etra whose influencing mark is a topographical conditioning. In these tapes, a referent from ‘reality’ is used such as landscapes, in order for one to see the process of its deflection with objective imagery which was useful in Woody’s intent to investigate how images are perceived in the eye vs. the camera.¹²⁴ However, the electronically created image is based on neither the eye or the lens camera and therefore represents ‘a new visual code.’¹²⁵ This code, as described by Lucinda Furlong, is transcribed from natural occurrences such as electromagnetic forces that the Rutt/Etra, for example, displays as waveforms perceivable as sound and image, addressing and questioning established perceptions of reality.¹²⁶

4.8 The Programmer, 1974

The Programmer was built in 1974 by George Brown and was the only semi-digital tool in the Vasulkas’ repertoire from before 1977. The Programmer allows control of the analog Switcher and Keyer and the possibility to store sequences and replay them on demand.¹²⁷ The Vasulkas commissioned George Brown to engineer the Programmer as a way to control the complex demands of the Multi-keyer. The Programmer was used in works from 1974 such as *Golden Voyage*, *1-2-3-4*, *Solo for 3*, and *Soundgated Images*. The Programmer is used in these works primarily for programming the demands of the Multi-Level Keyer, the H.D. Variable Clock, and the Colorizer, as another layer of control. It was also in this year that

¹²² “Historical Notice,” The Daniel Langlois Foundation.

¹²³ Lenka Dolanova, “Dialogue,” 295.

¹²⁴ Ibid.

¹²⁵ Lucinda Furlong, “A History...,” 15.

¹²⁶ Ibid.

¹²⁷ “Description of the tool,” The Daniel Langlois Foundation.

Woody, influenced by the Rutt/Etra, became more interested in theories of electronic imaging which would result in his photo series *Time/Energy Structure of the Electronic Image* produced later from 1975-76 and provide a visual dictionary of possible effects created by the Rutt/Etra.¹²⁸

4.9 The Digital Image Processor, 1976

The Digital Image Processor from 1976 was designed by computer scientist Jeffrey Schier and physicist Don McArthur with collaborative help from the Vasulkas and musician/programmer Walter Wright. This digital video system used algorithmic functions to allow a computer to work on two video images. The combination of codes in the function allowed various outcomes, revealing the system's inner structure.¹²⁹ Experiments leading to the Digital Image Processor were first based in mathematics and a 16 bit micro-computer, the DEC LSI-11.¹³⁰ Through a combination of analog and digital units, interfaces, generators, modules, and converters, this hybrid tool would be recycled and updated with smoother interaction between hardware and software to become the Digital Image Articulator later that year.

4.10 The Digital Image Articulator, 1976

The Digital Image Articulator is able to process the video image into pixels and then reshape them into an algorithmic layout. First, the video signal is translated onto an x/y grid, then the signal is converted by analog to digital converters into binary code. The pixel resolution level of the video frame depends on the range of values captured during the analog video scan and corresponds to where on the x/y grid the signal will be written into image data.¹³¹ Through a microprocessor, components generated through algorithms are sequenced by the computer interface into a digital programming unit, the Arithmetic Logic Unit which is based on

¹²⁸ Lenka Dolanova, "Dialogue...", 291.

¹²⁹ Lucinda Furlong, "Tracking Video Art: Image Processing as a Genre," 236.

¹³⁰ Jeffrey Schier, "Don McArthur and Jeff Schier," 144.

¹³¹ "Historical Notice," The Daniel Langlois Foundation.

Boolean algebra, a computer system that translates signals into written command.¹³² The ALU arranges the various components of the Articulator based on commands that are then shown in real time on the screen. The encoded images that result from being converted from analog to digital is stored according to the luminance value of the image content. Luminance is a term used in television technology for the signal that conveys information about color properties such as hue, saturation, and value.¹³³ Each value is then designated into a numerical range correlating to a grey scale on the 128 X 128 grid of pixels.¹³⁴ According to Lucinda Furlong,

What was important about this device was its capacity for performing various complex operations- zooming, multiplication of the image, keying, etc.- in ‘real time.’ This made it possible for a video signal to be digitally processed as it passed through the device- practically instantaneously- in contrast to the kind of computer imaging in which a program is entered and one must wait minutes, or hours, depending on the program’s complexity, for the computer to perform the operation.¹³⁵

These explorations are documented in the later work by Woody called *Artifacts* from 1980 which visualizes the transfer of analog to digital pixilation in the image of a sphere and also in Steina’s *Cantaloup* from the same year. With referents to earlier works *Noisefields* and *Vocabulary*, a visual relationship is contextualized for the viewer to follow along in the Vasulkas’ knowledge building through experimentations using the same imagery of sphere, hand, and face.¹³⁶ *Artifacts* shows a demonstration of the procedural tools involved in the Digital Image Articulator that Woody built as to perform image processing in real time. As well, the images in *Artifacts* reveal how the digitized image is constructed of pixel frames whose level of pixilation is determined by the memory capacity available in the computer system; more memory allows more data and therefore small pixilations. In Steina’s *Cantaloup* she documents the process of image programming with the Digital Image Articulator and the specific nature of density in organizing the digital image.

¹³² Ibid.

¹³³ Stephen Beck, “Image Processing and Video Synthesis,” 163.

¹³⁴ Yvonne Spielmann, “Aesthetics...”

¹³⁵ Lucinda Furlong, “Tracking Video Art...,” 236.

¹³⁶ Lenka Dolanova, “Dialogues,” 287.

These new screen languages offered by processors and synthesizers that depart from the television image bring about a new aesthetic perception of the possibilities of electronic images. In excerpts from the Experimental Television Center's 'Image Processing Manual' by Sherry Miller Hocking and Richard Brewster from the early 1980's and included in the *Eigenwelt der Apparatewelt* catalogue, Hocking describes how video "as a kinetic as well as an electronic form... concerns itself with the time/space equation."¹³⁷ The role of the signal is in defining how the image will appear in any moment in time, and its specific behavior for a specific amount of time, therefore it is the primary material for construction. Hocking also alludes that "...the creation of an electronic image is an architectural process and constructed in time."¹³⁸ The relation of architectural space to the electronic image is therefore in the material of the signal and how it reveals the physical nature through image manipulation. As has been detailed throughout the various tools in this early and crucial period of experimentation and collaboration, each device performs a specific function of signal manipulation carrying with it new aesthetic definitions.¹³⁹

After initial focus on mainly horizontal drift and audiovisual relationships, the Vasulkas continued in the modernist tendency to break down established traditions by expanding their repertoire and joining various engineers to assist them in building specialized video tools. In the 1992 exhibition at Ars Electronica, *Eigenwelt der Apparatewelt (The Apparatus World – A World unto Itself); Pioneers of Electronic Art* an overview of the electronic arts are presented with the tools as the main protagonist. Woody stated in the catalogue introduction that compared to electronic audio instruments, video instruments held no comparable intellectual context in which to consider them as cultural artifacts. Instead of showing works in the exhibition through pictorial or conceptual influences arising from the art world influences at the time, the Vasulkas as curators chose to focus on describing works in the context of their state as audio/video electronic signal, the state in which they can be altered by electronic instruments. As can be seen in this narrative of tool functions starting with "The Putney" Model VCS from 1968 to the Digital Image Articulator from 1976, the new screen languages offered by these processors and synthesizers that depart from the

¹³⁷ Sherry Miller Hocking, "Image Processing; Experimental Television Center," 16.

¹³⁸ Ibid.

¹³⁹ Ibid.

television image bring about a new aesthetic perception of the possibilities of electronic images.

5 Temporal and Spatial Aesthetics

In Nicholas Bourriaud's *The Radicant* from 2009, the curator attempts to describe the current state of modernity, 'altermodernity,' in aesthetic terms. It is "...the intertwining of the properties of space and time..." that mark the current state of contemporary art.¹⁴⁰ Bourriaud continues:

...today's art seems to negotiate the creation of new types of space by resorting to a geometry of translation: topology. This branch of mathematics deals less with the quantity of spaces than with their quality, the protocol of their transition from one condition to another.¹⁴¹

This translation of space echoes the earlier translations enacted by the Vasulkas with their renegotiation of space/time relationships through video processing. Borrowing from Bourriaud's idea that in projecting space into time, time turns into a topology or terrain, help to frame the visual outcome of the Vasulkas' temporal aesthetic. Likewise, Bourriaud's idea that in projecting time into space, space turns into a narrative or journey-form, help to frame the visual outcome of the Vasulkas' spatial aesthetic. In Robert Arn's article 'The Form and Sense of Video' in the *Eigenwelt der Apparatewelt* catalogue he says: "Perhaps the simplest and most obvious concern of video art is with the nature of 'process' itself, and with the paradoxes and illusions of time on which the concept rests."¹⁴² It is also this 'process' itself upon which the Vasulkas made their most expansive aesthetic explorations.

In one of the Vasulkas' first documented works, *Participation* from 1969-1971, an unedited hour-long continuation of street and concert scenes from New York City is documented in a sweeping cultural snapshot of events in that time and place. Compiled as an anthology in 1977 for the Third Annual Video Documentary Festival in New York City, the footage is without narration so that the viewer is attentive to the raw video images themselves. This kind of footage was not possible without Sony's portable, battery operated Portapak system which allowed artists to film right from the street providing the first documents of culture in video format in the late 1960s and early 1970s. Many artists such as the Vasulkas' who were using the Portapak were close to alternative movements in America at that time.

¹⁴⁰ Nicholas Bourriaud, *The Radicant*, 1.

¹⁴¹ Ibid.

¹⁴² Robert Arn, "The Form and Sense of Video."

The Vasulkas often remark that they were attracted to the decadent atmospheres of gay culture and rock music. This is exactly the world which *Participation* explores, including concerts by Jethro Tull and Jimi Hendrix, a street performance by Don Cherry, and dramatic scenes from Andy Warhol's Superstars. Clearly a less experimental project than the Vasulkas' later works, *Participation* is a very important part of their experience with process and time despite the editing possibilities at this time being very limited. Although some would argue that this sweeping unedited film is too lengthy, it is a fitting format for the ideological discussion around video that was just beginning with no foreseeable future in sight. *Participation* also provides a 'blank canvas' of unedited material in real time upon which the Vasulkas were already displaying a strong exploration of their tool's possibilities and its image comprehension.

In Michael Z. Newman's book *Video Revolutions; On the History of a Medium* from 2015, he makes a distinction between the meanings of the term 'video' as a cultural keyword and its mark on changing technologies. For example, he describes three distinct phases of usage for the term 'video.' The first phase was during early television in the 1960s when 'video' and 'television' were interchangeable.¹⁴³ The second phase was when portable video systems such as the Portapak became available to the public and marked a distinction between the mass medium of television and the alternative cultural medium of video, marking the beginning of a video revolution and the establishment of video as a medium in its own right.¹⁴⁴ The third phase involved the transition of video into digital formats, still operating under the same developments of a new video participation that was ushered in with the Portapak.¹⁴⁵

This title of the Vasulkas' work *Participation* speaks of this new advent of the medium and introduces the plausible ways in which the viewer is both participant and passive viewer of media. *Participation* introduces the technical conditions of temporality that video brings to the cultural sphere. Boris Groys describes this process as the way in which the

¹⁴³ Michael Z. Newman, *Video Revolutions*, 44.

¹⁴⁴ Ibid.

¹⁴⁵ Ibid.

present becomes an historical narrative: "...We are coming to see history as a series of processional presences, as a string of individual moments, each one a present."¹⁴⁶

According to Yvonne Spielmann, early unedited or processed works from 1970 represent a "void medium" which acts as a technological and ideological point of departure for later works in which they expound upon the notion of a medium fixed in dimensions and directions.¹⁴⁷ Two assortments from this time period accompany *Participation* in its experimental footage and documentary style compilation of counterculture in New York City. The first of these assortments, *Sketches*, from 1970, include *Red Roses* (a performance by Jackie Curtis), *Let It Be* (a performance by Steina), *The Kiss* (a performance by Helon Wong), *Charles' Story* (a performance by Charles Hayworth), *Alfons* (a performance by Alfons Schilling), *Thierry* (a performance by Thierry Benizeau), and *Gundance* (a performance by Daniel Nagrin with music by Archie Shepp).¹⁴⁸ These assemblages encompass their earliest image processing techniques that are all based on human performance and body movement. The type of architectural space offered in these works is also phenomenological as it bridges the viewer's orientation of space with new sensory-motor experiences of image and sound.

When The Kitchen opened in 1971, these works were given a space to be viewed by the public outside of established cinema as well as the gallery or museum. In *The Kitchen Turns Twenty: A Retrospective Anthology* from 1992, Lee Morrissey remarks that it was experimentation and the expansion of perceptive possibilities that was The Kitchen's greatest contribution to Avant-Garde arts.¹⁴⁹ At The Kitchen, these early audiovisual works were viewed not as recorded television, but as events in themselves happening in real time, of archived footage, bringing a further aesthetisization of past in the present. During this time of social and political upheaval, experimentation in the arts along with a new dialogue with mass media contributed to new conceptualizations of time and space, as well as the role of the human body as medium.¹⁵⁰

¹⁴⁶ Boris Groys, "Comrades of Time."

¹⁴⁷ Yvonne Spielmann, *Video: The Reflexive Medium*, 197.

¹⁴⁸ *Electronic Arts Intermix*.

¹⁴⁹ Lee Morrissey, *The Kitchen Turns Twenty: A Retrospective Anthology*.

¹⁵⁰ Sylvia Martin, *Video Art*, 12.

Video feedback as a closed-circuit installation was seminal in the Vasulkas' early works. Feedback allowed the artist to reflect on their own position, as well as that of the viewer and the technology itself. Sylvia Martin writes in *Video Art*:

The live pictures transmitted by direct video feedback demonstrate their own structural system and counteract the illusionism of film and television. Stored recordings, on the other hand, are generally played as single-channel tapes on monitors, which create their own presence in the space.¹⁵¹

The notion of presence is a crucial part of the time element of video as well as media archaeology. It is an image's 'presence' that determines the extent to which it possesses 'aura' and the extent to which it can be mediated. The Vasulkas' use of human body movement and performance footage brought the mediated body into the discourse of 'origins.' According to Vivian Sobchack in an essay included in *Media Archaeology: Approaches, Applications, Implications*, "...this sense of presence emerges from the epistemological and sensual specifics (both material and structural) that are entailed not in theoretical or interpretive discourse but in operative (and necessarily corporeal) practice and knowledge..."¹⁵²

The ability of video to carry a flowing current that exists without external input was one of the most studied phenomena of video in the early 1970s. This ability pushed the possibility that video technology was not only a translation tool but able to allow a space for new interplays between time and space where objects could be created and manipulated through electrical processes. One of these dimensions was feedback produced by the electrical signal being repeated between monitor and camera as it represents an infinite object created on the pure surface dimension of video. Video feedback is the fixation of an image on the pure surface of video of pulsating signals that are inscribed in the temporal dimension of video.¹⁵³ Although not a reflective phenomena, video becomes a mirror through feedback's recursive inversion of the image which creates the semblance of a mirroring effect. In *Fractal Narrative* from 2014, German Duarte points out that the recursive patterns playing out in the

¹⁵¹ Ibid.

¹⁵² Vivian Sobchack, "Afterword, Media Archaeology and Re-Presencing the Past," 324.

¹⁵³ German A. Duarte, *Fractal Narrative: About the Relationship Between Geometries and Technology and Its impact on Narrative Spaces*, 225.

enclosed circuit of the surface phenomena of feedback create a surface that is reminiscent of fractals.¹⁵⁴

Consequently, video technology, by reorganizing the components of the image, created a transformation of space and narrative that is fractal by nature as it exists on a continuum of temporal intervals; "...a momentary entity in continuous becoming."¹⁵⁵ Feedback's "infinite tunneling" effect was also expressive of information systems as a metaphor for the self-regulating system of video grounded in duration and creating a map of relationships between time and space.¹⁵⁶ Exemplary of this self-generating property of feedback manipulated by a Keyer and Colorizer can be found in the tapes from 1971, *Black Sunrise*, *Elements*, and *Key Snow*, which the Vasulkas described as a "performance of energies organized into electronic images and sounds."¹⁵⁷

A second assortment of works, *Studies*, from 1970-1971, includes *Interface* (a performance by Charles Hayworth with music by Gino Piserchio), *Discs* (**Image 5.1**), *Calligrams*, *Tissues*, *Descends*, *Decay I*, and *Decay II*, works which implement the first usage of the Dual Colorizer by Eric Siegel and the Putney Audio Synthesizer. According to Yvonne Spielmann, the Vasulkas' video images establish the potential of video to express its variability through sculptural objects generated by sound.¹⁵⁸ Many of these works were compiled into *Matrix I and II* which appeared in one of the six half-hour long episodes the Vasulkas produced for the public access television channel, WNED-Buffalo, called *Vasulka Video* in 1978.

As previously mentioned, *Matrix I and II* from 1970-1972 represented the catalyst in Woody's growing awareness of the frame's ability to move through several monitors, a spatial aesthetic that arrested video from cinema's strict verticality. The *Matrix* series also helped the Vasulkas to lay the groundwork for the image's scale, pattern, and variable dimensions, a crucial point of departure for later works with the Rutt/Etra Scan Processor, for example. In the abstract work *Discs*, a semi-circular shape is disrupted by smaller circular

¹⁵⁴ Ibid.

¹⁵⁵ Ibid, 220.

¹⁵⁶ Chris Hill, *Attention! Production! Audience!...*, 17.

¹⁵⁷ Electronic Arts Intermix.

¹⁵⁸ Yvonne Spielmann, *Video: The Reflexive Medium*, 197.

rolls which enter the initial shape in a rhythmic pattern of acceleration representing “the time delay of repeated signal inputs” which results in this abstract pattern of circles entering circles.¹⁵⁹ This work is a continuation of the expansion of the spatial frame happening in *Matrix I-II* and in *Calligrams*. *Calligrams* shows an interrupted horizontal drift become vertical. The interruption of the usual horizontal drift is correlated in the audio as well as the chaotic scan lines.

According to Yvonne Spielmann, the vertical structure of the image represents “the instability of the ‘frame’ (as it) appears in transition to spatiality.”¹⁶⁰ Spielmann notes that noise is another element of the unstructured matrix from which the video image arises and it is both image and sound together that compose her notion of the ‘matrix phenomenon.’¹⁶¹ The first generation of video artists could be seen as representative of the first instance of the two trajectory histories of visual art and music meeting in a common physical audiovisuality. The intermedial spaces between music, film, sculpture, and architecture allowed this duality to be digested in the technology which projected music as image simultaneously.

In *Home* from 1973, Steina and Woody use the Dual Colorizer by Eric Siegel, the Video Sequencer/Video Keyer by George Brown, and the Line-locked strobe by Steve Rutt (**Image 5.2**). Taking ordinary household objects such as apples and kettles, and household actions such as cutting potatoes on a chopping board, the Vasulkas transform these inanimate parts of everyday life into an audiovisual array of the possibilities of early imaging techniques of colorizing, keying, and layering of image planes.¹⁶² *Home* is almost an allusion to the early Dutch still-life genre which uses similar objects as symbols of ‘memento mori’ to see that death is inherent in life. The symbols spell out as objects the fact that death is inherent within these living things, as became apparent in the time that it took the painter to depict them. The allusion is strong, at least, to the canon of classical painting, perhaps to comment on the trajectory of the artistic image and the aesthetic possibilities of the image when made electronic. *Golden Voyage*, also from 1973, can be correlated to modern art through the paintings of Rene Magritte, whose work the Vasulkas found to be creating similar effects as

¹⁵⁹ Lenka Dolanova, “Dialogue...,” *A History of Video Processing Tools*, 287.

¹⁶⁰ Yvonne Spielmann, “Video and Computer,” The Daniel Langlois Foundation.

¹⁶¹ Ibid.

¹⁶² “Home,” *Electronic Arts Intermix*.

their own. Referring directly to Magritte in an animation of his painting *The Golden Legend*, the Vasulkas take loaves of bread on a journey across various landscapes in a surreal/absurd trope on the process of sequences still-lives into motion using the Colorizer, Multi-Keyer, Switcher, and Horizontal Drift clock.¹⁶³

In *Vocabulary*, also from 1973, Woody demonstrates how objects from reality can be reorganized spatially by using the Multi-Level Keyer, Rutt/Etra Scan Processor, and the Dual Colorizer, without changing the objects' position.¹⁶⁴ The object in *Vocabulary* is Woody's hand which is displayed in the foreground of a sphere at first, but slowly the luminosity values are changed and the scan lines are enlarged causing the hand and sphere to appear as though on the same surface level; they are "no longer reorganizing themselves in space plastically but through their emphasized brightness values."¹⁶⁵ Representing the conjunction of the tool processes of the Keyer and feedback, *Vocabulary* (**Image 5.3**) shows the process by which feedback disintegrates the boundaries of hand and sphere and switches their distinct spatial forms into "a relationship of surface" determined by the luminosity values of the entire image.¹⁶⁶ This "impossible" relationship arising between the objects in analog video provides us with something like an aesthetic preview of the later technical possibilities of digital video.¹⁶⁷ In 1980, Woody uses the Digital Image Articulator in a conceptually similar work called *Artifacts* (**Image 5.4**) to visualize the internal processes of construction and deconstruction in the electronic image between analog and digital, again using his hand as the object of translation.¹⁶⁸ Two pieces from 1974, *Solo for 3* and *1-2-3-4*, use the programmer/Multi-Keyer/H.D. Variable Clock by George Brown and the Dual Colorizer by Eric Siegel to create images of objects in various layerings of foreground and background relationships using the programmer.

Brian Massumi, in an article entitled "Sensing the Virtual, Building the Insensible," explains how perception in the electronic image rests on variation:

¹⁶³ Lucinda Furlong, "A History..." 13.

¹⁶⁴ Yvonne Spielmann, *Video: A Reflexive Medium*, 206.

¹⁶⁵ Ibid.

¹⁶⁶ Ibid, 207.

¹⁶⁷ Ibid.

¹⁶⁸ Ibid.

Depth is a surface effect susceptible to the brightness confound. When it goes, so goes separable form. Not only do the relative size and distance of objects flutter, their boundaries blur. They cease to be separate figures, becoming not entirely localizable zones in a fuzzy continuum. In other words, they cease to be objects, becoming what they always were, in the beginning and in parallel: fluctuations. Visual runs. Experiential transition zones.

These zones highlight the way in which the Vasulkas' aesthetic is one of process and an attunement to figuration in flux. The architectural form in the video medium for them is, as Massumi explains, a process of capture and release of variations along a continuum. He continues:

The fixed boundaries and "constants" of our habitual perceptions are emergences from an experiential confound to which they can return, and must return. For they are not in the final analysis structural constants at all, but continually regenerated effects, predicated on the variation they follow and emerge from, as its perceptual arrest. They rest entirely on variation.¹⁶⁹

The Vasulkas' experiments can be seen as chance occurrences in a continuum of space/time and with these tools they have found ways to manipulate the visualization of space/time. As a teapot loses its boundaries in the video image, it is returned to "what they always were...fluctuations."¹⁷⁰ Massumi also compares "the architectural activity associated with the topological turn" as being similar to John Cage's experiments with chance in the creative process as well as the cut-up technique of William S. Burroughs' as a neo-modernist trope defined by Deleuze as "...the mutual processual envelopment, on a single abstract variational surface, of complexes of complexity..."¹⁷¹

The Vasulkas' experimental process, like Cage's and Burroughs', abstracts from a complex variation of surfaces the realization of a new geometry of narrative space.¹⁷² German Duarte in *Fractal Narrative* describes the space in the video image as "a space without space" as its surface encompasses an infinity of forms hidden beneath it.¹⁷³ As video is representative of the transition from analog to digital, the electronic image in video is already a process of

¹⁶⁹ Brian Massumi, "Sensing the Virtual, Building the Insensible," 15.

¹⁷⁰ Ibid.

¹⁷¹ Ibid, 8.

¹⁷² German Duarte, *Fractal Narrative*, 220.

¹⁷³ Ibid, 223.

virtualization, a state of potentiality driven by self-generating process.¹⁷⁴ This transition zone between analog and digital where early video technology resides is also where electronic images lose their material surface. This loss is due not only to the transition to a screen but also the composition of the fluxuating video image itself.¹⁷⁵ Part of this inner structure of video can be seen in *Study No. 25* from 1975, in which the Vasulkas use the Scan Processor to model the “inner video signal” through a cylindrical object generated by the technology itself, not a translation of an original object (**Image 5.5**).¹⁷⁶ Duarte relates the creation of this kind of object to what Vilem Flusser described as an “emersion... from the zero dimensionality of the space to the dimension of the image that can create the illusion of a three dimensional element.”¹⁷⁷ The image, derived from the unstructured energy potential of video arises from the empty television frame being manipulated by the Scan Processor which electromagnetically shrinks and bends the void into a cylindrical shape. With the acquisition of the Rutt/Etra Scan Processor, Woody subsequently developed an aesthetic concentrated more on what he called the “time/energy object” itself and its building component, the waveform.

In a tableaux of segments belonging to *Time/Energy Structure of the Electronic Image* (**Image 5.6**) created between 1974-1975, Woody displays images created by the Rutt/Etra Scan Processor are a result of analyzing smaller and smaller time-sequences, which, according to Woody is “a process necessary to understanding wave formations, their components, and the process of their synthesis and programmability.”¹⁷⁸ Considered as a point of departure from the camera obscura based media models, the Rutt/Etra allows the possibility to move between conceptual models and constructed images, opening “a new self-generating cycle of design within consciousness and the eventual construction of new realities without the necessity of external referents as a means of control.”¹⁷⁹ The photographs in the tableaux are recordings of raster displays from the Scan Processor, including photographs

¹⁷⁴ Ibid.

¹⁷⁵ Ibid.

¹⁷⁶ Ibid, 226.

¹⁷⁷ Ibid.

¹⁷⁸ Woody Vasulka and Scott Nygren, “Didactic Video: Organizational Models of the Electronic Image,” 1.

¹⁷⁹ Ibid.

from *The Matter*. In *The Matter* from 1974, a pattern of dots takes the shape of each of the three waveform shapes of sine, square, and triangle. Created by the waveform generator, the patterns that emerge demonstrate the variability of time and energy as objects in video.¹⁸⁰ According to Spielmann, the waveforms represent “another possibility for multiplying the demonstrable functions of video, especially with regard to presenting time as space.”¹⁸¹ The waveform, however, was originally a representation of audio, so the translation of these forms into video further represent their mutual interchangeability within the video dimension. In 1974 the Vasulkas created various experiments dealing exclusively with the reciprocal nature of audio and video signal; *Soundgated Images*, *Soundsize*, *Noisefields*, and *Heraldic View*.

At the time of these experiments, McLuhan’s emphasis on electronic information being an exteriorization of human consciousness was part of the cultural aesthetic revolution taking place, which the Vasulkas’ contributed to with their works from this period. Other works from 1974 such as *Reminiscence*, *C-Trend*, *Grazing*, and *Telc*, which use the Rutt/Etra Scan Processor and the Colorizer by Eric Siegel, are transformations of scenes from objective reality such as landscapes and streetscapes into topographic maps so that one can see the process of deflection which the Rutt/Etra Scan processor initiates. **(Image 5.7)**¹⁸² By separating the camera lens perspective from the visual code, Woody developed a new mode of spatial composition. In *Fractal Narrative*, German Duarte remarks that Woody applied the same methods in this process as the IBM researcher Benoit Mandelbrot used in discovering fractal geometry.¹⁸³ This process is basically one of finding “a new spatial representation by analyzing objects and phenomena at different scales.”¹⁸⁴ Both apply a zoom-in effect on the image, the start of a “new code” for Woody, which, according to Duarte, is much more than mere code as it is representative of “another geometry that allows both a dimension where irregular phenomena and irregular shapes can be presented, and where new flexible objects can be placed, observed and used in a new narrative space.”¹⁸⁵ Part of Woody’s new

¹⁸⁰ Yvonne Spielmann, “Woody Vasulka- The Matter, 1974,” The Daniel Langlois Foundation.

¹⁸¹ Ibid.

¹⁸² Lucinda Furlong, “A History...,” 14.

¹⁸³ German Duarte, *Fractal Narrative*, 232.

¹⁸⁴ Ibid.

¹⁸⁵ Ibid.

revelation of informational “code” being read in the electronic image pressed his understanding of the image towards one that required reading instead of seeing.¹⁸⁶ This “intelligibility of the image” creates its own temporal aesthetic in its reception as both meaningful code as well as a carrier of presence of a new object created by the machine themselves, not a representation of natural objects from objective reality.¹⁸⁷ These images were the first of their kind, being more machine made than human, and therefore belonging to a different temporal and spatial condition.

As objective images are translated into binary code, the human part of the process is removed and along with it a greater objectivity regarding nature and decreased ability to represent reality without mediation by machines. The blending of reality and its representation through images created by machines highlights the “indeterminacy of the image” which breaks down the relationship between subject-object through the electronic image.¹⁸⁸ The changes brought by the increasingly electronic mediation of reality was both representative of the “indeterminacy of the image” and its cause, bringing with it a change in narrative. This narrative is one that will bring about the end of linear history by shifting from a linear narrative (which began with the invention of writing) to a fractal narrative.¹⁸⁹

Woody’s image, self-generated through electronic signal, brought about a change in spatial narrative and with it a transformation of the video process of editing. Instead of distinct images, it became more reasonable to identify the image as an indistinct transitional zone, an aesthetic quality in itself. Woody, with the help of the Rutt/Etra Scan Processor, could realize this new conception of narrative space in its objecthood, which is represented by the topological rendering of the object. Breaking from his previous affiliation with cinematic narrative, Woody realized the video narrative as one consisting of images to be modeled instead of spliced. This modeling of the image with tools, carried out through a break down of the image into its smallest bits of data, is described by Duarte in Deleuze’s description of the surface points of the image as being made up of picture elements corresponding to an “infinite

¹⁸⁶ Ibid, 233.

¹⁸⁷ Ibid.

¹⁸⁸ Ibid, 238.

¹⁸⁹ Ibid, 239.

surface.”¹⁹⁰ These bits of data which determine the definition of the electronic image are also, according to Duarte, what Baudrillard refers to as the ‘simulacres’ which allow the conceptualization of the world as they no longer represent only an image, but a representation of the image through code in a fractal space.¹⁹¹ This bears directly on analogy and metaphor, the fundamentals of all art, as the inter-relationships of audio and visual energy forms are fully realized.

Similar to Deleuze’s temporal fold, the audiovisual narrative space of the proto-digital has no center and is composed of relationships between points of time in a continuous state of gathering into a whole.¹⁹² As the Vasulkas explored these relationships between points in time using tools, they gradually built a visual materialization of the inner dynamics of the electronic image. Each of their video works, especially in the early years, could be seen as a set of architectural blueprints for these inner dynamics. The topological rendering allowed by the Rutt/Etra Scan Processor provides an answer to how the Vasulkas’ creative exploration of the electronic image was carried out by treating it as architectural space. Architecture creates abstract spaces from which realizable forms are determined, but when these forms are in continuous transformation as in the electronic image, it is best dealt with by turning the temporal into terrain or a topology. Topology is able to integrate the variations of transmutations of form on an infinite plane, allowing forms to exist both in interrelationship as well as in distinction on the same plane.

¹⁹⁰ Ibid, 243.

¹⁹¹ Ibid, 245.

¹⁹² Ibid.

6 Conclusion

In *Points of View: A Journey Through the Visual World of Iceland*, six cultural institutions in Iceland collaborate in providing a journey through the nation's visual culture. Each exhibition, reflecting the research of each institution, lasts for one year. On view from April 2015 to April 2016 is Steina's video installation *Pergament / Bókfell* which draws parallels between the history of the written language and the aesthetics of digital code. These parallels are visualized in two installments of approximately 20 minutes of digital video manipulations. Conceived in collaboration with the Vasulka Chamber at the National Gallery of Iceland and the Árni Magnússon Institute for Icelandic Studies, Steina takes Icelandic manuscripts written as early as the 9th century into the current dialogue of digital literacy.

'Pergament,' the Latin word for parchment, is as much about the history of linear thought being mediated by technology as it is about narrative and the constructs of language. In the work, a heavily pixilated manuscript of yellowing parchment, red capitals, thick black script, twists and breaks across the screen. Melted by digital effect, their legibility is doused by the weight of history. Drifting from pages of the sagas seemingly being washed by digital tidal waves, the script becomes a three-dimensional landscape of geometric forms as though testing what visual perception has learned over the thousands of years that humans have been writing. This piece acts as a metaphor for many of the layers explored in media archaeology through material history, as well as the narrativity that began according to Flusser with the invention of writing that continues into computer coding.

In *Pergament / Bókfell*, Steina continues to explore the medium from the inside out suggesting future identities for Icelandic manuscripts and their place in visual culture. Returning to Benjamin's dialectical image, the place of its encounter is in the medium of language where the temporal relation between past and present is recognized in the image. Steina carries the artifacts of written language into a present code, completing a media archaeological circuit that traces her culmination of explorations of the electronic image.

The Vasulkas' five decade long career is a case study for what media archaeology investigates; as creators of their own video production tools at the birth of video as an artistic medium in the late 1960's, they illustrate the extent to which apparatus' are more than technology but a symbol of cultural revolution. Media archaeology opens up new relation between current media theory and the events of nineteenth century media technologies, for example, in its ability to link the beginning of cinema to current software studies. But it is precisely this attention to process that makes media archaeology a unique and important path

to understanding media's effects on the micro and macro scale. An understanding of media processes does not only require historical descent, but also infrastructural descent into the materiality of media. This has economic concerns as well, since the onset of 'protected modes' of encased software make it difficult for users to break into and further distances consumers from investigating their media technology. This is also evident in user interfaces and applications, in which the consumer is kept out of the programming aspect, and is therefore in some ways, programmed himself.¹⁹³ More and more media archaeologists are practicing excavation as they descend into the machine mechanics, taking them also into machine time rather than historical time.

Media theorist Giuliana Bruno has written on how moving images are the archaeological ruins with which future generations will look at as testimony to modern times. As our history is made up of different materials of ruins, celluloid instead of concrete, the mark of passing time is impressed in a different manner.¹⁹⁴ The development of media devices is an important part of this research as the medium's change in mechanism bears their progression in usage. The Vasulkas themselves designed and built a collection of these devices and tools in order to explore the nature of video technology and hardware. The technological changes that took place were crucially linked to the aesthetic changes in a medium so dependent on its tools of production. In this way they are also their own archivists while also being the archivists of the whole creative revolution of video in which they took part.

Part of the foundations of the architecture of the electronic image that the tools have explored and manipulated are also the foundations of nature: time, energy, and space. Robert Arn, in an article included in the *Eigenwelt der Apparatewelt* catalogue called 'The Form and Sense of Video,' says that video is literally "a space/time machine."¹⁹⁵ In another article in the *Eigenwelt der Apparatewelt* catalogue called 'Space-Time Dynamics in Video Feedback' from 1984, the physicist, James P. Crutchfield also relates that "...a video feedback system is a space-time simulator."¹⁹⁶ As these descriptions of these early synthesizers, processors, and

¹⁹³ Ibid, 81.

¹⁹⁴ Giuliana Bruno, *Public Intimacy*, 81.

¹⁹⁵ Robert Arn, "The Form and Sense of Video," 184.

¹⁹⁶ James B. Crutchfield, "Space-Time Dynamics in Video Feedback," 191.

articulators have shown, the Vasulkas' approach to production through exploration of tool construction establishes a terrain for re-organizing the physical and cognitive terrains of their aesthetic reception. According to Deleuze, the digital technology that the Vasulkas helped to bring about, turned the electronic image into an information reservoir for 'codified nature' and a representation of the intermediary matrix between humans and nature.

The Vasulkas' architectural investigation of the electronic image and its aesthetic possibilities are shown to be parallel to the temporal fold of Deleuze. One property specific to video that constructed their architectural approach was the electronic wave form that has great mutable audio and video effect. Another property is the video frame as the pulsing of time controls the video raster to stabilize the image into a 'normal' visualization. What television viewers rarely realize is that the image they are watching is a continuous stream of images passing through the frame, unless the television breaks. Deleuze's theory of the fold holds architectural metaphor in its dynamic state.

The Deleuzian 'fold' is a helpful metaphor in realizing the space of possibilities in which relationships between time and energy interact, and in considering each fold as an event in electronic terrain. An outline of each of the tools used to explore this terrain is helpful in realizing the relationships they traversed and their effects. The spatial idea of the fold visualized as architecture shows the potential of each tool's impact on imagery. The infinite outcomes resulting from processes unfold as a continuous architectural landscape that is as revealing about spatial relationships within the image as it is of our spatial awareness outside of the image as interactive viewers. A media archaeology of this architecture, therefore, reveals an infrastructural matrix that is neither purely human nor technological, but a dialogue between them. In a similar manner, Benjamin's dialectical image is seemingly at once belonging to material reality and virtual reality, as well as existing as a picture and a perception.¹⁹⁷

While Woody delved into building an electronic vocabulary with the Rutt/Etra Scan Processor in 1975, Steina developed a parallel trajectory in *Machine Vision* which used a myriad of camera control mechanizations developed by Woody. Steina organized these

¹⁹⁷ Anthony Auerbach, "Imagine No Metaphors: The Dialectical Image of Walter Benjamin."

apparatuses into a relationship aimed at disassociating the camera from human vision.¹⁹⁸ These works combine the automated movements of cameras into a “dislocation of the picture plane” which allows the viewer to reorganize the surrounding space into a new whole, just as Woody dislocates the surface level of objects in *Vocabulary*, forcing the viewer to recalibrate the fragmented planes.¹⁹⁹

These re-organizations of spatial and temporal realities are also reflected in the experience of history on a large time scale. Returning to the media archaeological metaphor, the translation of images by the Vasulkas through signal processing is also an unraveling of the “feedback loops between media and human experience.”²⁰⁰ According to Wolfgang Ernst, this requires a certain reverse engineering of media that looks at its hardware epistemologically in order to see the relationship between media and cultural phenomena. As the ability to store and transmit time developed through various media inventions, the television represented the inclusion of space into the arrangement of events on the screen. With the digitalization of this image, pixels became, according to Flusser, micro-elements of time which turn the image into post-historical, existing as a multiplication of narratives, unstable and at once “in and out of time.”²⁰¹

In *Xerox and Infinity*, an essay by Baudrillard from 1987, he explains the aesthetic shift of perception that the electronic image brought into play: “The tactility here is not the organic sense of touch: it implies merely an epidermal contiguity of eye and image, the collapse of the aesthetic distance involved in looking. We draw ever closer to the surface of the screen; our gaze is, as it were, strewn across the image.”²⁰² This brings us back to Benjamin’s notion of ‘aura’ as the presence one encounters when in engagement with an ‘original.’ The presence of ‘aura’ in regards to the electronic image is then, according to the media archaeologist, emergent in the meta-data of description which carries endless open-ended potential but remains only a fraction of the narrative. Benjamin tries to show that the decline of the ‘aura’ is not just some aesthetic question, but that it is connected to the

¹⁹⁸ Lucinda Furlong, “A History...,” 14.

¹⁹⁹ Ibid.

²⁰⁰ Tim Barker, “Media In and Out of Time,” 5.

²⁰¹ Ibid, 7.

²⁰² Jean Baudrillard, “Xerox and Infinity,” 53.

traditional philosophical problem of defining truth and the relation between cultural memory and the rational present. Media archaeology, as a research practice investigating both cultural history and the materiality of media, has its own dialectic. The Vasulkas represent this dialectic in their process of exploring the multi-dimensionality of video and the aesthetic possibilities of being present across a multitude of structures.

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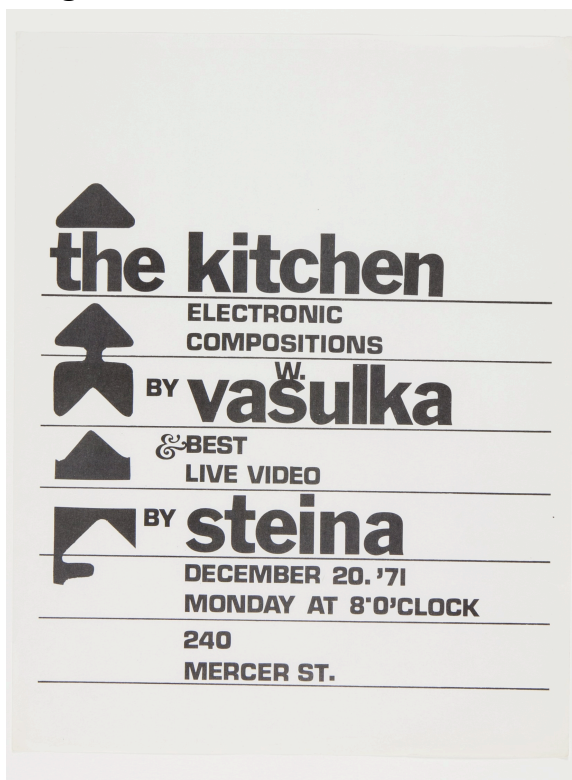
Appendix 1: Images

Image 1.1:



The Vasulkas in their studio in Buffalo, New York, circa 1977. Photo: Kevin Noble. The Daniel Langlois Foundation.

Image 1.2:



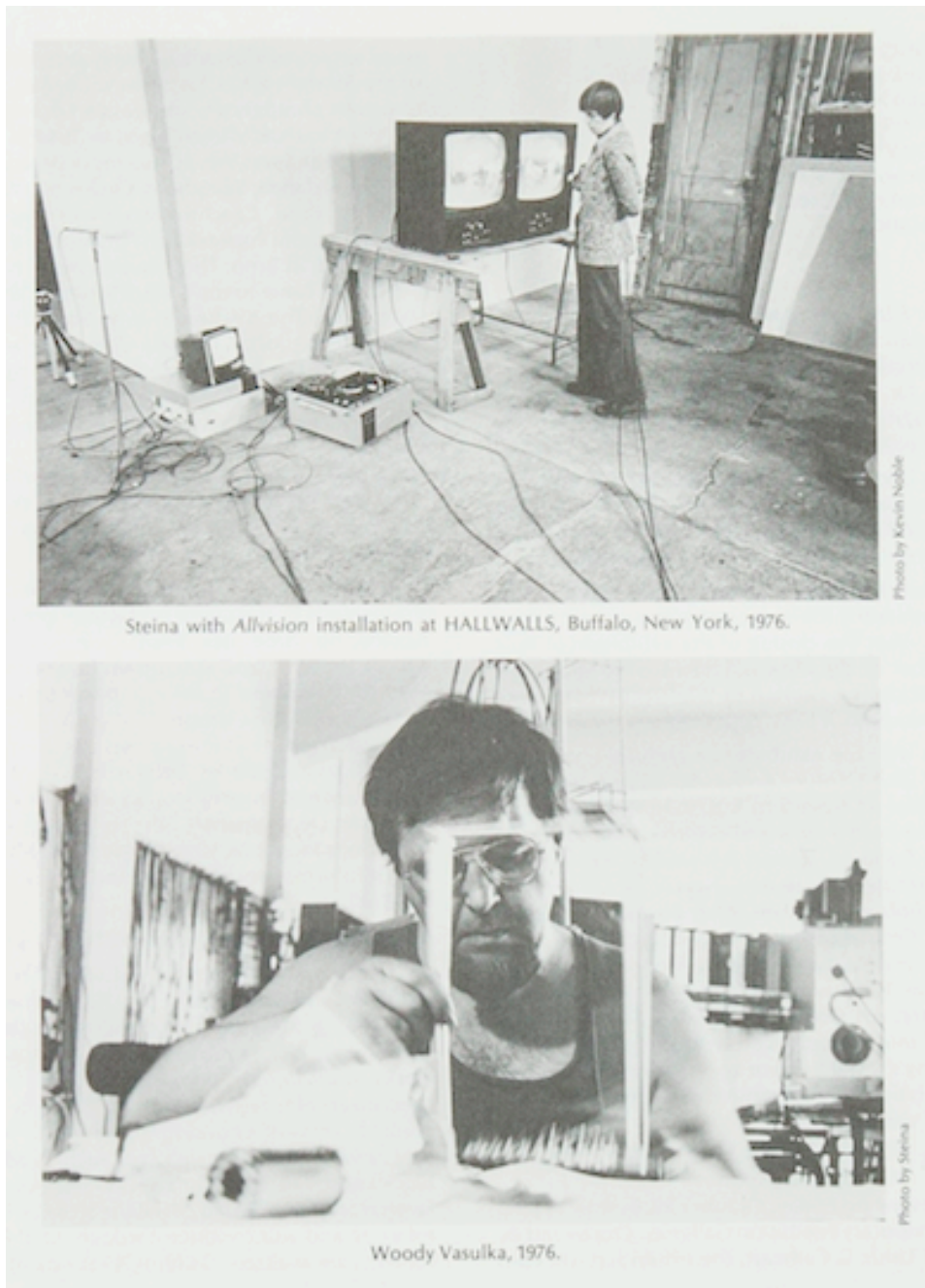
Early Flyer for The Kitchen, 1971. The Vasulka Chamber.

Image 3.1:



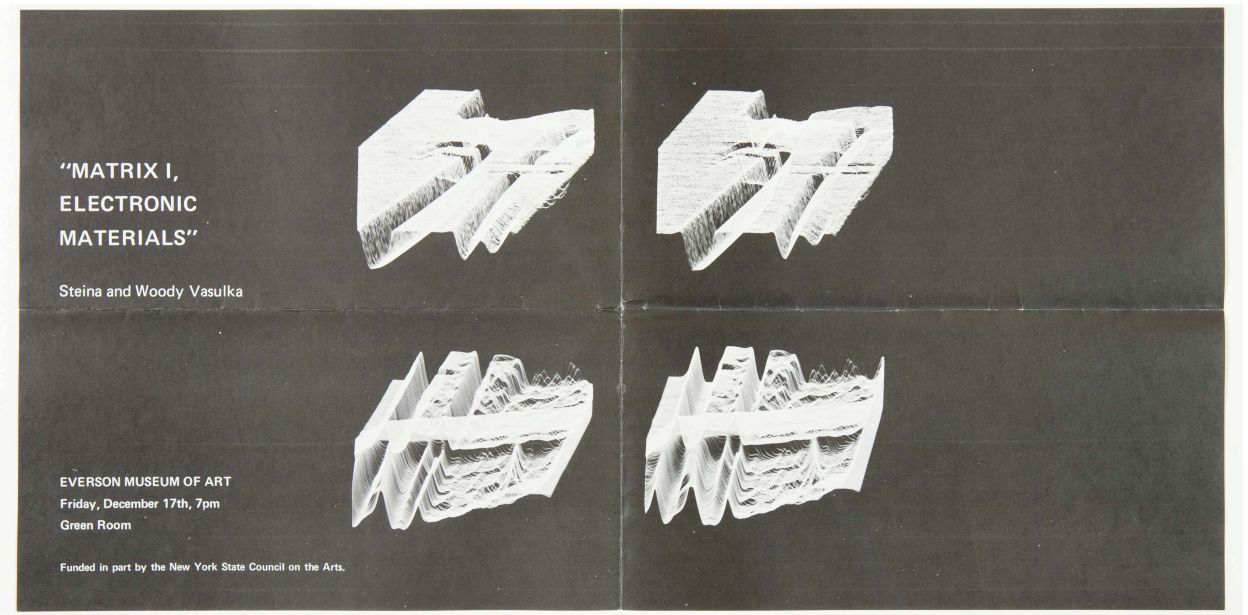
Sony introduces the world's first portable video recorder in 1967, the DV-2400.
http://www.smecc.org/sony_cv_series_video.htm.

Image 3.2:



From the Albright-Knox Catalogue Exhibition, 1978. The Vasulka Chamber.

Image 3.3:



“Matrix 1, Electronic Materials” Exhibition, 1970-72. The Vasulka Chamber.

Image 4.1:



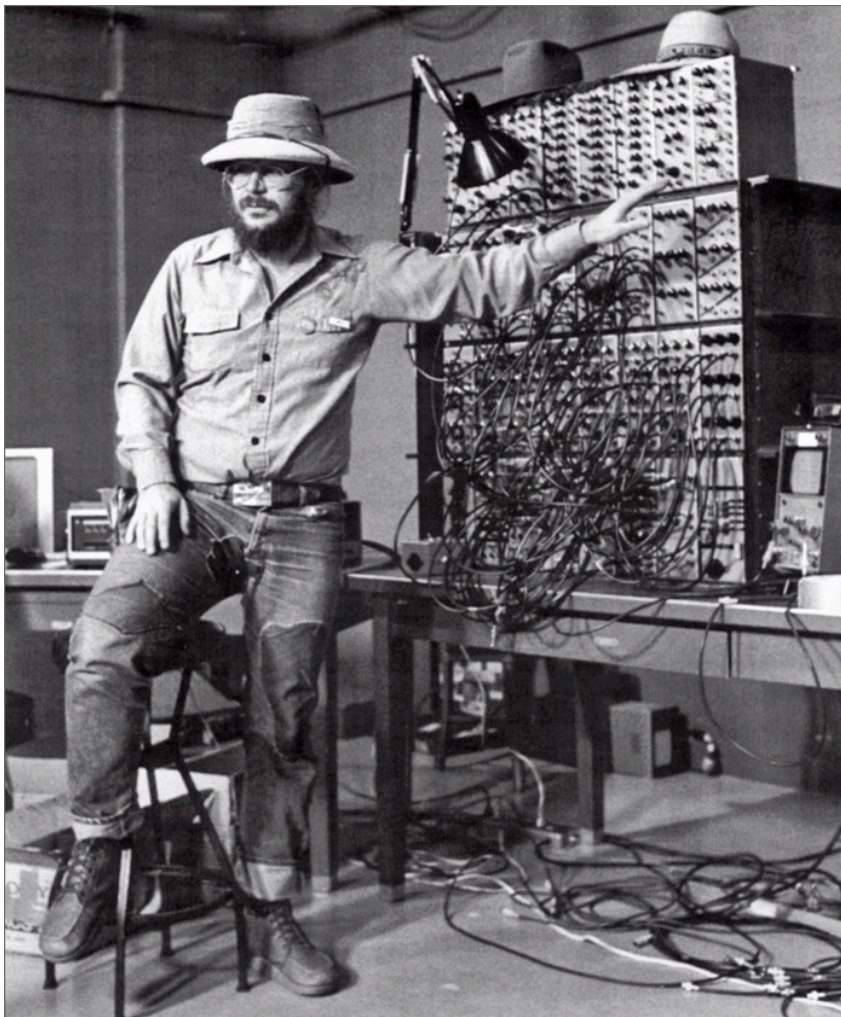
3-D Binocular Vision / "14 Street-Out" by Woody Vasulka and Alphonse Schilling.
Exhibition flyer, 1972. Electronic Arts Intermix,
<http://www.eai.org/artistSupportDocs.htm?id=8654&lookupId=34>

Image 4.2:



The Video Sequencer a.k.a Field Flip/Flop Switcher, 1972. From the *Eigenwelt der Apparatewelt* Exhibition Catalogue, 1992.

Image 4.3:



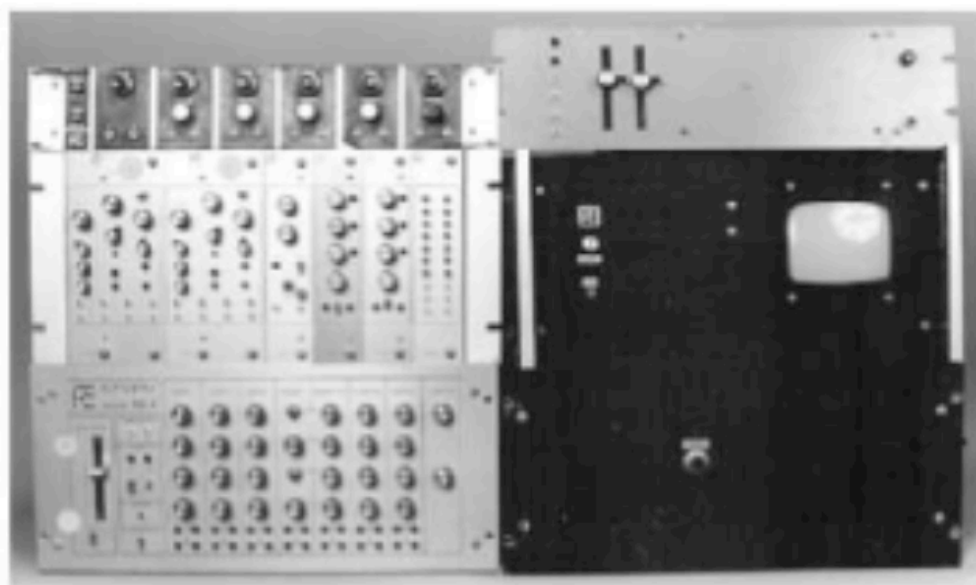
Dan Sandin with the Sandin Image Processor. <https://www.evl.uic.edu/dan/IP.html>

Image 4.4:



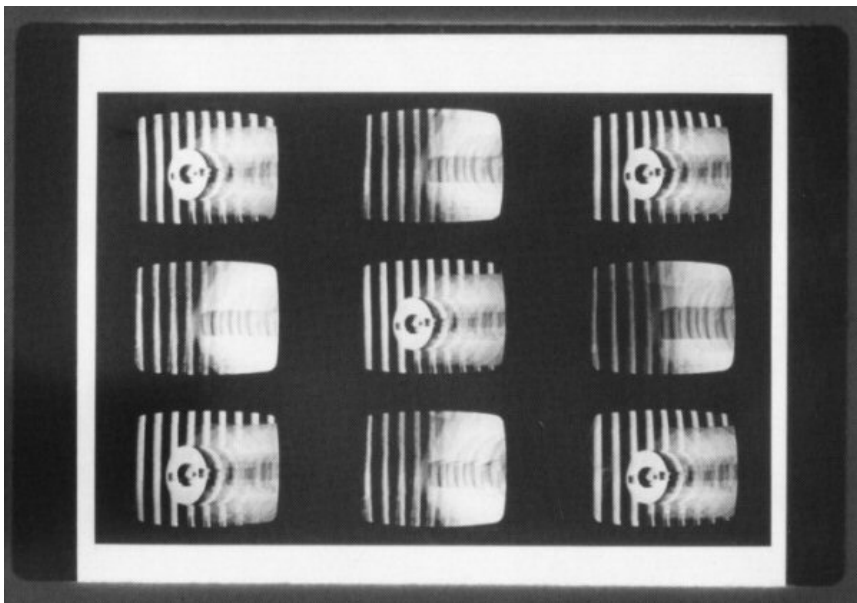
The Multi-Level Keyer, 1973. From the *Eigenwelt der Apparatewelt* Exhibition Catalogue, 1992.

Image 4.5:



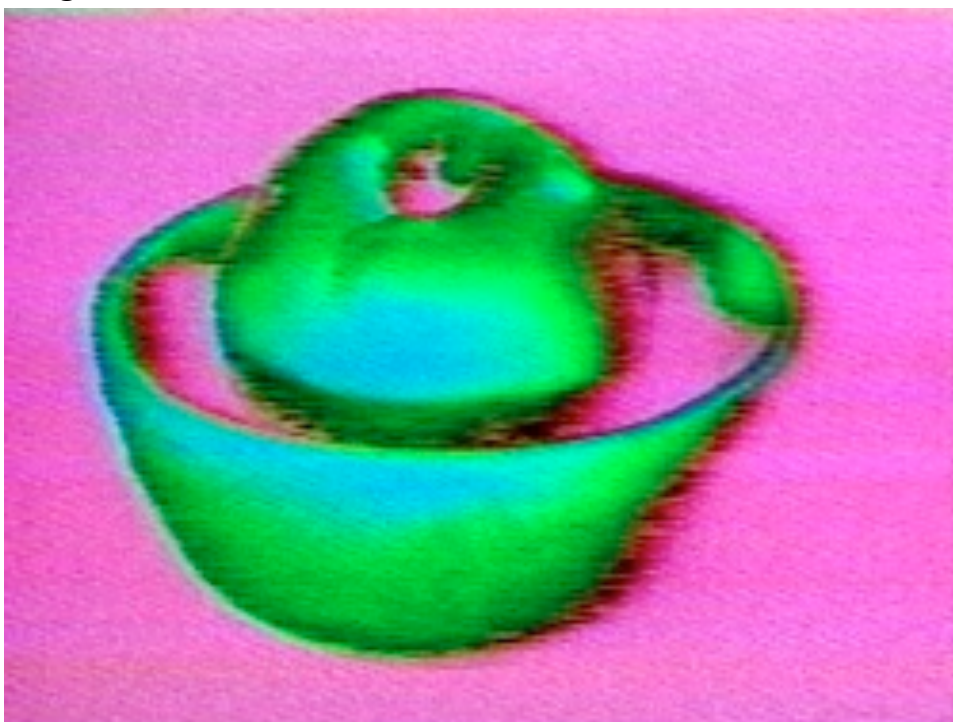
The Rutt/Etra Scan Processor, 1973. From the *Eigenwelt der Apparatewelt* Exhibition Catalogue, 1992.

Image 5.1:



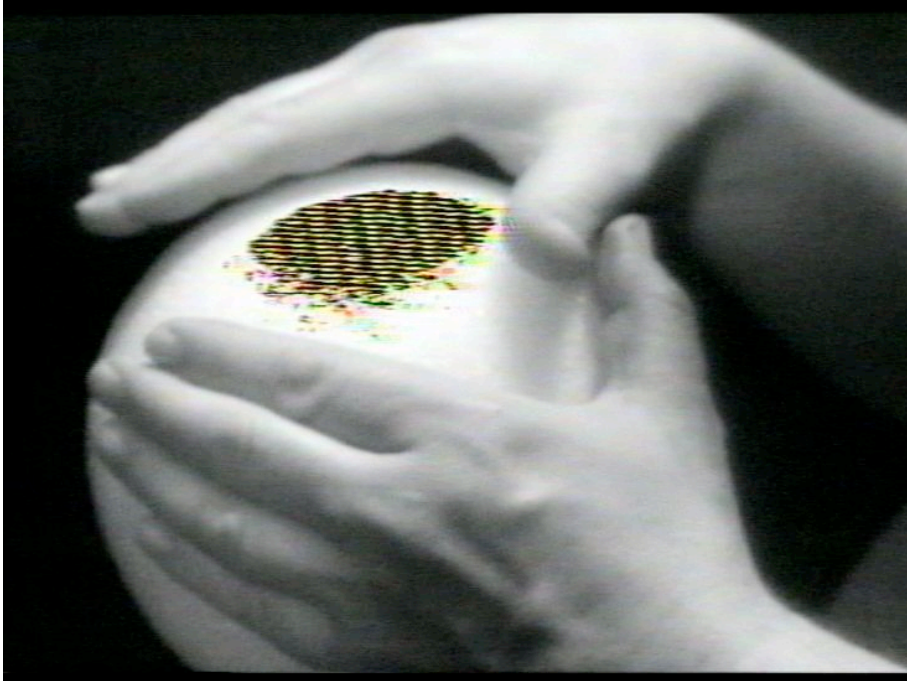
Discs, from *Matrix* series, 1970-72. The Daniel Langlois Foundation.

Image 5.2:



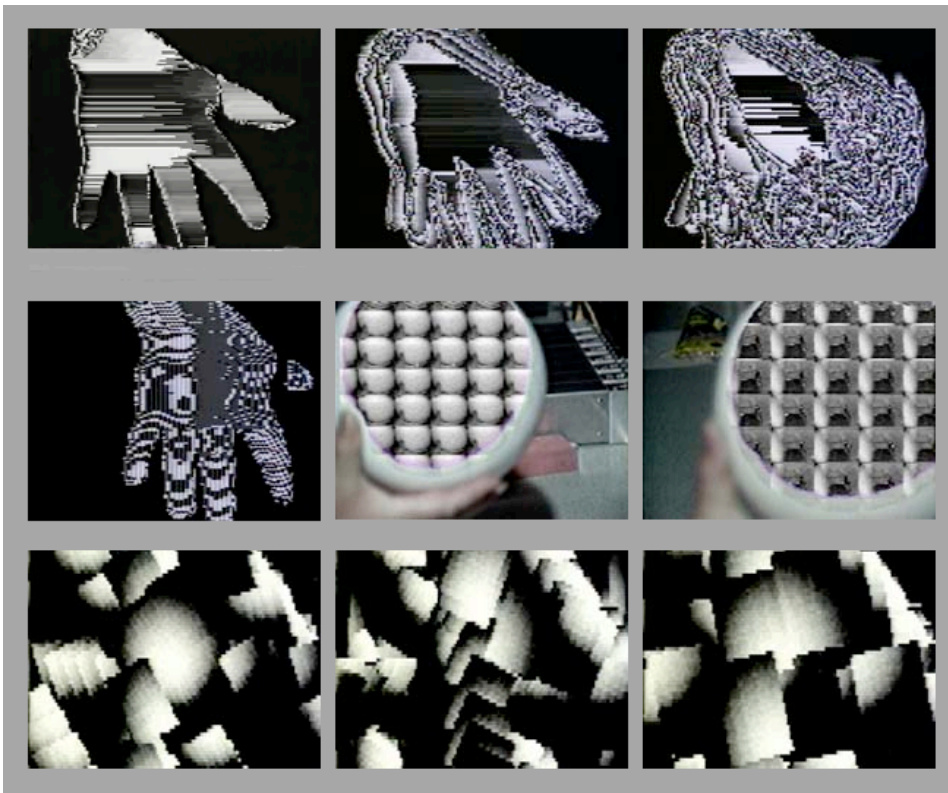
Home, 1973. Electronic Arts Intermix.

Image 5.3:



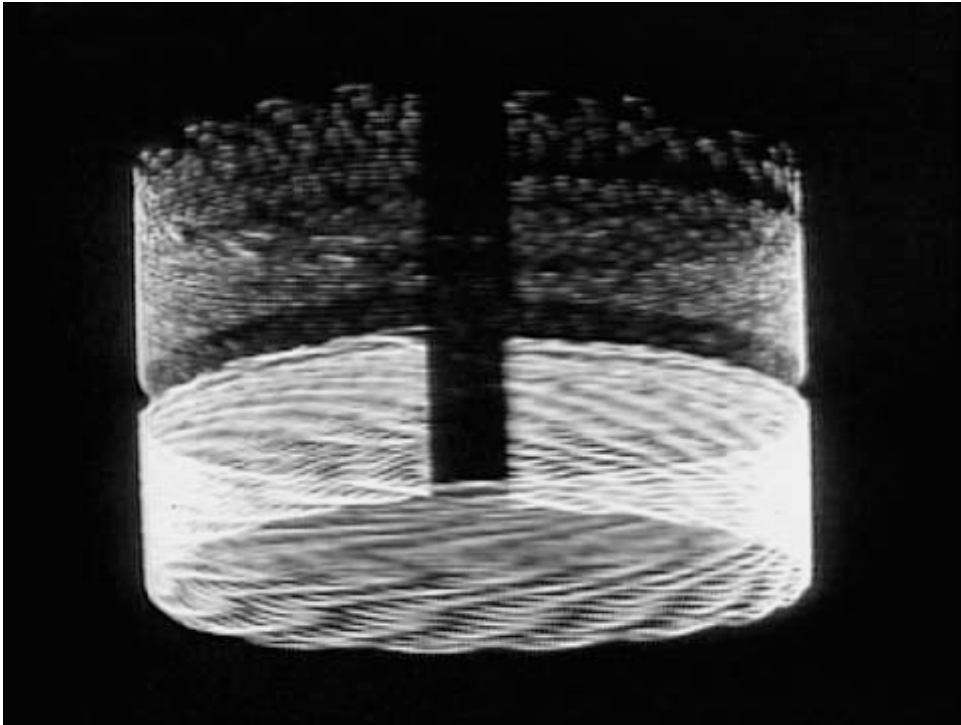
Vocabulary (still), 1973. Lima Foundation.

Image 5.4:



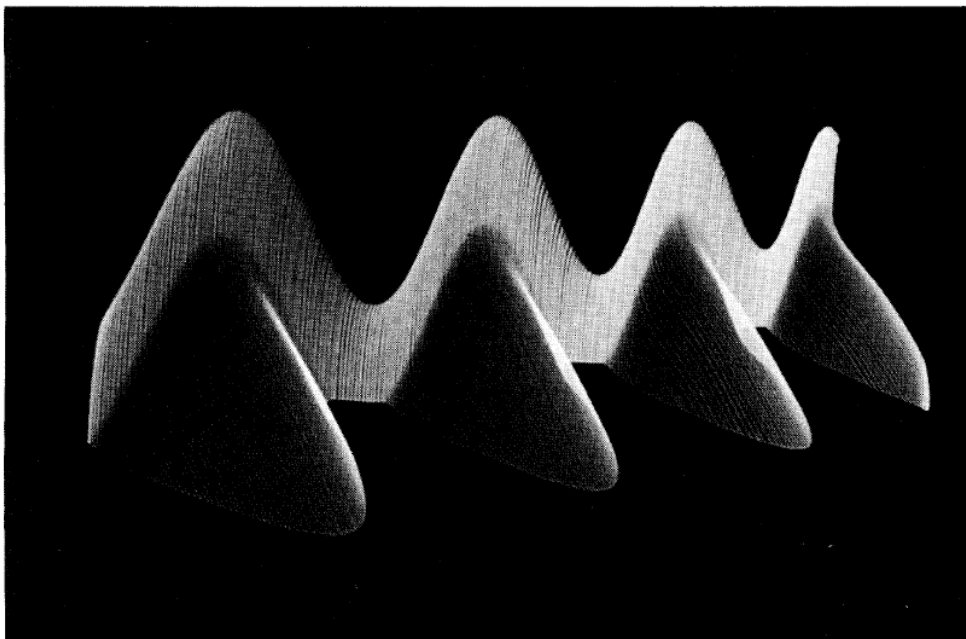
Artifacts (stills), Woody Vasulka, 1980. <http://www.iaslonline.de/>

Image 5.5:



Study No. 25, Steina and Woody Vasulka, 1975. Vasulka.org

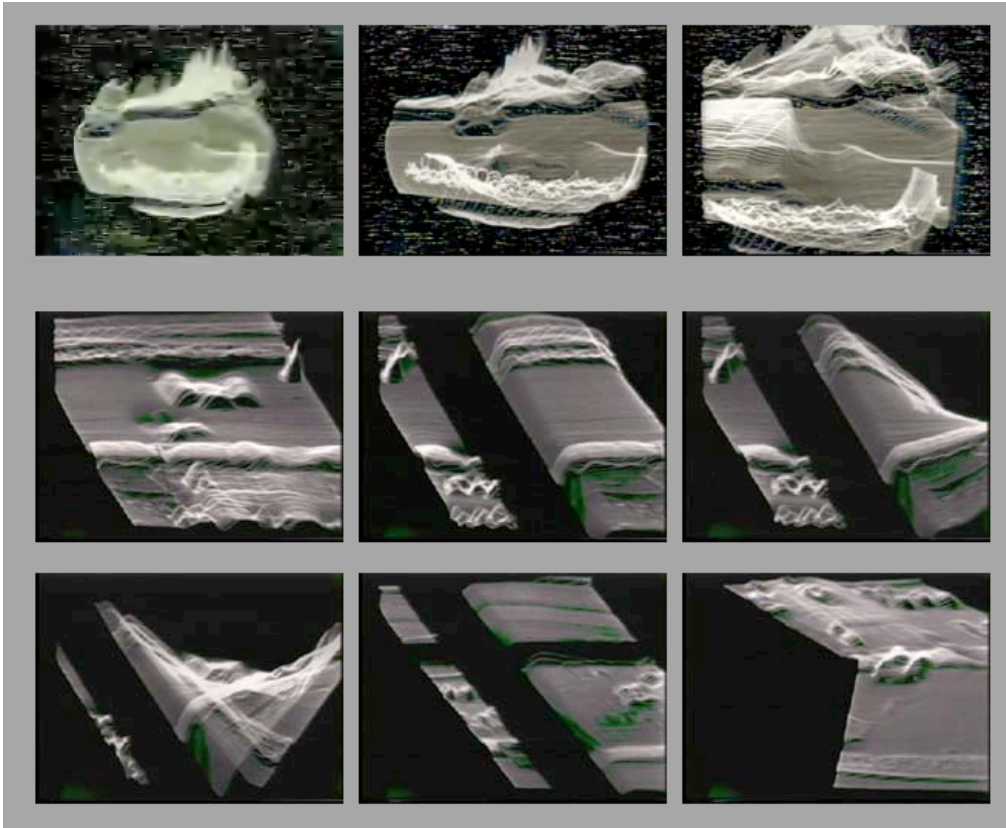
Image 5.6:



Woody Vasulka, Studies from Time - Energy Objects, 1975.

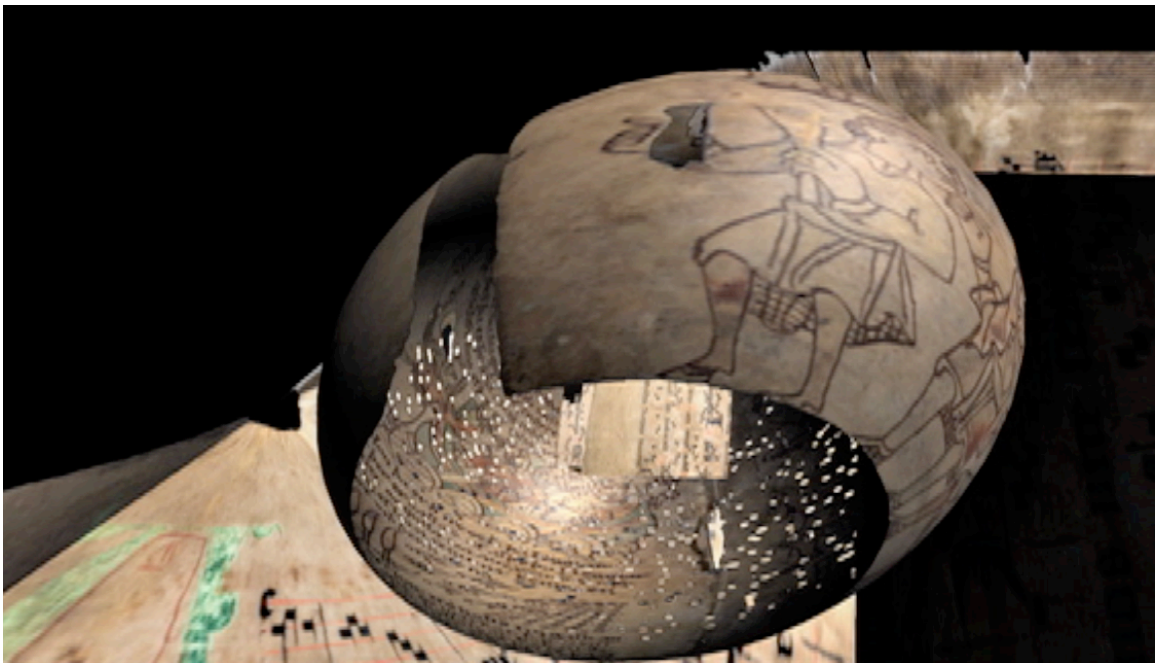
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Image 5.7:



C-Trend (stills), Steina and Woody Vasulka, 1974. Vasulka.org

Image 6.1:



Pergament / Bókfell, Steina, 2015. The Vasulka Chamber.

